APPENDIX A

Air Quality and Greenhouse Gas Emissions Technical Report

City of Los Angeles
Oil and Gas Drilling Ordinance
Air Quality and Greenhouse Gas Emissions Technical Report

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TABLE OF CONTENTS

Section		Page
1.0 Introduction		1
	1.1 Project Location	1
	1.2 Project Description	2
2.0 Air Quality		6
	2.1 Air Quality Setting	6
	2.2 Ambient Air Quality	9
	2.3 Existing Oil & Gas Air Quality Emissions	18
	2.4 Regulatory Framework	20
	2.5 Thresholds and Methodology	34
	2.6 Project Impacts	39
3.0 Greenhouse Gas		47
	3.1 Greenhouse Gas Setting	47
	3.2 Regulatory Framework	55
	3.3 Thresholds and Methodology	86
	3.4 Project Impacts	89

LIST OF FIGURES

Figure		Page
1	South Coast Source Receptor Areas in the City of Los Angeles	14

LIST OF TABLES

Table		Page
1	Criteria Pollutants Summary of Common Sources and Effects	9
2	Ambient Air Quality Standards	11
3	Air Quality Standard Attainment Statuses for the Los Angeles County Portion of SCAB	12
4	Air Monitoring Ambient Pollutant Concentrations by Source Receptor Ar5ea	15
5	Existing Oil & Gas Air Quality Emissions – Pounds per Day	19
6	City of Los Angeles Safety Element	33
7	South Coast AQMD Air Quality Significance Thresholds	36
8	Local Significance Thresholds By SRA – Pounds per Day	38
9	Oil & Gas Well Abandonment Emissions (Per Well) – Pounds Per Day	42
10	Avoided Oil & Gas Air Quality Emissions – Pounds per Day	43
11	Localized Oil & Gas Well Abandonment Emissions (Per Well) – Pounds Per Day	45
12	Atmospheric Lifetimes and Global Warming Potential for Greenhouse Gases	50
13	California Greenhouse Gas Emissions Inventory	54
14	Required Estimated Statewide Greenhouse Gas Emissions Reductions	72
15	Oil & Gas Well Abandonment GHG Emissions (Per Well)	90
16	Avoided Oil & Gas GHG Emissions	91

Appendices

A Sensitive Receptors

B Air Quality & GHG Technical Data

1.0 INTRODUCTION

This Air Quality and Greenhouse Gas Technical Report describes the potential air quality and greenhouse gas (GHG) impacts of the proposed Oil and Gas Drilling Ordinance (Ordinance or Project) to prohibit new oil and gas extraction and make existing extraction activities a nonconforming use in all zones within the City of Los Angeles (City). This report has been prepared by Impact Sciences, Inc. to support the Project's environmental documentation being prepared pursuant to the California Environmental Quality Act (CEQA). This analysis considers both the temporary air quality and GHG impacts that would result from the Ordinance and the long-term impacts associated with the implementation of the Ordinance.

1.1 PROJECT LOCATION

The Project is a citywide code amendment applicable within the boundaries of the City. The City has an approximate land area of 465 square miles (297,600 acres) with an estimated population of nearly 4.0 million residents in 2020 (3,898,747), according to the 2020 Census. The City lies within Los Angeles County which encompasses 4,000 square miles, 88 incorporated cities, and more than 10 million residents (10,014,009), according to the 2020 Census. The City is divided into 15 Council Districts and 35 Community Plan Areas. More than 87 percent of the City is developed with urban uses.

According to August 2022 data from the California Geologic Energy Management division (CalGEM), the City has 26 oil and gas fields that intersect city boundaries and 5,273 oil and gas wells. There are approximately 641 active, 1,350 idle, 35 canceled, and 3,247 plugged wells.[1] Of the City's idle wells, as of July 2022, 56 are orphan wells likely to have no responsible solvent operator. There are oil and gas facilities in nearly every section of the City.[2] While some wells are situated in heavy industrial areas, others are located within residential neighborhoods and amongst community parks and schools. Much of the existing oil drilling and extraction is within underserved communities throughout the City.

Wells are found in nearly all parts of the City including but not limited to the communities of Wilmington, Harbor Gateway, Downtown, West Los Angeles, South Los Angeles, and the Northeast San Fernando Valley. While some wells are situated in heavy industrial areas, others are located in neighborhoods within

1 An active well is an oil well that has been drilled and completed, an idle well is inactive and not producing, but capable of being reactivated, a canceled well is one where a well permit was canceled prior to drilling, and a plugged well has been plugged and sealed to current standards.

2 There are two gas storage fields within the City, the Aliso Canyon and the Playa Del Rey Fields, which are both operated by the Southern California Gas Company (SoCalGas). SoCalGas is the primary operator of underground natural gas fields, natural gas storage wells, and natural gas transmission facilities within the City. No natural gas wells operated by public utilities would be impacted by the Ordinance.

close proximity to residences, schools, and other sensitive uses. For a list of sensitive receptors located in proximity to wells throughout the City, please refer to **Appendix A** to this report.

1.2 PROJECT DESCRIPTION

The Project is a proposed ordinance amending Sections 12.03, 12.20, 12.23, 12.24, and 13.01 of the Los Angeles Municipal Code (LAMC) to (1) eliminate the provisions of the LAMC that allow for the creation of new "O" Oil Drilling Supplemental Use Districts; (2) end by-right oil and gas extraction in the M3-Heavy Industrial Zones; (3) declare existing oil and gas extraction within the City a nonconforming use to terminate within 20 years; and (4) prohibit new or expanded oil and gas extraction activities (such as the drilling of new wells or the redrilling or deepening of existing wells). The Ordinance permits maintenance of the wells that the Zoning Administrator determines is necessary to protect public health and safety or the environment. Twenty years from the effective date of the Ordinance, all nonconforming oil and gas extraction uses will terminate.

This Ordinance is not applicable to (1) common carrier oil pipelines intended for regionally-coordinated transport of hydrocarbons; (2) service stations or like uses; (3) refineries; and (4) oil and injection wells that are verified to be plugged and abandoned in accordance with all applicable local, state, and federal laws, rules and regulations, including the California Statutes and Regulations overseen by the California Geologic Energy Management division (CalGEM), and LAFD and for which the well pad has been restored suitably for its subsequent use, and (5) any well operated by a public utility regulated by the California Public Utilities Commission, including those operating at the Aliso Canyon and Playa Del Rey Gas Storage Fields.

The Ordinance does not set a specific timetable for the closure and abandonment of wells, regulate the abandonment of oil wells that have permanently ceased operation, or mandate or regulate the remediation of well sites where extraction has terminated permanently.[3]

The Ordinance will make existing oil and gas drilling operations legally nonconforming uses in the City, subject to a 20-year amortization period. Existing oil and gas extraction activities may continue to operate until the end of the amortization period after which time all drilling-related activities must cease. After a well ceases operation, current regulations require that the well be abandoned and plugged. However, the current regulations do not establish a set time period by which the abandonment process must be

[3] Public Resources Code Section 21000 requires that a lead agency identify all feasible mitigation measures that will avoid or substantially lessen the significant environmental effects of the project. This MND identifies areas of potentially significant impacts that would occur as a result of abandonment activities (See Noise, Geology and Soils). In accordance with CEQA, mitigation measures are proposed where such impacts could be reduced by their imposition.

completed after a well ceases operation. As stated above, the Ordinance does not regulate abandonment when well operations permanently cease.

Currently it is unknown as to how many oil wells will permanently cease operations prior to the 20 year expiration date. This is because the time period that each of the City's approximately 1,991 active and idle wells will permanently cease extraction and undergo abandonment depends on a number of individual factors. For example, upon the Ordinance becoming effective, some operators may choose to conclude operations immediately, while others may have contractual obligations to the landowners of the drilling sites and operate for a few years before the site is abandoned. Others may continue to operate until the end of the 20-year amortization period. However, once a well permanently ceases operation, there is a financial and economic incentive for the oil well operator to complete the abandonment process to reduce the costs of maintaining the well site. Therefore, because there is no reasonable way to accurately predict the timeline for cessation and abandonment at the individual level, this analysis instead assumes all oil drilling will cease 20 years from the effective date of the Ordinance as required. Abandonment of individual wells may occur at any time during the 20-year timeframe, and potentially beyond the 20-year timeframe.

Although not regulated by the Ordinance, well abandonment is a reasonably foreseeable outcome for many of the wells currently operating in the City, although as stated above, no specific timeline for abandonment currently exists and the Ordinance does not include any regulations related to the timing of the abandonment of oil wells. When a well is shut down, termination and abandonment activities will generally include (1) the cessation of production and drilling operations; (2) the closure and plugging of all oil and gas wells, including water flooding injection wells, except injection wells as permitted and demonstrated to be active and necessary by CalGEM; and (3) the plugging/capping of subsurface pipelines. Neither implementation of the Ordinance nor the oil well abandonment process should require excavation of previously undisturbed land and no new permanent structures would be constructed as part of the Project.

Termination activities of nonconforming oil and gas extraction must adhere to all applicable local, state, and federal laws, regulations, rules and standards, including the California Statutes and Regulations and all other requirements overseen by CalGEM as the principal regulatory authority for the closure of oil and gas extraction and production sites. Termination and abandonment activities will occur within previously disturbed and developed areas of the properties that encompass oil and gas extraction activities. In some cases, new access points may be necessary to allow for ingress/egress of equipment necessary to complete the abandonment of wells. However, no new permanent roads or permanent changes to existing roads would be necessary as part of the Project.

The closure of oil and gas wells entails plugging the wells in place in accordance with California Statutes and Regulations and all other applicable requirements as overseen by CalGEM. The process of well abandonment will be determined on a case-by-case basis under the regulatory supervision of CalGEM and the LAFD and will depend on individual site conditions such as type and depth of well. However, for the purposes of this environmental analysis, several generalized assumptions have been made based upon standard industry practice, existing regulations governing well abandonment, and case studies. While plugging and abandonment varies by well, there is a consistent set of procedures that are followed. Generally, the drill site's existing drilling or maintenance rig will be used to abandon the well and remove equipment from the well.[4] Well equipment will be removed from the site by truck. Cement trucks will also arrive onsite to fill the well at various depths over a span of several days. An operator may use in excess of 2,500 cubic feet of cement for one abandonment. The process entails removing equipment and filling the well with cement at different phases in order to ensure that it is safe to abandon the well at varying depths. At the end of each work day, the well site is closed and the rig is shut down in order to resume operations the following work day. CalGEM conducts inspections at certain milestones for this scope of work, including the following:

- Operators conduct a series of pressure tests on the wells to identify that there are no leaks or that the pressure is unsafe to work on the well. A test to measure any levels of hydrogen sulfide is common.

- Operators use a drilling or maintenance rig to work on the well and prepare blowout prevention equipment for the well that will be plugged.

- CalGEM inspects the blowout prevention equipment to ensure that it is safe for the operator to continue with plugging and abandonment work.

- Operators use the rig to pull out various cables, tubing, and other connections from the well casing.

