4.1 AIR QUALITY AND GREENHOUSE GAS EMISSIONS

4.1.1 ENVIRONMENTAL SETTING

IN THIS SECTION:

- Regulatory Setting
- Regional & Project Setting
- Existing Air Quality Conditions
- Air Basin Plans
- Climate Change

The following section is based on an air quality and greenhouse gas emissions analyses prepared for the proposed project by Illingworth & Rodkin, Inc. The original analysis was prepared in March 2012 and was updated in December 2013. The updated report is included in Technical Appendix C-1, which is available on the DEIR CD, on the City of Petaluma website http://cityofpetaluma.net/cdd/riverfront.html, and on file for review at the City of Petaluma Community Development Department, Planning Division, located at 11 English Street in Petaluma, on Monday through Thursday between the hours of Hours: 8 AM to 12 PM and 1 PM to 5 PM.

The section also draws from analyses contained in the City of Petaluma *General Plan 2025* Environmental Impact Report (EIR) that was certified on May 19, 2008. The City's General Plan and EIR are also available for review at the Planning Division office and online at: http://cityofpetaluma.net/cdd/plan-general-plan.html.

REGULATORY SETTING

Federal Regulations

The Federal Clean Air Act (FCAA) and its amendments establish the National Ambient Air Quality Standards (NAAQS). These standards identify levels of air quality for "criteria" pollutants that are regarded as the maximum levels of ambient (background) air pollutants considered to have an adequate margin of safety needed to protect the public health and welfare. The "criteria pollutants" are ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur oxides (SO_2), respirable particulate matter with a diameter less than 10 microns (PM_{10}), fine particulate matter with a diameter less than 2.5 microns ($PM_{2.5}$), and lead. The U.S. Environmental Protection Agency (EPA) Region IX office oversees compliance with the FCAA.

State Regulations

CALIFORNIA CLEAN AIR ACT

The California Air Resources Board (CARB), a department of the California Environmental Protection Agency (CalEPA), oversees air quality planning and control throughout California. Its responsibility lies with ensuring compliance with the California Clean Air Act (CCAA) and its amendments, as well as responding to the FCAA requirements and regulating emissions from motor vehicles sold in California. It also sets fuel specifications to further reduce vehicular emissions. The amendments to the CCAA establish California Ambient Air Quality Standards (CAAQS) and a legal mandate to achieve these standards by the earliest practicable date. These standards apply to the same criteria pollutants as the FCAA and also include sulfates, visibility reducing particles, hydrogen sulfide, and vinyl chloride. In general, the state ambient air quality standards are more stringent than the national ambient air quality standards, notably ozone and PM_{10}.

The State of California is divided into 14 geographic air basins for the purpose of monitoring and controlling regional air quality. The project site is located in the San Francisco Bay Area Air Basin, which is under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). The District is the agency primarily responsible for assuring that national and state ambient air quality standards are attained and maintained in the San Francisco Bay Area. The District's jurisdiction includes all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo and Santa Clara Counties, and the southern portions of Solano and Sonoma Counties. Both the National and California ambient air quality standards have been adopted by the BAAQMD.

TOXIC AIR CONTAMINANTS

In addition to the California's Ambient Air Quality Standards, toxic air contaminants (TACs) are other pollutants that include carcinogens and noncarcinogens. These contaminants tend to be localized and are found in relatively low concentrations in ambient air. However, they can result in adverse chronic health effects including cancer. California regulates TACs through its air toxics program and Air Toxics "Hot Spots" Information and Assessment of the Health and Safety Code. The CARB identifies TACs in conjunction with the State Office of Environmental Health Hazard Assessment (OEHHA). Sources of TACs include industrial processes such as petroleum refining and manufacturing, commercial operations such as gasoline stations, dry cleaners, and motor vehicle exhaust. One of the TACs of greatest concern in California is diesel particulate matter, which is classified as a carcinogen (causes cancer).

Diesel particulate matter was identified as a toxic air contaminant (TAC) by the state of California in 1998. The CARB developed a comprehensive strategy to control diesel PM emissions, including preparation of the "Diesel Risk Reduction Plan." Once the Diesel Risk Reduction Plan was adopted, the CARB started developing emission regulations for a number

of categories of in-use diesel vehicles and equipment. An important part of the Diesel Risk Reduction Plan is a series of measures for various categories of in-use on- and off-road diesel engines, which are generally based on the following types of controls:

- Retrofitting engines with emission control systems, such as diesel particulate filters or oxidation catalysts,
- Replacement of existing engines with new technology diesel engines or natural gas engines, and,
- Restrictions placed on the operation of existing equipment.