- Operators may require the use of brine water to clean out different segments of the well. If no debris or sand is observed, then the operators continue using the rig to remove cables, tubing, and more connections from the well.

- After the operator has removed the sufficient amount of tubings, casing, and connections and there are minimal amounts of debris observed, then the operator will bring a cement truck to begin pouring fresh water and cement mix down the well. CalGEM is required to observe this first segment of pouring

4 When a drilling or maintenance rig is not on the well site, a rig will need to be brought to the site to complete the abandonment process.

as the inspector is looking to observe that the bottom hole is filled with the appropriate amount of cement.

- The operator continues to remove casings and tubings with support of the rig while also pouring cement down the well at depths deemed safe and clear enough to pour cement. Pressure testing of the well is frequently conducted to identify any safety risks.

- As the work nears the top segment of the well, the operator continues to use the rig and cement trucks are brought to the drill site to fill the well with cement. The ending segment can include up to 600 cubic feet of cement into the well's casings in order to displace any well fluids or debris. The operator will fill the well casing to the near very top and this process is observed by CalGEM and by the Los Angeles Fire Department.

- At the conclusion, the operator removes any blowout prevention equipment from the rig and the well is closed and steel welded with the API Number and the LAFD Well Number identified on the top cover.

Given the varied timeline of individual well abandonment and the fact the Ordinance does not establish any regulations related to well site remediation or redevelopment (except where mitigation measures are required to reduce identified potentially significant impacts), it would be speculative to contemplate when site remediation would occur after the wells are abandoned and the types of redevelopment and future land uses that may occur on former drill sites. What might get built and at what intensity or scale is not possible to identify or analyze at this time. Therefore, the scope of analysis in this Initial Study is limited to (1) cessation of oil and gas extraction in the city and (2) abandonment activities that are reasonably foreseeable. The analysis does not examine impacts from remediation and/or future development. Those impacts would be analyzed in subsequent environmental analyses at either the programmatic or project level.

2.0 AIR QUALITY

2.1 AIR QUALITY SETTING

South Coast Air Basin

South Coast Air Basin Characteristics

The California Air Resources Board (CARB) divides the state into air basins that share similar meteorological and topographical features. The City of Los Angeles is located within the South Coast Air Basin (SCAB). The SCAB is the geographic region over which the South Coast Air Quality Management District (SCAQMD) has regulatory jurisdiction and encompasses 6,745 square miles covering all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. The SCAB is a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean to the west; the San Gabriel, San Bernardino and San Jacinto Mountains to the north and east; and the San Diego County line to the south.

Temperature and Precipitation

The general region lies in the semi-permanent high-pressure zone of the eastern Pacific, resulting in a mild climate tempered by cool sea breezes with light average wind speeds. It is considered semi-arid and is characterized by warm summers, mild winters, infrequent seasonal rainfall, moderate daytime onshore breezes, and moderate humidity. This usually mild climatological pattern is interrupted occasionally by periods of extremely hot weather, winter storms, or Santa Ana winds. The annual average temperature varies little throughout the SCAB region, ranging from the low 60s to the high 80s, measures in degrees Fahrenheit (F°). With a more pronounced oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than inland areas.

In contrast to a very steady pattern of temperature, rainfall is seasonally and annually highly variable. Almost all annual rains fall between November and April. Summer rainfall is normally restricted to widely scattered thundershowers near the coast, with slightly heavier shower activity in the east and over the mountains.

Humidity

Although the SCAB has a semiarid climate, the air near the earth's surface is typically moist because of the presence of a shallow marine layer. Except for infrequent periods when dry, continental air is brought into the SCAB by offshore winds, the "ocean effect" is dominant. Periods of heavy fog, especially along the

coast, are frequent, and low clouds, often referred to as high fog, are a characteristic climate feature. Annual average humidity is 70 percent at the coast and 57 percent in the eastern portions of the SCAB.

Wind

Wind patterns across the south coastal region are characterized by westerly or southwesterly onshore winds during the day and by easterly or northeasterly breezes at night. Wind speed is higher during the dry summer months than during the rainy winter.

Between periods of wind, air stagnation may occur in both the morning and evening hours. Air stagnation is one of the critical determinants of air quality conditions on any given day. During the winter and fall, surface high-pressure systems over the SCAB, combined with other meteorological conditions, can result in very strong, downslope Santa Ana winds. These winds normally continue a few days before predominant meteorological conditions are reestablished.

The mountain ranges to the east affect the diffusion of pollutants by inhibiting the eastward transport of pollutants. Air quality in the SCAB generally ranges from fair to poor and is similar to air quality in most of coastal Southern California. The entire region experiences heavy concentration of air pollutants during prolonged periods of stable atmospheric conditions.

Inversions

In conjunction with the two characteristic wind patterns that affect the rate and orientation of horizontal pollutant transport, two similarly distinct types of temperature inversions control the vertical depth through which pollutants are mixed. These inversions are the marine/subsidence inversion and the radiation inversion. The height of the base of the inversion at any given time is known as the "mixing height."

The SCAB experiences a persistent temperature inversion (increasing temperature with increasing altitude) as a result of the Pacific high air masses in the lower atmosphere that effectively trap pollutants near the Earth's surface by limiting vertical mixing, especially in the summer. Atmospheric temperature typically decreases with altitude. However, under inversion conditions, temperature increases as altitude increases, thereby preventing air close to the ground from mixing with the air above it. The combination of winds and inversions is a critical determinant leading to highly degraded air quality in the summer and generally good air quality in the winter in Los Angeles.

Air Pollutants of Concern

Criteria air pollutants are defined as pollutants for which the federal and state governments have established ambient air quality standards for outdoor concentrations. The federal and state standards have been set at levels above which concentrations could be harmful to human health and welfare. These standards are designed to protect the most sensitive persons such as children, pregnant women, and the elderly, from illness or discomfort. Criteria air pollutants include ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter 2.5 microns or less in diameter (PM2.5), particulate matter ten microns or less in diameter (PM10), and lead (Pb). Note that reactive organic gases (ROGs), which are also known as reactive organic compounds (ROCs) or volatile organic compounds (VOCs), and nitrogen oxide (NOx) are not classified as criteria pollutants. However, ROGs and NOx are widely emitted from land development projects and participate in photochemical reactions in the atmosphere to form O_3; therefore, NOx and ROGs are relevant to the proposed project and are of concern in the air basin and are listed below along with the criteria pollutants. Sources and health effects commonly associated with criteria pollutants are summarized in **Table 1, Criteria Pollutants Summary of Common Sources and Effects**.

Table 1
Criteria Pollutants Summary of Common Sources and Effects

Pollutant	Major Man-Made Sources	Human Health & Welfare Effects
Carbon Monoxide (CO)	An odorless, colorless gas formed when carbon in fuels is not burned completely; a component of motor vehicle exhaust.	Reduces the ability of blood to deliver oxygen to vital tissues, affecting the cardiovascular and nervous system. Impairs vision, causes dizziness, and can lead to unconsciousness or death.
Nitrogen Dioxide (NO2)	A reddish-brown gas formed during fuel combustion for motor vehicles and industrial sources. Sources include moto vehicles, electric utilities, and other sources that burn fuel.	Respiratory irritant; aggravates lung and heart problems. Precursor to ozone and acid rain. Contributes to global warming and nutrient overloading which deteriorates water quality. Causes brown discoloration of the atmosphere.
Ozone (O3)	Formed by a chemical reaction between volatile organic compounds (VOC) and nitrous oxides (NOx) in the presence of sunlight. VOCs are also commonly referred to as reactive organic gases (ROGs). Common sources of these precursor pollutants include motor vehicle exhaust, industrial emissions, gasoline storage and transport, solvents, paints, and landfills.	Irritates and causes inflammation of the mucous membranes and lung airways; causes wheezing, coughing, and pain when inhaling deeply; decreases lung capacity; aggravates lung and heart problems. Damages plants; reduces crop yield. Damages rubber, some textiles, and dyes.
Particulate Matter (PM10 & PM2.5)	Produced by power plants, steel mills, chemical plants, unpaved roads and parking lots, wood-burning stoves and fireplaces, automobiles, and others.	Increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing; aggravated asthma; development of chronic bronchitis; irregular heartbeat; nonfatal heart attacks; and premature death in people with heart or lung disease. Impairs visibility (haze).
Sulfur Dioxide (SO_2)	A colorless, nonflammable gas formed when fuel containing sulfur is burned; when gasoline is extracted from ore. Examples are petroleum refineries, cement manufacturing, metal processing facilities, locomotives, and ships.	Respiratory irritant; aggravates lung and heart problems. In the presence of moisture and oxygen, sulfur dioxide converts to sulfuric acid which can damage marble, iron, and steel. Damages crops and natural vegetation. Impairs visibility. Precursor to acid rain.

Source: CAPCOA, Health Effects. Available: http://www.capcoa.org/health-effects/

2.2 AMBIENT AIR QUALITY

Air pollutant emissions in the SCAB are generated by stationary and mobile sources. Stationary sources can be divided into two major subcategories: point sources and area sources. Point sources occur at an identified location and are usually associated with manufacturing and industry. Examples of point sources are boilers or combustion equipment that produce electricity or generate heat. Area sources are widely distributed and produce many small emissions. Examples of area sources include residential and commercial water heaters, painting operations, lawn mowers, agricultural fields, landfills, and consumer products, such as barbeque lighter fluid and hair spray. Mobile sources are emissions from motor vehicles, including tailpipe and evaporative emissions, and are classified as either on-road or off-road. On-road sources may be legally operated on roadways and highways. Off-road sources include aircraft, ships, trains,

race cars, and self-propelled construction equipment. Air pollutants can also be generated by the natural environment, such as when fine dust particles are pulled off the ground surface and suspended in the air during high winds.

Ambient air quality is determined primarily by the type and amount of pollutants emitted into the atmosphere, as well as the size, topography, and meteorological conditions of a geographic area. The SCAB has low mixing heights and light winds, which help to accumulate air pollutants. Exhaust emissions from mobile sources generate the majority of ROG, CO, NO_X, and SO_X both in the SCAB generally and specifically the Los Angeles County portion of the SCAB. Area-wide sources generate the most airborne particulates (i.e., PM10 and PM2.5) in both the SCAB and Los Angeles County. The determination of whether a region's air quality is healthful or unhealthful is made by comparing contaminant levels in ambient air samples to national and state standards. Measurements of ambient concentrations of criteria pollutants are used by the U.S. EPA and the CARB to assess and classify the air quality of each air basin, county, or, in some cases, a specific urbanized area.

The federal Clean Air Act (CAA) requires U.S. EPA to designate areas as attainment, nonattainment, or maintenance (previously nonattainment and currently attainment) for each criteria pollutant (O_3, NO_2, CO, SO_2, PM10, PM2.5, and Pb) based on whether the National Ambient Air Quality Standards (NAAQS) have been achieved. The NAAQS are summarized in **Table 2**. The classification is determined by comparing actual monitoring data with national standards. If a pollutant concentration measured over time in a particular area consistently remains below the standard level, the area is classified as being in "attainment" of the air quality standard. If the pollutant concentration exceeds the standard, the area is classified as a "nonattainment" area. If the agencies are unable to gather sufficient data to determine whether the standard is met in an area, the area is typically designated as "unclassified." The U.S. EPA has classified the Los Angeles County portion of the SCAB as a nonattainment area for O_3, PM2.5, and Pb, as presented in **Table 2**, below.

Table 2
Ambient Air Quality Standards

Air Pollutant	Averaging Time	State Standard	Federal Standard
Ozone (O3)	1-Hour	0.09 ppm	-
	8-Hour	0.07 ppm	0.07 ppm
Carbon Monoxide (CO)	1-Hour	20.0 ppm	35 ppm
	8-Hour	9.0 ppm	9 ppm
Nitrogen Dioxide (NO2)	1-Hour	180 ppb	100 ppb
Sulfur Dioxide (SO2)	1-Hour	250 ppb	75 ppb
	24-Hour	40 ppb	140 ppb
Sulfates (SO4)	24-Hour	25 μg/m3	-
Fine Particulate Matter (PM2.5)	24-Hour	-	35 μg/m3
	Annual Arithmetic Mean	12 μg/m3	12 μg/m3 (Primary) 15 μg/m3 (Secondary)
Respirable Particulate Matter (PM10)	24-Hour	50 μg/m3	150 μg/m3
Lead (PB)	30-Day Average	1.5 μg/m3	-
	Calendar Quarter	-	1.5 μg/m3 (for certain areas)
	Rolling 3-Month Average	-	0.15 μg/m3

Source: CARB, Ambient Air Quality Standards, 2016. Available at: https://ww2.arb.ca.gov/sites/default/files/2020-07/aaqs2.pdf, accessed November 2021.
Notes: ppm = parts per million; ppb = parts per billion; μg/m³ = microgram per cubic meter.

The California Clean Air Act (CCAA) requires the CARB to designate areas within California as either attainment or nonattainment for each criteria pollutant based on whether the California Ambient Air Quality Standards (CAAQS) have been achieved. As shown in **Table 2**, the CAAQS are generally more stringent than the NAAQS; and additional state standards are specified for sulfates, hydrogen sulfide (H_2S), vinyl chloride, and visibility-reducing particles. Under the CCAA, areas are designated as nonattainment for a pollutant if air quality data shows that a state standard for the pollutant was violated at least once during the previous three calendar years. Exceedances that are affected by highly irregular or infrequent events are not considered violations of a state standard and are not used as a basis for designating areas as nonattainment. Under the CCAA, the non-desert Los Angeles County portion of the Basin is designated as a nonattainment area for O_3, PM2.5, and PM10 as shown in **Table 3**.

Table 3
Air Quality Standard Attainment Statuses for the Los Angeles County Portion of SCAB

Pollutant	California Ambient Air Quality Standards	National Ambient Air Quality Standards
Ozone (O_3) (1-Hour)	Nonattainment	Nonattainment (Extreme)
Ozone (O_3) (8-Hour)	Nonattainment	Nonattainment (Extreme)
Carbon Monoxide (CO) (1-Hour and 8-Hour)	Attainment	Attainment (Maintenance)
Nitrogen Dioxide (NO_2) (1-Hour)	Attainment	Unclassified/Attainment
Nitrogen Dioxide (NO_2) (8-Hour)	Attainment	Attainment (Maintenance)
Sulfur Dioxide (SO_2) (1-Hour)	Attainment	Pending – Expect Unclassified/Attainment
Sulfur Dioxide (SO_2) (24-Hour)	Attainment	Unclassified/Attainment
Fine Particulate Matter (PM2.5) (24-Hour)	Nonattainment	Attainment (Maintenance)
Fine Particulate Matter (PM2.5) (Annual)	Nonattainment	Not Applicable
Respirable Particulate Matter (PM10) (24-Hour)	Not Applicable	Nonattainment (Serious)
Respirable Particulate Matter (PM10) (Annual)	Nonattainment	Nonattainment (Moderate)
Lead (Pb)	Attainment	Nonattainment (Partial)

Source: CARB, Ambient Air Quality Standards Designation Tool, 2020. Available at: https://ww2.arb.ca.gov/aaqs-designation-tool, accessed November 2021.

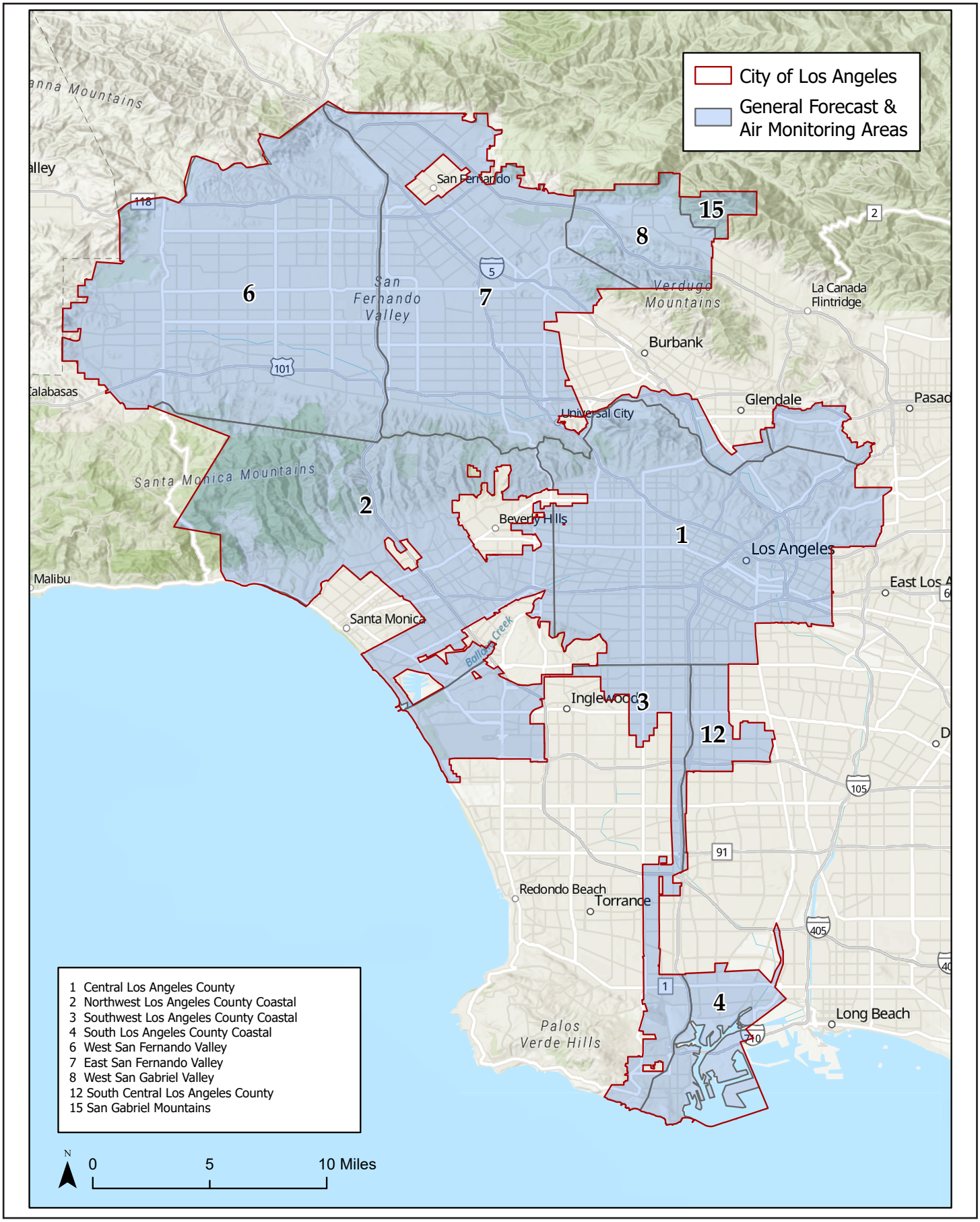
Local Air Quality

Ambient air quality in Los Angeles can be inferred from ambient air quality measurements conducted at nearby air quality monitoring stations. The SCAQMD jurisdiction is divided geographically into 38 source receptor areas (SRAs), wherein 37 monitoring stations operate—one station in each SRA excluding SRA 7—to measure and record concentrations of the regulated pollutants that provide representative air quality conditions in the region. The 38 SRAs are divided based on proximity to air monitoring stations and local meteorological patterns. The purpose of the monitoring station is to measure ambient concentrations of pollutants and determine whether ambient air quality meets the National Ambient Air Quality Standards (NAAQS) and the California Ambient Air Quality Standards (CAAQS). Ozone and particulate matter (PM10 and PM2.5) are pollutants of particular concern in the SCAB.

The City of Los Angeles encompasses parts of eight SRAs in the Coastal, Metropolitan, San Fernando Valley, and San Gabriel Valley areas (See **Figure 1, South Coast Source Receptor Areas in the City of Los Angeles**). (SRA 1, described as Central Los Angeles County; SRA 2, described as Northwest Los Angeles County Coastal; SRA 3, described as Southwest Los Angeles County Coastal; SRA 4, described as South Los Angeles County Coastal; SRA 6, described as West San Fernando Valley; SRA 7, described as East San

Fernando Valley; SRA 8, described as West San Gabriel Valley; and SRA 12, described as South Central Los Angeles County).

Air quality conditions in the City are characterized by concentrations of air pollutants measured at the monitoring stations located within the City. Each station records concentrations of O_3, CO, NO_2, SO_2, PM10, and PM2.5 at timescales that match the corresponding ambient air quality standards. **Table 4** presents the monitored air quality data from each SRA Monitoring Station from 2018 to 2020.