REGIONAL & PROJECT SETTING

Regional Setting

Petaluma has a Mediterranean climate with cool wet winters and hot dry summers. The Petaluma Valley is bordered to the east by the Sonoma Mountains. To the west is a series of low hills, followed by the Estero Lowlands, which open to the Pacific Ocean. The region from the Estero Lowlands to the San Pablo Bay in the east is known as the Petaluma Gap. Winds move eastward through the Petaluma Gap, along the trough occupied by the Bodega Bay Highway. During winter storms, winds shift about 180 degrees, and come from the south-southeast.

Generally, air pollution potential is low in the Petaluma Valley because of its link to the Petaluma Gap and its low population density. However, there are two scenarios that can produce elevated pollutant levels: 1) stagnant conditions in the morning hours created when a weak ocean breeze meets a weak bay breeze, and 2) an eastern or southeastern offshore wind pattern in the afternoon brings in polluted air from the Central Valley and the Carquinez Strait region. Pollutants from Highway 101 are also carried by these winds into Downtown Petaluma. Localized air pollution can also occur from heavy industrial activities in the southwest subarea of the City.

Project Setting

The Riverfront project site is located within 1,000 feet of U.S. Highway 101 and Lakeville Highway (State Route 116). These roadways are sources of toxic air contaminant (particulate and diesel) emissions. Stationary sources affecting the project site were not identified within 1,000 feet of the site. There are no existing "sensitive receptors" contiguous to the project site. The BAAQMD's "CEQA Guidelines" (2010) defines sensitive receptors as "facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly and people with illnesses. Examples include schools, hospitals and residential areas." The closest sensitive receptors are the Mary Isaac Center, located approximately 300 feet west of the site and the existing residential units that are part

of the McNear Landing development, located south of the Petaluma River, approximately 200 feet from the north bank of the Petaluma River..

EXISTING AIR QUALITY CONDITIONS

The air quality within the San Francisco Bay Area Air Basin is influenced by a wide range of emissions sources, such as dense population centers, heavy vehicular traffic, and industry. With the assistance of the BAAQMD, CARB compiles inventories and projections of carbon monoxide (CO), reactive organic gas (ROG), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and particulate matter (PM_{10}) emissions for the Bay Area. Air quality is monitored at 32 sites within the San Francisco Bay Area Air Basin. ROG is included in the inventories because it is a precursor to ozone formation. The BAAQMD operates an air quality monitoring station in downtown Santa Rosa at 5th Street, approximately 15 miles north of Petaluma.

The San Francisco Bay Area air basin currently has a non-attainment status for the state 1-hour and 8-hour ozone standard, the federal ozone standard (8-hour), the state PM_{10} and $PM_{2.5}$ standards, and the federal 24-hour $PM_{2.5}$ standard. The basin is considered attainment for other state and national standards, except that it is unclassified for the federal one-hour NO_2 and PM_{10} standards and unclassified for the state hydrogen sulfide and "visibility reducing particles" standards.[1] (Basins are designated as attainment, non-attainment or unclassified for criteria pollutants addressed in state and federal air quality standards.)

AIR BASIN PLANS

On September 15, 2010, the Bay Area Air Quality Management District (BAAQMD) adopted its 2010 Clean Air Plan (2010 CAP). The 2010 CAP serves to update the Bay Area ozone plan in compliance with the requirements of the Chapter 10 of the California Health & Safety Code, and defines a control strategy that the BAAQMD and its partners will implement to: (1) reduce emissions and decrease ambient concentrations of harmful pollutants; (2) safeguard public health by reducing exposure to air pollutants that pose the greatest health risk; and (3) reduce greenhouse gas (GHG) emissions to protect the climate. The 2010 CAP provides a control strategy designed to:

- Reduce emissions of ozone precursors, PM, air toxics, and greenhouse gases;
- Continue progress toward attainment of state ozone standards;
- Reduce transport of ozone precursors to neighboring air basins;
- Protect public health by reducing population exposure to the most harmful air pollutants; and
- Protect the climate.

[1] Bay Area Air Quality Management District website. "Air Quality Standards & Attainment Status." Online at: http://hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm.

The control strategy set forth in the 2010 CAP propose a total of 55 control measures, including:

- 18 Stationary Source Measures;
- 10 Mobile Source Measures;
- 17 Transportation Control Measures;
- 6 Land Use and Local Impact Measures; and
- 4 Energy and Climate Measures.

CLIMATE CHANGE

Climate change refers to any significant change in measures of climate, such as average temperature, precipitation, or wind patterns over a period of time. Significant changes in global climate patterns have recently been associated with global warming, an average increase in the temperature of the atmosphere near the Earth's surface, attributed to accumulation of greenhouse gas (GHG) emissions in the atmosphere. Greenhouse gases trap heat in the atmosphere, which in turn heats the surface of the Earth. Some GHGs occur naturally and are emitted to the atmosphere through natural processes, while others are created and emitted solely through human activities. Other than water vapor, the GHGs contributing to global climate change include carbon dioxide, nitrous oxide, methane, chlorofluorocarbons, hydrofluorocarbons and perfluorocarbons (see Appendix C-1 for further discussion). In the United States, carbon dioxide emissions account for about 85 percent of the GHG emissions.

The State of California passed the Global Warming Solutions Act of 2006 (AB 32), which seeks to reduce GHG emissions generated by California to achieve 1990 emissions levels by the year 2020. Executive Order S-3-05 further requires that California's GHG emissions be 80 percent below 1990 levels by the year 2050. The California Air Resources Board (CARB) is the lead agency for implementing AB 32. In accordance with provisions of Assembly Bill 32 (AB 32), CARB completed a statewide GHG Inventory that provides estimates of the amount of GHGs emitted to, and removed from, the atmosphere by human activities within California. In accordance with requirements of AB 32, a Scoping Plan was adopted by CARB in December 2008. The Scoping Plan must be updated every five years. CARB is currently in the process of updating the Scoping Plan, and a discussion draft was released in October 2013.

The existing adopted Scoping Plan identifies 18 emissions reduction measures that address cap-and-trade programs, vehicle gas standards, energy efficiency, low carbon fuel standards, renewable energy, regional transportation-related greenhouse gas targets, vehicle efficiency measures, goods movement, solar roofs program, industrial emissions, high speed rail, green building strategy, recycling, sustainable forests, water and air (California Air Resources Board,

December 2008). Key elements for reducing the state's greenhouse emissions to 1990 levels by 2020 include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewables energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related greenhouse gas emissions for regions throughout California, and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State's long-term commitment to AB 32 implementation.

In June 2010, the Bay Area Air Quality Management District (BAAQMD) adopted revised CEQA Guidelines, which included thresholds of significance for greenhouse gas emissions. The Guidelines were subsequently updated in May 2011. The BAAQMD was the first regional air district to adopt numeric thresholds for greenhouse gas emissions from residential and commercial projects. The guidelines identified 1,100 metric tons (MT) of Carbon Dioxide equivalent per year (CO_2e/yr) or 4.6 MT/year[2] per service population (residents/employees) as a numeric emissions level below which a project's contribution to global climate change would be less than "cumulatively considerable."

4.1.2 IMPACTS AND MITIGATION MEASURES

CRITERIA FOR DETERMINING SIGNIFICANCE ANALYSIS

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines (including Appendix G), City of Petaluma plans, policies and/or guidelines, and agency and professional standards, a project impact would be considered significant if the project would:

1a Conflict with or obstruct implementation of the air quality management plan;

1b Violate any air quality standards or contribute substantially to an existing or projected air quality violation *i.e.* would generate construction-related exhaust emissions of Reactive Organic Gases (ROG), NOx or $PM_{2.5}$ greater than 54 pounds per day or PM_{10} greater than 82 pounds per day or would generate operational-related emissions of ROG, NOx or

[2] The reference gas used is CO_2, and GHG emissions are measured in metric tons of CO_2 equivalent.

$PM_{2.5}$ greater than 54 pounds per day (or 10 tons per year) or PM_{10} greater than 82 pounds per day (or 15 tons per year), pursuant to impact criteria for significance developed by the BAAQMD[3];

1c Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard;

1d Expose sensitive receptors (i.e. residents, schools, hospitals) to substantial pollutant concentrations, i.e. those that exceed the BAAQMD standards identified above and/or toxic air contaminants that exceed health exposure rates;

1e Create objectionable odors in substantial concentrations, affecting a substantial number of people;

1f Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment, i.e., would generate 1,100 MT of CO2e per year or an emission efficiency metric of 4.6 MT of CO2e per year per service population; or

1g Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The BAAQMD updated its CEQA Guidelines in June 2010 and in May 2011. The Guidelines included reference to thresholds of significance for the purpose of conducting CEQA air quality evaluations. The District's June 2010 adopted thresholds of significance were challenged in a lawsuit, and in March 2012, the Alameda Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the thresholds. The Court did not determine whether the thresholds were valid on the merits, but found that the adoption of the thresholds was a project under CEQA, and environmental review must be conducted. On August 13, 2013, the California Court of Appeals ruled that adoption of environmental thresholds by a public agency following the provisions of CEQA Guidelines Section 15064.7 is not a "project" under CEQA. The decision upheld the process followed by the BAAQMD to adopt its 2010 significance thresholds for criteria air pollutant emissions, toxic air contaminants (TAC), and greenhouse gases (GHGs). This decision has been appealed to the California Supreme Court. In any case, the BAAQMD thresholds were adopted following an extensive public review and research process, which provided substantial evidence in support of the thresholds. Scientific information supporting the thresholds was documented in BAAQMD's proposed thresholds of significance analysis[4]. Therefore, this Draft EIR relies on those thresholds for its analysis.