SOURCE: SCAQMD, 2022

FIGURE 1

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South Coast Source Receptor Areas in the City of Los Angeles

1293.001•03/17

Table 4
Air Monitoring Ambient Pollutant Concentrations by Source Receptor Area

		OZONE (O_3)				NITROGEN DIOXIDE (NO_2)		RESPIRABLE PARTICULATE MATTER (PM_{10})				FINE PARTICULATE MATTER ($PM_{2.5}$)		
		Max 1-hour (ppm)	Max 8-hour (ppm)	Number of days exceeding state 1-hour standard	Number of days exceeding 8-hour standard	Max 1-hour (ppm)	Annual average (ppm)	Max 24-hour ($\mu g/m^3$)	Annual average ($\mu g/m^3$)	Number of samples exceeding state standard	Number of samples exceeding federal standard	Max 24-hour ($\mu g/m^3$)	Annual average ($\mu g/m^3$)	Number of samples exceeding federal standard
SRA	Standards[1]			0.09 ppm	0.070 ppm					50 $\mu g/m^3$	150 $\mu g/m^3$			35 $\mu g/m^3$
1	2018	0.098	0.073	2	4	0.07	0.018	81	34.1	31	0	43.8	12.58	3
	2019	0.085	0.08	0	0	0.07	0.018	62	25.5	3	0	43.5	10.85	1
	2020	0.185	0.118	14	22	0.062	0.017	77	23	24	0	47.3	12.31	2
2	2018	0.98	0.073	0	2	0.064	0.012	-	-	-	-	-	-	-
	2019	0.086	0.075	0	1	0.048	0.0097	-	-	-	-	-	-	-
	2020	0.134	0.092	6	8	0.0766	0.0106	-	-	-	-	-	-	-
3	2018	0.074	0.065	0	0	0.059	0.0092	45	20.5	0	0	-	-	-
	2019	0.082	0.067	0	0	0.056	0.0095	62	19.2	2	0	-	-	-
	2020	0.117	0.074	1	2	0.059	0.0095	43	22.5	0	0	-	-	-
4[3]	2018	-	-	-	-	-	-	55	23.9	1	0	47.1	11.15	2
	2019	-	-	-	-	-	-	72	21	2	0	30.6	9.22	0
	2020	-	-	-	-	-	-	59	24.9	2	0	39	11.38	1
6	2018	0.12	0.101	14	49	0.057	0.012	-	-	-	-	31	10.32	0
	2019	0.101	0.087	1	6	0.064	0.0107	-	-	-	-	30	9.16	0
	2020	0.142	0.115	14	49	0.057	0.012	-	-	-	-	27.6	10.13	0
7	2018	-	-	-	-	-	-	-	-	-	-	-	-	-
	2019	-	-	-	-	-	-	-	-	-	-	-	-	-
	2020	0.133	0.108	31	49	0.06	0.0145	-	-	-	-	-	-	-
8	2018	0.112	0.09	8	19	0.068	0.014	-	-	-	-	32.5	10.28	0
	2019	0.12	0.098	4	12	0.059	0.013	-	-	-	-	30.9	8.9	0
	2020	0.163	0.115	41	60	0.0612	0.0136	-	-	-	-	34.9	11.06	0
12	2018	0.075	0.063	0	0	0.068	15	-	-	-	-	43	12.96	1
	2019	0.1	0.079	1	1	0.07	0.0141	-	-	-	-	39.5	10.87	1
	2020	0.152	0.115	3	4	0.0723	0.0145	-	-	-	-	43.2	13.57	7

Source: California Air Resources Board, "Air Quality Data Statistics," http://www.arb.ca.gov/adam/. 2020. SCAQMD. 2021. Air Quality South Coast Air Quality Management District, https://www.aqmd.gov/home/air-quality/historical-air-quality-data/historical-data-by-year

[1] Parts by volume per million of air (ppm), micrograms per cubic meter of air ($\mu g/m^3$), or annual arithmetic mean (aam).

[2] The 8-hour federal O3 standard was revised from 0.075 ppm to 0.070 ppm in 2015. The statistics shown are based on the 2015 standard of 0.070 ppm

[3] Data collected from SCAQMD Station Number 77.

According to air quality data from SCAQMD Monitoring Stations shown in **Table 4**, concentrations of O_3 exceeded the State 1-hour standard at least once in each of the three years presented in six of the SRAs. Levels of O_3 also exceeded the national and State 8-hour standards at least once in six of the SRAs between 2018–2020. PM10 concentrations did not exceed the 24-hour NAAQS during the three-year period; however, concentrations did exceed the applicable State 24-hour PM10 standard in three of the SRAs between 2018–2020 but did not exceed the Federal 24-hour PM10 standard. PM2.5 concentrations exceeded the federal 24-hour standard at least once between 2018-2020 in three of the SRAs. The data demonstrate consistency with the nonattainment designations in **Table 3**, above.

Toxic Air Contaminants

In addition to the criteria pollutants discussed above, toxic air contaminants (TACs) are another group of pollutants of concern. TACs are considered either carcinogenic or noncarcinogenic based on the nature of the health effects associated with exposure to the pollutant. For regulatory purposes, carcinogenic TACs are assumed to have no safe threshold below which health impacts would not occur, and cancer risk is expressed as excess cancer cases per one million exposed individuals. Noncarcinogenic TACs differ in that there is generally assumed to be a safe level of exposure below which no negative health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis.

There are many different types of TACs, with varying degrees of toxicity. Sources of TACs include industrial processes, such as petroleum refining and chrome-plating operations; commercial operations, such as gasoline stations and dry cleaners; and motor vehicle exhaust. Public exposure to TACs can result from emissions from normal operations, as well as from accidental releases of hazardous materials during upset conditions. The health effects associated with TACs are quite diverse and generally are assessed locally, rather than regionally. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis, or genetic damage, or short-term acute affects such as eye watering, respiratory irritation (a cough), running nose, throat pain, and headaches.

To date, CARB has designated 244 compounds as TACs. Additionally, CARB has implemented control measures for a number of compounds that pose high risks and show potential for effective control. The majority of the estimated health risks from TACs can be attributed to a relatively few compounds.[5]

CARB identified diesel particulate matter (DPM) as a TAC. DPM differs from other TACs in that it is not a single substance but rather a complex mixture of hundreds of substances. Diesel exhaust is a complex mixture of particulates and gases produced when an engine burns diesel fuel. DPM is a concern because it

5 California Air Resources Board. *CARB Identified Toxic Air Contaminants*. Available online at: https://ww2.arb.ca.gov/resources/documents/carb-identified-toxic-air-contaminants, accessed August 15, 2022.

causes lung cancer; many compounds found in diesel exhaust are carcinogenic. DPM includes the particle-phase constituents in diesel exhaust. The chemical composition and particle sizes of DPM vary between different engine types (heavy-duty, light-duty), engine operating conditions (idle, accelerate, decelerate), fuel formulations (high/low sulfur fuel), and the year of the engine. Some short-term (acute) effects of diesel exhaust include eye, nose, throat, and lung irritation, and diesel exhaust can cause coughs, headaches, light-headedness, and nausea. DPM poses the greatest health risk among the TACs. Almost all diesel exhaust particle mass is 10 microns or less in diameter. Because of their extremely small size, these particles can be inhaled and eventually trapped in the bronchial and alveolar regions of the lung.

Sensitive Receptors

Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved. Sensitive population groups include children, the elderly, the acutely ill, and the chronically ill, especially those with cardiovascular diseases.[6]

Residential areas are considered sensitive receptors to air pollutions because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Children are considered more susceptible to health effects of air pollution due to their immature immune systems and developing organs.[7] As such, schools are also considered sensitive receptors, as children are present for extended durations and engage in regular outdoor activities. Recreational land uses are considered moderately sensitive to air pollution. Although exposure periods are generally short, exercise places a high demand on respiratory functions, which can be impaired by air pollution. In addition, noticeable air pollution can detract from the enjoyment of recreation.

In addition to the numerous parcels zoned for residential uses in proximity to oil wells throughout the City, there are approximately 766 air quality sensitive uses within 100 feet of oil wells.[8] These sensitive land uses consist of schools, day cares, elder care facilities, adult residential facilities, parks, and hospitals. Please refer to **Appendix A** to this report for more information related to sensitive receptors located in proximity to oil wells.

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6 California Air Resources Board. *Sensitive Receptor Assessment*. Available online at: https://ww2.arb.ca.gov/capp-resource-center/community-assessment/sensitive-receptor-assessment, accessed August 15, 2022.

7 Office of Environmental Health Hazard Assessment and The American Lung Association of California. *Air Pollution and Children's Health*. Available online at: https://oehha.ca.gov/media/downloads/faqs/kidsair4-02.pdf, accessed August 15, 2022.

8 Due to the programmatic nature of this analysis, it is acknowledged that not every sensitive receptor will be identified. However, a good-faith effort at identifying the known sensitive receptors has been included in Appendix A to this report.

Existing Health Risk

The Multiple Air Toxics Exposure Study V (MATES V) is a monitoring and evaluation study conducted by the SCAQMD in SCAB. Originally developed in 1986 and now in its fifth iteration, the MATES V program relied on concentrations of more than 30 TACs—including both gases and particulates—measured at 10 fixed sites throughout the SCAB during the 2018–2019 period in conjunction with a basin-wide TAC emissions inventory and a regional modeling effort to characterize ambient excess carcinogenic risks across the SCAB.[9] MATES V also included an exploratory analysis of chronic non-cancer health impacts (e.g., cardiovascular, respiratory, neurological health outcomes, etc.) based on the measured concentrations and modeled emissions. The results of MATES V determined that the carcinogenic risk estimated from data collected at the 10 monitoring sites was approximately 40 percent lower on average than the risk that was estimated in MATES IV using monitoring data from the 2012–2013 time period. The estimated SCAB-wide population-weighted cancer risk calculated from the modeling data estimated that the reduction relative to MATES IV was approximately 54 percent, similar to the decrease demonstrated in monitored data. Based on the inhalation exposure pathway only, MATES-V found that the average population-weighted carcinogenic risk in the SCAB declined from 897 per million in 2012–2013 to 424 in a million in 2018–2019.

At the county level, Los Angeles County ambient average inhalation-pathway population-weighted cancer risk decreased from approximately 1,015 per million in MATES IV to 462 per million in MATES V, a reduction of 54 percent, which is similar to the modeled reduction across the SCAB. Accounting for multiple exposure pathways, the highest carcinogenic risk in MATES V was estimated near the Ports of Los Angeles and Long Beach to be approximately 960 per million, and the countywide average for Los Angeles County was approximately 497 per million (approximately 57 percent lower than MATES IV results). The MATES V ambient carcinogenic risk in the City of LA ranges between approximately 670 and 800 per million. According to the MATES V data visualizer, approximately 70 percent of the ambient excess cancer risk is attributed to diesel PM concentrations.

2.3 EXISTING OIL & GAS AIR QUALITY EMISSIONS

Oil and gas operations throughout the City contribute to existing local and regional air quality conditions. Existing operating emissions fall into two general categories: 1) worker commutes and 2) fugitive emissions. Typical emissions from worker commutes (i.e., motor vehicle trips) include ROG, NOx, CO,

9 SCAQMD, *MATES-V Final Report, Multiple Air Toxics Exposure Study in the South Coast Air Basin*. August 2021. Available online at: http://www.aqmd.gov/docs/default-source/planning/mates-v/mates-v-final-report-9-24-21.pdf?sfvrsn=6, accessed August 16, 2022.

SOx, PM10 and PM2.5. These emissions were estimated with the use of the California Emissions Estimator Model (CalEEMod). See **Appendix B** to this report.

Fugitive emissions include ROGs (also referred to as volatile organic compounds) which may include but not be limited to pentane, n-pentane, hexane, ethane, and other longer-chain hydrocarbons. In general, fugitive emissions from oil and gas activities may be attributed to the following primary types of sources: fugitive equipment leaks; process venting; evaporation losses; disposal of waste gas streams (e.g., by venting or flaring), and accidents and equipment failures. Fugitive leaks from piping and equipment are typically small yet detectable emissions from equipment where there are joints, flanges, and seals. Although joints and flanges are typically bolted, small amounts of hydrocarbons may be emitted through leaky joints.