[3] The BAAQMD does not have a significance threshold for lead. This criteria pollutant is measured at levels well below ambient air quality standards (Illingworth & Rodkin, December 2013).

[4] Bay Area Air Quality Management District. December 7, 2009. "California Environmental Quality Act Guidelines Update – Proposed Thresholds of Significance."

IMPACT ANALYSIS

Based on the significance criteria identified above and on the analyses in the Revised Initial Study (Appendix A of this DEIR), the project would not conflict with or obstruct implementation of adopted air quality management plans (1a), or conflict with an applicable plan, policy or regulation adopted for the purpose of reducing greenhouse gas emissions (1g).

The following impact analyses address criteria pollutant emissions and potential violation of air quality standards (1b-c), exposure of sensitive receptors to substantial pollutant concentrations (1d), creation or exposure to objectionable odors in substantial concentrations (1e), and greenhouse gas emissions (1f).

Project Air Emissions

Impact 4.1-1 – *Criteria Pollutant Emissions*: The project would result in emissions during construction and from vehicles once development is complete, which would not be considered significant except for generation of fugitive dust during construction. This is considered a *potentially significant* impact.

The project would result in emissions during construction and from vehicles once development is complete, which would not be considered significant except for generation of fugitive dust during construction if not mitigated. Construction activities include grading and vehicle/equipment use. Major sources of emissions during grading and site preparation include exhaust emissions from construction vehicles; fugitive dust generated by construction vehicles and equipment traveling over exposed surfaces; and soil disturbances from grading and backfilling. Upon completion of construction, the proposed project will not result in stationary emissions, but future uses will result in less-than-significant mobile sources of operational emissions.

The project air quality analysis used the California Emissions Estimator Model (CalEEMod), which is currently being recommended by the BAAQMD. The results of the emissions calculations are presented in Table 4.1-1. As shown, the project would not exceed BAAQMD thresholds. Therefore, the project would not contribute substantially to existing or projected violations of air quality standards.

Although the project would not result in emissions that exceed BAAQMD thresholds, construction activities would increase fugitive dust locally and elevate levels of particulate matter downwind of construction, which is potentially significant if unmitigated. The BAAQMD significance criteria for particulate matter construction emissions are for exhaust emissions. Fugitive dust emissions are considered less than significant if BAAQMD-recommended Best Management Practices are implemented. Additionally, it is noted that the

project will be constructed in phases, which will reduce the level of emissions generated per phase, consistent with measures set forth in the City's General Plan (Policy 4-P-16).

TABLE 4.1-1: Project Air Emissions

Pollutant	Daily Total Project Emissions (lbs per day)	BAAQMD Threshold [1]
CONSTRUCTION EMISSIONS		
ROG	13.4	54
NO_x	34.8	54
PM_{10}	1.8	82
PM_{25}	1.7	54
OPERATIONS EMISSIONS		
ROG	35.9	54
NO_x	23.9	54
PM_{10}	0.5	82
PM_{25}	0.5	54

[1] Per BAAQMD's CEQA Guidelines: May 2011

SOURCE: Illingworth & Rodkin, December 2013

The City's General Plan EIR indicates that a substantial amount of construction and development would occur every year, but many individual projects would be small and generate construction and/or operational emissions that do not exceed the BAAQMD's recommended thresholds of significance. Although the City would not consider these projects to cause a potentially significant individual air quality impact, it would require each project to implement the proposed General Plan policies that address air quality in order to minimize emissions as part of the environmental review process for individual projects. The EIR indicates that implementation of Policy 4-P-16, which requires implementation of construction practices to reduce emissions, would reduce potential emissions to a less-than-significant level.

Project emissions are projected to be below the significance thresholds adopted by BAAQMD for evaluating impacts to ozone and particulate matter. Implementation of construction Best Management Practices as recommended by the Air District and project analysis, as well as measures required by the City's Engineering Division as conditions of project approval, will reduce impacts related to fugitive dust and related particulate emissions during construction to a less-than-significant level. Therefore, the project would not contribute substantially to existing or projected violations of ozone or particulate matter.

Carbon monoxide emissions from traffic generated by the project are also a concern as congested intersections with a large volume of traffic have the greatest potential to cause high-

localized concentrations of carbon monoxide. However, air pollutant monitoring data indicate that carbon monoxide levels in the Bay Area have been at healthy levels (i.e., below state and federal standards) since the early 1990s, and the region has been designated as attainment for the CO standard. An ambient air quality monitoring station in Santa Rosa measures carbon monoxide concentrations, and the highest measured level over any 8-hour averaging period during the last three years is less than 2.0 parts per million (ppm), compared to the ambient air quality standard of 9.0 ppm. The project would generate traffic that could contribute to these levels.

BAAQMD screening guidance indicates that projects would have a less-than-significant impact on carbon monoxide levels if project traffic would not increase at any affected intersection to more than 44,000 vehicles per hour. According to the project traffic report prepared for the project, the project could result in an increase of approximately 4,960 daily trips with approximately 430 PM peak hour trips. This would result in a total traffic volume of 3,652 AM peak hour trips at the Lakeville/Caulfield intersection, which is closest to the project site and would have the greatest trip increase associated with the project. Because traffic with the addition of the project would be substantially below the 44,000 vehicles per hour per intersection screening level, potential carbon monoxide emissions would be less-than-significant and would not cause or contribute to potential violations of air quality standards.

There are ambient air quality standards for other pollutants that were not addressed in this report. These include nitrogen dioxide (NO_2), sulfur dioxide (SO_2) and lead (Pb). These pollutants are measured at levels well below ambient air quality standards and, with the exception of NO_2, the project is not a source of emissions that would affect ambient levels. The project NOx emissions could affect NO_2 ambient levels, however, BAAQMD has not recommended thresholds that apply to NO_2 sources. Emissions of NOx are below the significance thresholds, and therefore, it can be assumed that the project would not cause or contribute to violations of NO_2 levels in the region.

California ambient air quality standards include industry specific contaminants, such as vinyl chloride and hydrogen sulfide. The project would not be a source of these emissions, and therefore, would not affect attainment of those standards.

Mitigation Measures

Implementation of Mitigation Measures AIR-1 and AIR-2 below are based on BAAQMD basic and additional measures, and as recommended in the project air quality report and in accordance with General Plan Policy 4-P-16 will mitigate construction-related PM_{10} and $PM_{2.5}$ emissions to a less-than-significant level. The measures are consistent with measures required in Mitigation 11-1 in the Central Petaluma Specific Plan EIR.

> MITIGATION AIR-1: Require implementation of the following measures during construction:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day or to a maintain a minimum soil moisture of 12%.
- All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 mph.
- The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time shall be limited. Activities shall be phased to reduce the amount of disturbed surfaces at any one time.
- All trucks and equipment, including their tires, shall be washed off prior to leaving the site.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt tracked-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 shall be prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 miles per hour.
- Site accesses to a distance of 100 feet from the paved road shall be treated with a 6 to 12 inch compacted layer of wood chips, mulch, or gravel.
- All paving shall be completed as soon as possible after pipeline replacement work is finished.
- Sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than one percent.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 2 minutes (California airborne toxics control measure Title 13, section 2485 of California Code of Regulations (CCR) establishes a maximum idling time of 5 minutes). Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with the manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
- Post a publicly visible sign with the telephone number and person to contact regarding dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.
- Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.
- Use low VOC (i.e., ROG) coatings beyond the local requirements (i.e., Regulation 8, Rule 3: Architectural Coatings).

AIR-2: Include the following measures as part of the construction specifications (General Plan Policy 4-P-16):

- Maintain construction equipment engines in good condition and in proper tune per manufacturer's specification for the duration of construction;
- Use alternative fuel construction equipment if available (i.e., compressed natural gas, liquid petroleum gas);
- Require that all construction equipment, diesel trucks, and generators be equipped with Best Available Control Technology for emission reductions of NOx and PM through the use of add-on control devices such as diesel oxidation catalysts or particulate filters; and
- Require all contractors use equipment that meets CARB's most recent certification standard for off-road heavy duty diesel engines.

Expose Sensitive Receptors

Impact 4.1-2a – *Expose Sensitive Receptors to Pollutants*: Portions of the proposed project would be subject to motor vehicle emissions from Highway 101, but sensitive receptors would not be exposed to substantial concentrations of pollutants. This is a *less-than-significant* impact.

According to the project air quality emissions analysis, operation of the project is not expected to cause any localized emissions that could expose sensitive receptors to unhealthy air pollutant levels. Stationary sources affecting the project site were not identified within 1,000 feet of the site. Construction activity would generate dust and equipment exhausts on a temporary basis; fugitive dust is discussed above (Impact 4.1-1) and diesel exhaust is discussed below (Impact 4.1-2b).