It should be noted that fugitive emissions are difficult to quantify with a high degree of accuracy and there remains substantial uncertainty in the emission factors and calculation methodologies for oil and gas activities. This is due to the numerous types of sources and many variables to be considered. The key emission assessment issues are: (a) use of simple production-based emission factors is susceptible to excessive errors; (b) use of rigorous bottom-up approaches requires expert knowledge to apply and relies on detailed data which may be difficult and costly to obtain; and (c) measurement programs are time consuming and very costly to perform.[10] Nevertheless, **Table 5, Existing Oil & Gas Air Quality Emissions**, has been included as a good-faith effort to illustrate the potential scope of air quality emissions associated with existing oil and gas operations throughout the City. See **Appendix B** to this report for further information related to calculations and assumptions utilized to prepare these estimates.

Table 5
Existing Oil & Gas Air Quality Emissions – Pounds per Day

Source	ROG	NOx	CO	SO2	PM10	PM2.5
Worker Emissions	1.99	3.52	34.80	0.08	2.73	0.53
Fugitive Emissions	807.66	--	--	--	--	--
Total	**809.65**	**3.52**	**34.80**	**0.08**	**2.73**	**0.53**

Source: Impact Sciences, September 2022. See Appendix B to this report.

10 Intergovernmental Panel on Climate Change, Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories, Fugitive Emissions From Oil and Natural Gas Activities.

2.4 REGULATORY FRAMEWORK

Federal

Clean Air Act

Federal Clean Air Act. The Federal Clean Air Act (CAA) was enacted in 1970 and has been amended numerous times in subsequent years, with the most recent amendments occurring in 1990.[11] The CAA is the comprehensive federal law that regulates air emissions in order to protect public health and welfare.[12] The U.S. EPA is responsible for the implementation and enforcement of the CAA, which establishes federal National Ambient Air Quality Standards (NAAQS), specifies future dates for achieving compliance, and requires the U.S. EPA to designate areas as attainment, nonattainment, or maintenance. The CAA also mandates that each state submit and implement a State Implementation Plan (SIP) for each criteria pollutant for which the state has not achieved the applicable NAAQS. The SIP includes pollution control measures that demonstrate how the standards for those pollutants will be met. The sections of the CAA most applicable to land use development projects include Title I (Nonattainment Provisions) and Title II (Mobile Source Provisions).[13]

Title I requirements are implemented for the purpose of attaining NAAQS for criteria air pollutants. **Table 2, Ambient Air Quality Standards**, shows the NAAQS currently in effect for each criteria pollutant. The Air Basin fails to meet national standards for O_3 and PM2.5 and, therefore, is considered a federal "non-attainment" area for these pollutants, as shown in **Table 3.** Therefore, the Air Basin is subject to the requirements of demonstrating a path towards attaining the NAAQS as part of the SIP. The NAAQS and the CAAQS, which are generally more stringent, have been set at levels considered safe to protect public health, including the health of sensitive populations and to protect public welfare.

Title II pertains to mobile sources, which includes on-road vehicles (e.g., cars, buses, motorcycles) and non-road vehicles (e.g., aircraft, trains, construction equipment). Reformulated gasoline and automobile pollution control devices are examples of the mechanisms the U.S. EPA uses to regulate mobile air emission sources. The provisions of Title II have resulted in tailpipe emission standards for vehicles, which have been strengthened in recent years to improve air quality. For example, the standards for NO_X emissions

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11 42 United States Code §7401 et seq. (1970).

12 United States Environmental Protection Agency, Summary of the Clean Air Act. Available online at: https://www.epa.gov/laws-regulations/summary-clean-air-act, accessed August 16, 2022.

13 United States Environmental Protection Agency, Clean Air Act Overview, Clean Air Act Table of Contents by Title, Last Updated January 3, 2017, https://www.epa.gov/clean-air-act-overview/clean-air-act-text, accessed August 16, 2022. As shown therein, Title I addresses nonattainment areas and Title II addresses mobile sources.

have been lowered substantially and the specification requirements for cleaner burning gasoline are more stringent.

National Emissions Standards for Hazardous Air Pollutants Program

Under federal law, 187 substances are currently listed as hazardous air pollutants (HAPs). Major sources of specific HAPs are subject to the requirements of the National Emissions Standards for Hazardous Air Pollutants (NESHAPS) program. The EPA is establishing regulatory schemes for specific source categories and requires implementation of the Maximum Achievable Control Technologies (MACT) for major sources of HAPs in each source category. State law has established the framework for California's TAC identification and control program, which is generally more stringent than the federal program and is aimed at HAPs that are a problem is California. The state has formally identified 244 substances as TACs and is adopting appropriate control measures for each. Once adopted at the state level, each air district will be required to adopt a measure that is equally or more stringent.

National Ambient Air Quality Standards

The federal CAA required the U.S. EPA to establish NAAQS. The NAAQS set primary standards and secondary standards for specific air pollutants**.** Primary standards define limits for the intention of protecting public health, which include sensitive populations such as asthmatics, children, and the elderly. Secondary Standards define limits to protect public welfare to include protection against decreased visibility, damage to animals, crops, vegetation, and buildings. A summary of the federal ambient air quality standards is shown in **Table 2, Ambient Air Quality Standards**.

State

California Clean Air Act of 1988

The California CAA of 1988 (CCAA) allows states to adopt ambient air quality standards and other regulations provided that they are at least as stringent as federal standards. The California Air Resources Board (CARB), a part of the California Environmental Protection Agency (Cal EPA), is responsible for the coordination and administration of both federal and state air pollution control programs within California, including setting the CAAQS. The CCAA, amended in 1992, requires all air quality management districts (AQMDs) in the state to achieve and maintain the CAAQS. The CAAQS are generally stricter than national standards for the same pollutants and has also established state standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles, for which there are no national standards. CARB also conducts research, compiles emission inventories, develops suggested control measures, and provides oversight of local programs. CARB also has primary responsibility for the development of California's State

Implementation Plan (SIP), for which it works closely with the federal government and the local air districts.

California Ambient Air Quality Standards

The federal CAA permits states to adopt additional or more protective air quality standards if needed. California has set standards for certain pollutants, such as particulate matter and ozone, which are more protective of public health than respective federal standards. California has also set standards for some pollutants that are not addressed by federal standards. The state standards for ambient air quality are summarized in **Table 2, Ambient Air Quality Standards**.

California State Implementation Plan

The federal CAA (and its subsequent amendments) requires each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The SIP is a living document that is periodically modified to reflect the latest emissions inventories, plans, and rules and regulations of air basins as reported by the agencies with jurisdiction over them. The CAA Amendments dictate that states containing areas violating the NAAQS revise their SIPs to include extra control measures to reduce air pollution. The SIP includes strategies and control measures to attain the NAAQS by deadlines established by the CAA. The EPA has the responsibility to review all SIPs to determine if they conform to the requirements of the CAA.

State law makes CARB the lead agency for all purposes related to the SIP. Local air districts and other agencies prepare SIP elements and submit them to CARB for review and approval. CARB then forwards SIP revisions to the EPA for approval and publication in the Federal Register. The 2016 Air Quality Management Plan (2016 AQMP) is the SIP for SCAB. The 2016 AQMP is a regional blueprint for achieving air quality standards and healthful air in the SCAB and those portions of the Salton Sea Air Basin (SSAB) that are under the SCAQMD's jurisdictions. The 2016 AQMP represents a new approach, focusing on available, proven, and cost effective alternatives to traditional strategies, while seeking to achieve multiple goals in partnerships with other entities promoting reductions in greenhouse gases and toxic risk, as well as efficiencies in energy use, transportation, and goods movement. The most effective way to reduce air pollution impacts is to reduce emissions from mobile sources. The AQMP relies on regional and multi-level partnerships of governmental agencies at the federal, state, regional, and local level. Those agencies (EPA, CARB, local governments, Southern California Association of Governments [SCAG] and the SCAQMD) are the primary agencies that implement the AQMP programs. The 2016 AQMP incorporates the latest scientific and technical information and planning assumptions, including SCAG's 2016-2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), updated emission inventory

methodologies for various source categories, and SCAG's latest growth forecasts. The 2016 AQMP includes integrated strategies and measures to meet the NAAQS.

On September 3, 2020, SCAG's Regional Council unanimously voted to approve and fully adopt Connect SoCal (2020-2045 RTP/SCS). However, the forecasts and measures in the plan have not been incorporated into any applicable air quality plan for the region.[14]

California Code of Regulations. The California Code of Regulations (CCR) is the official compilation and publication of regulations adopted, amended or repealed by state agencies pursuant to the Administrative Procedure Act. The CCR includes regulations that pertain to air quality emissions. Section 2485 in Title 13 of the CCR states that the idling of all diesel-fueled commercial vehicles (weighing over 10,000 pounds) during construction shall be limited to five minutes at any location. Section 93115 in Title 17 of the CCR states that operations of any stationary, diesel-fueled, compression-ignition engines shall meet specified fuel and fuel additive requirements and emissions standards. In addition, Section 95668 in Title 17 establishes greenhouse gas emission standards for crude oil and natural gas facilities.

California Air Toxics "Hot Spots" Information and Assessment Act (AB 2588)

The California Air Toxics Program is supplemented by the Air Toxics "Hot Spots" program, which became law (AB 2588, Statutes of 1987) in 1987. In 1992, the AB 2588 program was amended by Senate Bill 1731 to require facilities that pose a significant health risk to the community to perform a risk reduction audit and reduce their emissions through implementation of a risk management plan. Under this program, which is required under the Air Toxics "Hot Spots" Information and Assessment Act (Section 44363 of the California Health and Safety Code), facilities are required to report their air toxics emissions, assess health risks, and notify nearby residents and workers of significant risks when present.

Typically, land development projects generate diesel emissions from construction vehicles during the construction phase, as well as some diesel emissions from small trucks during the operational phase. Diesel exhaust is mainly composed of particulate matter and gases, which contain potential cancer-causing substances. Emissions from diesel engines currently include over 40 substances that are listed by EPA as hazardous air pollutants and by CARB as TACs. On August 27, 1998, CARB identified particulate matter

14 Southern California Association of Governments. *Adopted Final Connect SoCal* (2020-2045 RTP/SCS). Available online at: https://scag.ca.gov/read-plan-adopted-final-plan, accessed August 16, 2022

in diesel exhaust as a TAC, based on data linking diesel particulate emissions to increased risks of lung cancer and respiratory disease.[15]

In March 2015, the OEHHA adopted "The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments" in accordance with the Health and Safety Code, Section 44300. The Final Guidance Manual incorporates the scientific basis from three earlier developed Technical Support Documents to assess risk from exposure to facility emissions. The 2015 OEHHA Final Guidance has key changes including greater age sensitivity in particular for children, decreased exposure durations, and higher breathing rate profiles. Because cancer risk could be up to three times greater using this new guidance, it may result in greater mitigation requirements, more agency backlog, and increased difficulty in getting air permits. Regardless of the change in calculation methodology, actual emissions and cancer risk within South Coast Air Basin has declined by more than 50 percent since 2005.