The project is located within 1,000 feet of U.S. Highway 101 and Lakeville Highway (State Route 116). These roadways are sources of toxic air contaminant (particulate and diesel) emissions that could affect new residents located at the project site. Additionally, the Sonoma-Marin Rail Transit (SMART) railroad lies about 100 feet from portions of the site that could include residences. The rail line currently experiences infrequent train activity. Eventually SMART trains and freight trains will be using this rail line on a regular basis. The only operational stationary source that would have a measurable impact upon the project site is the City of Petaluma Wastewater Pump Station at 950 Hopper Street, which is within 1,000 feet of the site. The plant includes an emergency generator that is powered by diesel fuel. As previously indicated, The BAAQMD defines sensitive receptors as facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly and people with illnesses; examples include schools, hospitals and residential areas.

BAAQMD screening modeling of nearby highways and associated emissions indicates that the cancer risk would be 6.6 or fewer chances per million, $PM_{2.5}$ concentrations would be 0.05 microgram per cubic meter ($\mu g/m^3$) or less, and the hazard index for acute or chronic risks would be less than 0.01. These levels are below BAAQMD's thresholds for significant community risk impacts based on single and cumulative thresholds, which are: cancer risk of 10 per million for single sources and 100 per million for cumulative; 0.3 $\mu g/m^3$ for $PM_{2.5}$ concentration; and 1.0 for maximum hazard index. The results are summarized in Table 4.1-2. Thus, the project would not expose sensitive receptors to substantial pollutant concentrations or result in a significant impact.

Mitigation Measures

None are required as a significant impact has not been identified.

TABLE 4.1-2: Exposure of Sensitive Receptors to Emission Sources

Source	Closest Distance (Feet)	Maximum Cancer Risk (Per Million)	Maximum Hazard Index	Maximum Annual $PM_{2.5}$ Concentration (ug/m^3)
Project Site Sensitive Receptors				
U.S. Highway 101	200	4.1	<0.1	0.04
Lakeville Highway (Route 116)	700	6.3	<0.1	0.05
Wastewater Pump Station Generator	400	3.9	0.0	0.01
NCRA and SMART Railroad	100	<6.6	0.0	0.01
Sum		***<22.2***	***<0.2***	***<0.11***
BAAQMD Threshold – Single Source		**10**	**1.0**	**0.3**
Significant		*No*	*No*	*No*
BAAQMD Threshold-Cumulative		**100**	**10.0**	**0.8**
Significant		*No*	*No*	*No*

Notes: The risks reported represent lifetime cancer risks and annual $PM_{2.5}$ concentrations.
SOURCE: Illingworth & Rodkin, December 2013

Impact 4.1-2b – *Expose Sensitive Receptors to Pollutants During Construction*: Onsite sensitive receptors could be exposed to substantial temporary concentrations of pollutant concentrations during construction due to diesel equipment exhaust. This is a *potentially significant* impact.

Construction of the proposed project would expose nearby sensitive receptors to emissions of TACs due to use of diesel construction equipment. Construction equipment and associated heavy-duty truck traffic generates diesel exhaust, which is a known TAC. As indicated under Impact AIR-1, these exhaust air pollutant emissions would not be considered to contribute substantially to existing or projected air quality violations.

The closest sensitive receptors (residences) to the project site are located over 350 feet from the project site, on the opposite side of the Petaluma River. Additional residences are located farther away to the northeast and northwest of the site. Much of the emissions would occur during the grading phase of construction, which would occur over a relatively brief duration. Closest residences to the project site would be exposed to construction emissions, but this brief exposure period would be substantially less than the exposure period typically assumed for health risk analysis, 70-year exposure period. However, construction activity would be ongoing to some degree over a period of 5 years and possibly longer.

A screening health risk assessment of the construction impacts to nearby existing residences was conducted. This risk assessment focused on modeling on-site construction activity using construction period emissions and were modeled using the CalEEMod model. Results of this assessment indicate that, with project construction, the incremental child cancer risk at the maximally exposed individual (MEI) would be 5.3 in one million and the adult incremental cancer risk would be 0.4 in one million. These predicted excess cancer risks are below the BAAQMD significance threshold of 10 in one million and would be considered a less than significant impact. The modeled maximum annual $PM_{2.5}$ concentration was 0.05 micrograms per cubic meter ($\mu g/m^3$) occurring at the same location where the maximum cancer risk occurs, which is well below the BAAQMD threshold of 0.3 $\mu g/m^3$ used to determine the significance of impacts for $PM_{2.5}$.