The CARB provides a computer program, the Hot Spots Analysis and Reporting Program (HARP), to assist in a coherent and consistent preparation of an HRA. HARP2, an update to HARP, was released in March 2015. HARP2 has a more refined risk characterization in HRA and CEQA documents and incorporates the 2015 OEHHA Final Guidance.

Diesel Risk Reduction Program. CARB identified particulate emissions from diesel-fueled engines as TACs in August 1998. Following the identification process, the ARB was required by law to determine if there is a need for further control, which moved us into the risk management phase of the program. CARB developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines* and the *Vehicles and the Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines*. The Diesel Advisory Committee approved these documents on September 28, 2000, paving the way for the next step in the regulatory process: the control measure phase. During the control measure phase, specific statewide regulations designed to further reduce DPM emissions from diesel-fueled engines and vehicles have and continue to be evaluated and developed. The goal of each regulation is to make diesel engines as clean as possible by establishing state-of-the-art technology requirements or emission standards to reduce DPM emissions.

15 Diesel exhaust is included within pollutants subject to the hotspot program. Please refer to OEHHA's Air Toxics Hot Spot Program Risk Assessment Guidelines. https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0, accessed August 16, 2022.

Regional

South Coast Air Quality Management District (SCAQMD). The SCAQMD is primarily responsible for planning, implementing, and enforcing air quality standards for the South Coast Air Basin. The Air Basin is a subregion within the western portion of the SCAQMD jurisdiction, as the SCAQMD also regulates portions of the Salton Sea Air Basin and Mojave Desert Air Basin within Riverside County.

Air Quality Management Plan and RTP/SCS. To meet the NAAQS and CAAQS, the SCAQMD has adopted a series of AQMPs, which serve as a regional blueprint to develop and implement an emission reduction strategy that will bring the area into attainment with the standards in a timely manner. The 2016 AQMP includes strategies to ensure that rapidly approaching attainment deadlines for O_3 and PM2.5 are met, and that public health is protected to the maximum extent feasible. The most significant air quality challenge in the Air Basin is to reduce NO_X emissions[16] sufficiently to meet the upcoming O_3 standard deadlines, as NO_X plays a critical role in the creation of O_3. The AQMP's strategy to meet the 8-hour O_3 standard in 2023 should lead to sufficient NO_X emission reductions to attain the 1-hour O_3 standard by 2022. Since NO_X emissions also lead to the formation of PM2.5, the NO_X reductions needed to meet the O_3 standards will likewise lead to improvement of PM2.5 levels and attainment of PM2.5 standards.[17] [18]

The AQMP also incorporates the transportation strategy and transportation control measures from SCAG's adopted 2016-2040 RTP/SCS (2016-2040 RTP/SCS)[19] Plan. SCAG is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial Counties, and addresses regional issues relating to transportation, the economy, community development and the environment. SCAG coordinates with various air quality and transportation stakeholders in Southern California to ensure compliance with the federal and state air quality requirements. Pursuant to California Health and Safety Code Section 40460, SCAG has the responsibility of preparing and approving the portions of the AQMP relating to the regional demographic projections and integrated regional land use, housing, employment, and transportation programs, measures, and strategies. SCAG is required by law to ensure that transportation activities "conform" to, and are supportive of, the goals of regional and state air quality plans to attain the NAAQS. The RTP/SCS includes transportation programs, measures, and strategies generally designed to reduce vehicle miles traveled (VMT), which are contained in the AQMP. The SCAQMD combines its portion of

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16 NOx emissions are a precursor to the formation of both O_3 and secondary PM2.5.

17 Estimates are based on the inventory and modeling results and are relative to the baseline emission levels for each attainment year (see Final 2016 AQMP for detailed discussion).

18 SCAQMD, *Final 2016 AQMP*, 2017. Page ES-2. http://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan/final-2016-aqmp. Accessed August 16, 2022.

19 SCAG, *Final 2016 RTP/SCP*, 2016. Available online at: https://scag.ca.gov/sites/main/files/file-attachments/f2016rtpscs.pdf?1606005557, accessed August 16, 2022.

the AQMP with those prepared by SCAG.[20] The RTP/SCS and Transportation Control Measures, included as Appendix IV-C of the 2016 AQMP for the Air Basin, are based on SCAG's 2016-2040 RTP/SCS.

The 2016 AQMP forecasts the 2031 emissions inventories ''with growth'' based on SCAG's 2016-2040 RTP/SCS. The region is projected to see a 12 percent growth in population, 16 percent growth in housing units, 23 percent growth in employment, and 8 percent growth in vehicle miles traveled between 2012 and 2031. Despite regional growth in the past, air quality has improved substantially over the years, primarily due to the effects of air quality control programs at the local, state and federal levels.[21]

On September 3, 2020, SCAG's Regional Council adopted the 2020-2045 RTP/SCS. The 2020-2045 RTP/SCS was determined to conform to the federally-mandated state implementation plan (SIP), for the attainment and maintenance of NAAQS standards. On October 30, 2020, CARB also accepted SCAG's determination that the SCS met the applicable state greenhouse gas emissions targets. The 2020-2045 RTP/SCS will be incorporated into the forthcoming 2022 AQMP.

SCAQMD Air Quality Guidance Documents. The SCAQMD published the *CEQA Air Quality Handbook* (approved by the AQMD Governing Board in 1993) to provide local governments with guidance for analyzing and mitigating project-specific air quality impacts.[22] The *CEQA Air Quality Handbook* provides standards, methodologies, and procedures for conducting air quality analyses. However, the SCAQMD is currently in the process of replacing the *CEQA Air Quality Handbook* with the *Air Quality Analysis Guidance Handbook*. While this process is underway, the SCAQMD has provided supplemental guidance on the SCAQMD website.[23]

The SCAQMD has also adopted land use planning guidelines in its *Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning*, which considers impacts to sensitive receptors from facilities that emit TAC emissions.[24] SCAQMD's siting distance recommendations are the same as those provided by CARB (e.g., a 500-foot siting distance for sensitive land uses proposed in proximity to freeways and high-traffic roads, and the same siting criteria for distribution centers and dry cleaning facilities). The

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20 SCAQMD, Final 2016 AQMP, 2017. Page ES-2. http://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan/final-2016-aqmp, accessed August 16, 2022.

21 SCAQMD, Figure 1-4 of the Final 2016 AQMP.

22 South Coast Air Quality Management District, CEQA Air Quality Handbook 1993, http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/ceqa-air-quality-handbook-(1993), accessed August 16, 2022.

23 SCAQMD, Air Quality Analysis Guidance, http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook#, accessed August 16, 2022.

24 South Coast Air Quality Management District, Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning, 2005, http://www.aqmd.gov/docs/default-source/planning/air-quality-guidance/complete-guidance-document.pdf?sfvrsn=4. Accessed August 16, 2022.

SCAQMD's document introduces land use-related policies that rely on design and distance parameters to minimize emissions and lower potential health risk. SCAQMD's guidelines are voluntary initiatives recommended for consideration by local planning agencies.

The SCAQMD has published a guidance document called the *Final Localized Significance Threshold Methodology* for CEQA evaluations that is intended to provide guidance when evaluating the localized effects from mass emissions during construction or operation of a project.[25] The SCAQMD adopted additional guidance regarding PM2.5 emissions in a document called *Final Methodology to Calculate Particulate Matter (PM)2.5 and PM2.5 Significance Thresholds*.[26] The latter document has been incorporated by the SCAQMD into its CEQA significance thresholds and *Final Localized Significance Threshold Methodology*.

SCAQMD Rules and Regulations. The SCAQMD has adopted several rules and regulations to regulate sources of air pollution in the Air Basin and to help achieve air quality standards for projects, which include, but are not limited to the following:

Regulation IV – Prohibitions: This regulation sets forth the restrictions for visible emissions, odor nuisance, fugitive dust, various air emissions, fuel contaminants, start-up/shutdown exemptions and breakdown events. The following is a list of rules which apply to the reasonably anticipated development of the Proposed Plan:

- **Rule 401 – Visible Emissions:** This rule states that a person shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant for a period or periods aggregating more than three minutes in any one hour which is as dark or darker in shade as that designated No. 1 on the Ringelmann Chart or of such opacity as to obscure an observer's view.

- **Rule 402 – Nuisance:** This rule states that a person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

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25 South Coast Air Quality Management District, Final Localized Significance Threshold Methodology, 2008, http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf. Accessed August 16, 2022.

26 South Coast Air Quality Management District, Final Methodology to Calculate Particulate Matter (PM)2.5 and PM2.5 Significance Thresholds, 2006, http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/particulate-matter-(pm)-2.5-significance-thresholds-and-calculation-methodology/final_pm2_5methodology.pdf?sfvrsn=2. Accessed August 16, 2022.

- **Rule 403 – Fugitive Dust:** This rule requires projects to prevent, reduce or mitigate fugitive dust emissions from a site. Rule 403 restricts visible fugitive dust to the project property line, restricts the net PM10 emissions to less than 50 micrograms per cubic meter (μg/m3) and restricts the tracking out of bulk materials onto public roads. Additionally, projects must utilize one or more of the best available control measures (identified in the tables within the rule). Mitigation measures may include adding freeboard to haul vehicles, covering loose material on haul vehicles, watering, using chemical stabilizers and/or ceasing all activities. Finally, a contingency plan may be required if so determined by the U.S. EPA.

Regulation XI – Source Specific Standards: Regulation XI sets emissions standards for specific sources. The following is a list of rules which may apply to reasonably anticipated activities of the Ordinance:

- **Rule 1186 – PM10 Emissions from Paved and Unpaved Roads, and Livestock Operations:** This rule applies to owners and operators of paved and unpaved roads and livestock operations. The rule is intended to reduce PM10 emissions by requiring the cleanup of material deposited onto paved roads, use of certified street sweeping equipment, and treatment of high-use unpaved roads (see also Rule 403).

- **Rule 1148 - Thermally Enhanced Oil Recovery Wells:** This rule states that No person shall operate a steam drive well unless the ROG emissions from the well are 4.5 pounds per day or less; or if steam drive wells are connected to a vapor control system, ROG emissions from the control system shall average no more than 4.5 pounds per day per connected well.

- **Rule 1148.1 - Oil and Gas Extraction Wells**: This rule includes requirements for well operators that aim to reduce emissions of volatile organic compounds (VOCs), toxic air contaminants (TAC) emissions and Total Organic Compounds (TOC) from the operation and maintenance of wellheads, well cellars, and the handling of produced gas at oil and gas extraction facilities to assist in reducing regional ozone levels and to prevent public nuisance and possible detriment to public health caused by exposure to such emissions.