Potential non-cancer health effects due to chronic exposure to diesel particulate matter (DPM) were also evaluated. The chronic inhalation reference exposure level (REL) for DPM is 5 $\mu g/m^3$. The maximum predicted annual DPM concentration was 0.028 $\mu g/m^3$, which is much lower than the REL. The Hazard Index (HI), which is the ratio of the annual DPM concentration to the REL, is 0.006. This is much lower than the BAAQMD significance criterion of a HI greater than 1.0.

In addition, new residences constructed onsite as part of the project would be much closer to construction activity. It is anticipated that much of the grading work that results in the highest emissions would be completed before project sensitive receptors reside at the site. Construction related air quality impacts following mass grading would be considerably less.

A credible worst-case scenario for on-site exposure of sensitive receptors to construction impacts would be the construction and occupancy of the single-family portion of the site prior to construction of the mixed use portion. The single-family residences would be generally downwind of the construction activities at the mixed use portions of the site.

Construction emissions were computed for this scenario assuming a two-year build-out of the mixed use portion, beginning in 2016. Results of this assessment indicate that, with this portion of project construction and occupancy of the single-family residences, the incremental child cancer risk at the MEI would be 26.2 in one million and the adult incremental cancer risk

would be 1.4 in one million. These predicted excess cancer risks are above the BAAQMD significance threshold of 10 in one million and would be considered a significant impact.

The modeled maximum annual $PM_{2.5}$ concentration was 0.23 micrograms per cubic meter ($\mu g/m^3$) occurring at the same location where the maximum cancer risk occurs. This $PM_{2.5}$ concentration is below the BAAQMD threshold of 0.3 $\mu g/m^3$ used to determine the significance of impacts for $PM_{2.5}$.

It should be noted that this analysis is quite conservative in that it assumed complete occupancy of the residential portions of the project prior to any construction of the mixed use portions. These residences were assumed to be downwind of the mixed use construction activity. In addition, the continual presence of an infant/small child was assumed at these new residences for almost the entire construction period. Because the predicted cancer risk associated with this construction would exceed the significance threshold of 10 in one million chances, this impact is considered potentially significant.

In conclusion, the project would have *a less-than-significant* impact with respect to community risk caused by construction activities to off-site receptors, but a potentially significant impact to on-site receptors. Appendix C-1 includes the emission calculations used for the area source modeling, dispersion modeling inputs, and the cancer risk calculations.

Mitigation Measures

Implementation of the Mitigation Measures AIR-3 below will mitigate construction emissions on sensitive receptors to a less-than-significant level.

> AIR-3: Require that construction activities implement the following measures at the project sites to reduce construction equipment exhaust when building construction activities occur within 200 feet of residences. The contractor shall develop and the City shall approve a plan demonstrating that the off-road equipment (more than 50 horsepower and on site for more than 2 consecutive workdays) to be used in project construction (i.e., owned, leased, and subcontractor vehicles) would achieve an additional 60 percent reduction in exhaust particulate matter emissions, compared to similar equipment based on CARB statewide average emissions. Based on the CalEEMod modeling, a feasible method to achieve this objective would be the following:
>
> a. All diesel-powered construction equipment more than 50 horsepower used on-site during all construction phases for more than two days consecutively shall meet or exceed U.S. EPA Tier 2 standards for particulate matter emissions or substituted with alternatively fueled equipment (e.g., LPG fuel).
>
> b. Prohibit use of diesel-powered generators for more than two days when line power is available.

c. All non-mobile construction equipment shall be alternatively fueled or meet U.S. EPA Tier 2 standards for particulate matter emissions

Based on the CalEEMod modeling, implementation of this mitigation measure would reduce $PM_{2.5}$ exhaust emissions by 64 percent. This mitigation measure would reduce emissions such that on-site exposures would be less than significant (e.g., not cause significant cancer risk or $PM_{2.5}$ exposures) with a maximum child cancer risk of 9.3 in one million, thereby reducing temporary, construction-related impacts, to a less than significant level.

Objectionable Odors

Impact 4.1-3 – *Objectionable Odors*: Future construction and development of the site, resulting from the proposed project, will not result in the generation of objectionable odors in substantial concentrations. However, occupancy of the project site has the potential to expose new residents to objectionable odors. This is considered a *potentially significant* impact.

Potential sources of odor generated by the proposed project could occur during construction due to construction-related diesel equipment exhaust and asphalt and architectural coatings of the new buildings. These emissions would be localized and temporary and may be intermittently noticeable to some residents. However, they would be localized and are not likely to adversely affect people off site or generate confirmed odor complaints. Standard construction requirements such as use of low VOC coatings, limiting equipment idling time, and other basic control measures (see Mitigation Air-1 above) will be imposed upon the project and will further minimize odors. Construction-related odor emissions would be temporary, short-term, and intermittent in nature. Construction activities for the Riverfront project are not expected to generate odors in substantial concentrations that would affect a substantial number of people and impacts to air quality from the creation of objectionable odors would be less than significant.

The Riverfront project site is located immediately adjacent to the existing Primary Influent Pump (PIP) station that is operated by the City of Petaluma. The PIP station is located at 950 Hopper Street, contiguous to the northwest corner of the project site. The City has operated dry-weather pumps at the PIP station since 1999. In 2013 new pumps were installed. Pump stations can be a source of odors. The potential for odors is reduced through soil by soil bed filters.

Several site visits were conducted by the air quality consultant in an attempt to identify any offensive odors from the site. Some odors could barely be detected at the downwind side of the facility, but they were not considered to be offensive. The odors could not be detected on site and at locations where residences could be developed. There may be upset conditions

that may result in odors produced by this facility, however, given the separation distance these odors would probably not be frequent.

Although the PIP station has not generated any complaints related to objectionable odors, it should be noted that there are currently limited receptors in the vicinity of the pump station that would be affected by objectionable odors. Development of the Riverfront site would introduce future residents, guests, visitors and employees to the site that would be potentially exposed to objectionable odors emanating from the PIP Station. The BAAQMD CEQA Air Quality Guidelines consider five or more confirmed odor complaints per year (averaged over 3 years) as significant. Although the project would not result in objectionable odors, it is noted that future occupants at the site could be exposed to odors. Upgrading the pump station to provide odor control shall be implemented if complaints are received.

In order to ensure that future residents are not exposed to objectionable odors emanating from the pump stations the following measure is required in order to reduce potential impacts due exposure to odor to levels below significance.

Mitigation Measures

Implementation of Mitigation Measure AIR-4 below will reduce exposure of future residents to objectionable odors emitting from the PIP Station to a less-than-significant level.

> AIR-4: Provide reimbursement to the City for the design and construction of the Primary Influent Pump Station mechanical odor control unit. The odor control unit shall meet current design criteria and be equivalent to the units installed at recent pump station upgrades within the City.

Greenhouse Gas Emissions

Impact 4.1-4 – *Greenhouse Gas Emissions*: Future construction and development of the site, resulting from the proposed project, will result in greenhouse gas emissions that are below regional thresholds. This is a *less-than-significant* impact.

A greenhouse gas emissions analysis was prepared for the proposed project (Illingworth & Rodkin, 2012), which used the California Emissions Estimator Model (CalEEMod) Version 2013.2.2, as currently recommended by the BAAQMD. The analysis and follow-up memo, which are included in Appendix C-1, provide further background and details on the model assumptions. The project greenhouse gas emissions analysis assumed that construction-related emissions would occur over approximately five years, beginning in 2014 and continuing through the end of 2018. Under this scenario, construction of the project would emit up to 1,042 MT of CO_2e annually. Since the current buildout projection is approximately six years, there would be one additional year of construction. This includes emissions from construction

equipment, truck traffic and associated construction worker traffic. It does not include indirect emissions associated with the manufacturing and transport of building materials. These emissions, an average of 784 MT of CO_2e annually, were conservatively compared to the BAAQMD operational threshold of 1,100 MT of CO_2e per year and were determined to be a less-than-significant impact for the construction period.

The project GHG emissions analysis assumed that the project is not likely to be fully built and occupied prior to 2020, and thus, GHG emissions were computed for 2020. This is consistent with current development projections in which the project construction would be initiated in 2014 and completed within six years. The GHG emissions modeling results indicate that in 2020, annual emissions resulting from the proposed project would be 4,324 MT of CO2e. This represents a per capita emission of 4.06 MT of CO_2e per year per service population, which is less than the GHG emissions threshold of 4.6 MT of CO_2e per year per service population. The project service population includes residents and employees and was calculated by applying a rate of 2.64 persons per household, which is based on the latest census data (2006-2010) for the City of Petaluma. The service population also includes the number of workers. The project "Fiscal and Economic Impact Analysis" (FEIA) estimated that the project would produce 348 onsite workers.

The project fiscal analysis also estimated project residential population and used the City's average household size (although slightly higher at 2.67 persons per household), except it used a lower rate for apartments, which results in a slightly lower residential population (565) than estimated in the GHG emissions analysis (720). However, the average household size is based on Census data that includes all types of dwelling units, as well as vacant units. Thus, it is used as the standard tool of measurement used to forecast population, and is appropriate for the estimating the project's residential population.

Based on the results of the GHG emissions modeling, the project's GHG emissions would be less than the threshold adopted by the BAAQMD, the impact would be less-than-significant and would not be considered to have a cumulatively considerable contribution to a significant cumulative impact.

Mitigation Measures

None are required as a significant impact has not been identified.