- **Rule 1148.2 - Notification and Reporting Requirements for Oil and Gas Wells and Chemical Suppliers:** This rule requires operators of an onshore oil or gas well shall electronically notify the Executive Officers prior to the start of drilling, well completion, or rework of an onshore oil or gas well.

Regulation XIV – Toxics and Other Non-Criteria Pollutants: Regulation XIV sets requirements for new permit units, relocations, or modifications to existing permit units which emit toxic air contaminants or other non-criteria pollutants. The following is a list of rules which may apply to reasonably anticipated activities of the Ordinance:

- **Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines:** This rule applies to stationary compression ignition (CI) engines greater than 50 brake horsepower and sets limits on emissions and operating hours. In general, new stationary emergency standby diesel-fueled engines greater than 50 brake horsepower are not permitted to operate more than 50 hours per year for maintenance and testing.

Idle Well Regulations

In California, an idle well is a well that has not been used for two years or more and has not yet been properly plugged and abandoned (sealed and closed). An operator in possession of any idle well is required to either submit an annual idle well fee for each well that was idle at any time in the last calendar year or file an Idle Well Management Plan (IWMP) for the elimination of all of the operator's long-term idle wells. An operator must submit their annual idle well fees or IWMP by May 1 of each year. The requirements for both can be found in PRC Section 3206. If an operator does not have an IWMP, the annual idle well fees the operator must pay for each of the operator's idle wells have been increased to reflect the potential costs associated with those wells. The fees are deposited into the Hazardous and Idle-Deserted Well Abatement Fund to help fund the permanent sealing and closure of deserted wells.

Assembly Bill No. 2729

Inactive and deserted oil and gas wells that are not maintained can pose threats to groundwater and public safety. The bill expands the definition of "idle well" and encourages operators to file Idle Well Management Plans for either plugging and abandoning long-term idle wells or returning them to production. It also increases idle well fees to help encourage operators to address such wells in their inventories.

The Oil, Gas, and Geothermal Administrative Fund (OGGA)

In accordance with Public Resources Code Section 3401 (a) the proceeds of charges levied, assessed, and collected pursuant to Article 7 of the Public Resources Code (commencing with Section 3400), upon the properties of every person operating or owning any interest in the production of a well shall be used exclusively for the support and maintenance of the department charged with the supervision of oil and gas. The proceeds may also be used by public entities, subject to appropriation by the Legislature, for all costs associated with well stimulation treatments and costs of the State Water Resources Control Board and regional water quality control boards as provided in Public Resources Code section 3401 (b).

The Hazardous and Idle-Deserted Well Abatement Fund (HIDWAF)

Idle well fees are deposited into the Hazardous and Idle-Deserted Well Abatement Fund (HIDWAF) and are appropriated to CalGEM to plug and abandon wells to mitigate a hazardous or potentially hazardous condition.

State Abandonment Authority

The Public Resources Code (PRC) provides various presumptions and circumstances under which CalGEM may find that a well has been deserted. If CalGEM determines a well has been idle-deserted, then CalGEM may order the plugging and abandonment of the well. If an operator fails to rebut such presumptions and fails to commence the ordered work, then CalGEM may undertake the plugging and abandonment of the well. CalGEM's options for funding the plugging and abandonment differs depending upon the solvency of the operator.

Pipeline and Hazardous Materials Safety Administration's Office of Pipeline Safety (PHMSA)

PHMSA's mission is to protect people and the environment by advancing the safe transportation of energy and other hazardous materials that are essential to our daily lives. To do this, the agency establishes national policy, sets and enforces standards, educates, and conducts research to prevent incidents. They also prepare the public and first responders to reduce consequences if an incident does occur.

Local

Office of Petroleum and Natural Gas Administration and Safety (OPNGAS)

Established in 2016, OPNGAS is charged with managing petroleum matters for the City and is headed by the Petroleum Administrator. The Petroleum Administrator manages the Office of Petroleum Administration; acts as a technical advisor to Mayor, Council, and City; performs internal & external interagency coordination; leads negotiations for pipeline franchise agreements; completes comprehensive inspections and safety compliance; is the central point of contact for oil and gas; verifies local, state and federal regulations; performs emergency and contingency planning and community and public engagement; and is an oil and gas media spokesperson

Los Angeles Municipal Code

Section. 13.01 of the Los Angeles Municipal Code (LAMC) establishes provisions for the districts where the drilling of oil wells or the extraction from the wells of oil, gases or other hydrocarbon substances is

permitted. All oil and gas projects require a conditional approval from the City of Los Angeles Department of City Planning and must be located within an oil drilling district.

Air Quality Element of the Los Angeles General Plan

Local jurisdictions, such as the City, have the authority and responsibility to reduce air pollution through their land use decision-making authority. Specifically, the City is responsible for the assessment and mitigation of air emissions resulting from its land use decisions. In general, the City of Los Angeles' General Plan (including the Framework, Air Quality, Mobility 2035, and Health and Wellness Elements) and the City of Los Angeles' Green New Deal (Sustainable pLAn 2019) contain policies and programs for the protection of the environment and health through improved air quality. These serve to provide additional critical guidance for the betterment of public health for the region and City.

The most directly-related of those plans, the City's General Plan Air Quality Element, was adopted on November 24, 1992, and sets forth the goals, objectives, and policies which guide the City in its implementation of its air quality improvement programs and strategies. A number of these goals, objectives, and policies are relevant to land use development, and relate to traffic mobility, minimizing particulate emissions from construction activities, discouraging single-occupancy vehicle trips, managing traffic congestion during peak hours, and increasing energy efficiency in City facilities and private developments.

The Air Quality Element establishes six goals:

- Good air quality in an environment of continued population growth and healthy economic structure;
- Less reliance on single-occupant vehicles with fewer commute and non-work trips;
- Efficient management of transportation facilities and system infrastructure using cost-effective system management and innovative demand-management techniques;
- Minimal impacts of existing land use patterns and future land use development on air quality by addressing the relationship between land use, transportation and air quality;
- Energy efficiency through land use and transportation planning, the use of renewable resources and less-polluting fuels and the implementation of conservation measures including passive measures such as site orientation and tree planting; and
- Citizen awareness of the linkages between personal behavior and air pollution and participation in efforts to reduce air pollution

The City is also responsible for the implementation of transportation control measures as outlined in the AQMP. Through capital improvement programs, the City can fund infrastructure that contributes to improved air quality by requiring such improvements as bus turnouts as appropriate, installation of energy-efficient streetlights, and synchronization of traffic signals. In accordance with CEQA requirements and the CEQA review process, the City assesses the air quality impacts of new development projects, requires mitigation of potentially significant air quality impacts by conditioning discretionary permits, and monitors and enforces implementation of such mitigation measures.

Plan for a Healthy Los Angeles

The Plan for a Healthy Los Angeles, first adopted by the City Council on March 31, 2015, lays the foundation to create healthier communities for all residents in the City. The City Council subsequently adopted targeted amendments in the Plan For a Healthy Los Angeles on November 24, 2021. The updated Plan satisfies the State requirements (SB 1000) to address environmental justice in the General Plan. As the Health, Wellness, and Equity element of the General Plan, it provides high-level policy vision, along with measurable objectives and implementation programs, to elevate health as a priority for the City's future growth and development. With a focus on public health and safety and environmental justice, the Plan for a Healthy Los Angeles provides a roadmap for addressing the most basic and essential quality-of-life issues: safe neighborhoods, a clean environment (i.e., improved ambient and indoor air quality), the opportunity to thrive, and access to health services, affordable housing, and healthy and sustainably produced food. The Plan includes policies calling for the reduction of air pollution form stationary and mobile sources, and the protection of communities' health through land use and design solutions that limit exposure to noxious activities such as oil and gas extraction.

Safety Element of the Los Angeles General Plan

The updated Safety Element, adopted by the City Council on November 24, 2021, includes an objective and policies to address climate change, including air quality.

Table 6
City of Los Angeles Safety Element

Policy/Objective	
Objective 1.2	Confront the global climate emergency by setting measurable targets for carbon reduction that are consistent with the best available methods and data, center equity and environmental justice, secure fossil free jobs, and foster broader environmental sustainability and resiliency.
Policy 1.2.1	**Environmental Justice.** In keeping with the Plan for a Healthy LA, build a fair, just and prosperous city where everyone experiences the benefits of a sustainable future by correcting the long running disproportionate impact of environmental burdens faced by low income families and communities of color.
Policy 1.2.2	**Renewable Energy.** Aggressively pursue renewable energy sources, transitioning away from fossil based sources of energy and toward 100% renewable energy sources.
Policy 1.2.6	**Mobility.** In keeping with the Mobility Plan, build a comprehensive and integrated transportation network that changes how Angelenos get around and reduces car dependency.
Policy 1.2.7	**Zero Emissions Vehicles.** In keeping with the Mobility Plan, work toward zero emissions transportation and goods movement and increases zero emissions infrastructure including charging.
Policy 1.2.8	**Industrial Emissions and Air Quality Monitoring**. In keeping with the Air Quality Element, ensure that every Angeleno can breathe clean, healthy air by addressing air pollution from all sources, with a particular emphasis on prioritizing the health and wellbeing of overburdened families and delivering environmental justice.
Policy 1.2.11	**Urban Ecosystem and Resilience.** In keeping with the Conservation and Open Space Elements, create a more temperate biodiverse city with more green space for people and habitat.
Policy 1.2.13	**Lead by Example.** Leverage government owned properties and publicly-driven investments to realize broader climate change goals.

Source: City of Los Angeles, Safety Element, 2021.

Los Angeles Green Plan

The City seeks to address the issue of global climate change with the *Green LA, An Action Plan to Lead the Nation in Fighting Global Warming* (LA Green Plan). This document outlines the goals and actions the City has established to reduce the generation and emission of GHGs from both public and private activities. According to the LA Green Plan, the City is committed to the goal of reducing emissions of CO_2 to 35 percent below 1990 levels. To achieve this, the City will:

- Increase the generation of renewable energy;
- Improve energy conservation and efficiency; and
- Change transportation and land use patterns to reduce dependence on automobiles.

The LA Green Plan is discussed in greater detail in **Section 4.7, Greenhouse Gas Emissions**.

City of Los Angeles Clean Up Green Up Ordinance

The City of Los Angeles adopted a Clean Up Green Up Ordinance (Ordinance Number 184,245) on April 13, 2016, which among other provisions, includes provisions related to ventilation system filter efficiency in mechanically ventilated buildings.[27] This Ordinance added Sections 95.314.3 and 99.04.504.6 to the Los Angeles Municipal Code (LAMC) and amended Section 99.05.504.5.3 to implement building standards and requirements to address cumulative health impacts resulting from incompatible land use patterns. Section 99.04.504.6, which became effective June 4, 2016, mandates that regularly occupied areas in mechanically ventilated buildings within 1,000 feet of a freeway be provided with air filtration media for outside and return air that meet a Minimum Efficiency Report Value (MERV) of 13. This Ordinance requires that these filters be installed prior to occupancy, and recommendations for maintenance with filters of the same value shall be included in the operation and maintenance manual. The only exception to Section 99.04.504.3 applies to existing mechanical equipment. Additionally, Section 99.05.504.3 states that regularly occupied areas in all mechanically ventilated buildings shall be provided with air filtration media for outside and return air that meets a MERV of 8. An exception is provided for existing mechanical equipment and for new ventilation units meeting certain 2013 California Energy Code requirements. These additions to the LAMC are designed to address cumulative health impacts in highly polluted areas resulting from incompatible land use patterns within the City of Los Angeles.

2.5 THRESHOLDS AND METHODOLOGY

Thresholds of Significance

The impact analysis provided below is based on Appendix G to the *State CEQA Guidelines*, which indicates that a project would have a significant impact on air quality if it would:

1. Conflict with or obstruct implementation of any applicable air quality plan.
2. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard.
3. Expose sensitive receptors to substantial pollutant concentrations.
4. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

The significance criteria established by the applicable air quality management or air pollution control district (SCAQMD) may be relied upon to make the above determinations. According to the SCAQMD, an

[27] City of Los Angeles Department of City Planning, Ordinance Number 184,245 Clean Up Green Up, Council File No. 15-1026, adopted April 13, 2016.

air quality impact is considered significant if a project would violate any ambient air quality standard, contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations. The SCAQMD has established thresholds of significance for air quality for construction and operational activities of land use development projects, shown in **Table 7 – South Coast AQMD Regional Significance Thresholds**.

Table 7
South Coast AQMD Air Quality Significance Thresholds

Mass Daily Thresholds [a]		
Pollutant	**Construction [b]**	**Operation [c]**
NOx	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM10	150 lbs/day	150 lbs/day
PM2.5	55 lbs/day	55 lbs/day
SOx	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day
Toxic Air Contaminants (TACs), Odor, and GHG Thresholds		
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million Cancer Burden > 0.5 excess cancer cases (in areas ≥ 1 in 1 million) Chronic & Acute Hazard Index ≥ 1.0 (project increment)	
Odor	Project creates an odor nuisance pursuant to South Coast AQMD Rule 402	
GHG	10,000 MT/yr CO_2eq for industrial facilities	
Ambient Air Quality Standards for Criteria Pollutants [d]		
NO_2 1-hour average annual arithmetic mean	South coast AQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 0.18 ppm (state) 0.03 ppm (state) and 0.0534 ppm (federal)	
PM10 24-hour average annual average	10.4 μg/m^3 (construction) [e] & 2.5 μg/m^3 (operation) 1.0 μg/m3	
PM2.5 24-hour average	10.4 μg/m^3 (construction) [e] & 2.5 μg/m^3 (operation)	
SO_2 1-hour average 24-hour average	0.25 ppm (state) & 0.075 ppm (federal - 99th percentile) 0.04 ppm (state)	
Sulfate 24-hour average	25 μg/m^3 (state)	
CO 1-hour average 8-hour average	South Coast AQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 20 ppm (state) and 35 ppm (federal) 9.0 ppm (state/federal)	
Lead 30-day Average Rolling 3-month average	1.5 μg/m^3 (state) 0.15 μg/m^3 (federal)	

[a] *Source: South Coast AQMD CEQA Handbook (South Coast AQMD, 1993)*

[b] *Construction thresholds apply to both the South Coast Air Basin and Coachella Valley (Salton Sea and Mojave Desert Air Basins).*

[c] *For Coachella Valley, the mass daily thresholds for operation are the same as the construction thresholds.*

[d] *Ambient air quality thresholds for criteria pollutants based on South Coast AQMD Rule 1303, Table A-2 unless otherwise stated.*

[e] *Ambient air quality threshold based on South Coast AQMD Rule 403.*

Localized Significance Thresholds

The SCAQMD has developed a set of mass emissions rate look-up tables that can be used to evaluate localized impacts that may result from construction and operational-period emissions called localized significance thresholds (LSTs). If the on-site emissions from proposed construction activities are below the emission levels found in the LST mass rate look-up tables for the project site receptor area (SRA), then emissions would not have the potential to cause a significant localized air quality impact. When quantifying mass emissions for LST analysis, only emissions that occur on site are considered. Consistent with SCAQMD LST guidance, emissions from offsite delivery hauling trucks, or employee trips are not considered in the evaluation of localized impacts (SCAQMD 2008).

The proposed Ordinance is citywide and thus multiple SRAs and LSTs would be applicable. Therefore, **Table 8, Local Significance Thresholds By SRA – Pounds per Day** shows the LST screening thresholds for all SRAs within the City.

Table 8
Local Significance Thresholds By SRA – Pounds per Day

SRA & Phase	Nitrogen Oxide (NO_x)	Carbon Monoxide (CO)	Coarse Particulate Matter (PM10)	Fine Particulate Matter (PM2.5)
SRA 1				
Construction	74	680	5	3
Operation	74	680	2	1
SRA 2				
Construction	103	562	4	3
Operation	103	562	1	1
SRA 3				
Construction	91	664	5	3
Operation	91	664	1	1
SRA 4				
Construction	57	585	4	3
Operation	57	585	1	1
SRA 6				
Construction	103	426	4	3
Operation	103	426	1	1
SRA 7				
Construction	80	498	4	3
Operation	80	498	1	1
SRA 8				
Construction	69	535	4	3
Operation	69	535	1	1
SRA 12				
Construction	46	231	4	3
Operation	46	2312	1	1

Source:
SCAQMD. 2009. Appendix C Mass Rate Look Up Table. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/appendix-c-mass-rate-lst-look-up-tables.pdf?sfvrsn=2.
Note: All LSTs presented are for a 1-acre site with receptors located at a distance of 25 meters. These LSTs are the most restrictive for each SRA, resulting in a conservative analysis of project impacts.

Methodology

Although not regulated by the Ordinance, well abandonment is a reasonably foreseeable outcome for many of the wells currently operating in the City, although as stated previously, no specific timeline for abandonment currently exists and the Ordinance does not include any regulations related to the timing of the abandonment of oil wells. As such, for purposes of this analysis, there are two distinct phases that would have the potential to change air quality emissions at locations in proximity to oil and gas wells

throughout the City: 1) Short-term and temporary abandonment related activities, and 2) Long-term changes to air quality attributable to the cessation of oil and gas extraction and operations.

Air quality impacts were evaluated in accordance with the methodologies recommended by CARB and the SCAQMD. Air Quality emissions associated with short-term and temporary abandonment related activities were calculated using CalEEMod. Because these emissions would be short-term and temporary, they have been compared to SCAQMD's regional and localized significance thresholds. Long-term changes to air quality attributable to the cessation of oil and gas extraction and operations have been characterized quantitively and qualitatively, and have been compared to SCAQMD's thresholds of significance as appropriate.

2.6 PROJECT IMPACTS

AQ Impact 1 **Would implementation of the project conflict with or obstruct implementation of any applicable air quality plan? *(Less than Significant).***

As part of its enforcement responsibilities, the EPA requires each state with nonattainment areas to prepare and submit a SIP that demonstrates the means to attain the federal standards. The SIP must integrate federal, state, and local plan components and regulations to identify specific measures to reduce pollution in nonattainment areas, using a combination of performance standards and market-based programs. Similarly, under state law, the CCAA requires an air quality attainment plan to be prepared for areas designated as nonattainment with regard to the federal and state ambient air quality standards. Air quality attainment plans outline emissions limits and control measures to achieve and maintain these standards by the earliest practical date.

As discussed previously, the 2016 AQMP was drafted by the SCAQMD and was developed in effort with CARB, SCAG, and the U.S. EPA to establish a program of rules and regulations to reduce air pollutant emissions to achieve CAAQS and NAAQS.[28] The plan's pollutant control strategies are based on SCAG's Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS). While SCAG adopted the updated 2020-2045 RTP/SCS in September 2020, it has not been incorporated into an applicable air quality plan.

Criteria for determining consistency with the AQMP are defined in Chapter 12, Section 12.2 and Section 12.3 of the SCAQMD's 1993 CEQA Air Quality Handbook, and include the following:

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[28] South Coast Air Quality Management District. 2016. *Air Quality Management Plan*. Available online at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/final2016aqmp.pdf, accessed August 16, 2022.

- Consistency Criterion No. 1: The project will not result in an increase in the frequency or severity of an existing air quality violation, or cause or contribute to new violations, or delay the timely attainment of air quality standards or the interim emissions reductions specified in the AQMP.

- Consistency Criterion No. 2: The project will not exceed the assumptions in the AQMP or increments based on the years of the project build-out phase.

The violations to which Consistency Criterion No. 1 refers are the CAAQS and the NAAQS. As evaluated under **AQ Impact 2** below, the Ordinance would not exceed the short-term standards or long-term standards and, thus, would not have the potential to violate any air quality standards. Thus, the Ordinance would be consistent with first criterion.

With respect to Consistency Criterion No. 2, the 2016 AQMP contains air pollutant reduction strategies based on SCAG's growth forecasts, and SCAG's growth forecasts were defined in consultation with local governments and with reference to local general plans. The Ordinance would not result in any changes to housing or population forecasts for the City or the region as a whole. Therefore, the Ordinance would not exceed the assumptions utilized to develop the 2016 AQMP and the Ordinance would be consistent with the second criterion. As such, because the Ordinance would be consistent with the criteria for demonstrating consistency with the AQMP, the Ordinance would not have the potential to conflict with or obstruct implementation of any applicable air quality plan and this impact is ***less than significant***.

AQ Impact 2 **Would implementation of the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard? *(Less than Significant).***

A project may have a significant impact if project-related emissions would result in a cumulatively considerable net increase for an criteria pollutant for which the region in nonattainment under applicable federal or state ambient air quality standards. The cumulative analysis of air quality impacts follows the SCAQMD's guidance such that construction or operational project emissions will be considered cumulatively considerable if project-specific emissions exceed an applicable SCAQMD recommended threshold.

Short-Term and Temporary Air Quality Emissions

The closure of oil and gas wells entails plugging the wells in place in accordance with California Statutes and Regulations and all other applicable requirements as overseen by CalGEM. The process of well abandonment will be determined on a case-by-case basis under the regulatory supervision of CalGEM and

the LAFD and will depend on individual site conditions such as type and depth of well. However, for the purposes of this environmental analysis, several generalized assumptions have been made based upon standard industry practice, existing regulations governing well abandonment, and case studies. While plugging and abandonment varies by well, there is a consistent set of procedures that are followed. Generally, the drill site's existing drilling or maintenance rig will be used to abandon the well and remove equipment from the well.[29] Well equipment will be removed from the site by truck. Cement trucks will also arrive onsite to fill the well at various depths over a span of several days. An operator may use in excess of 2,500 cubic feet of cement for one abandonment. The process entails removing equipment and filling the well with cement at different phases in order to ensure that it is safe to abandon the well at varying depths. At the end of each work day, the well site is closed and the rig is shut down in order to resume operations the following work day. See **Section 1.2, Project Description**, for the anticipated steps of well abandonment.

For purposes of estimating potential air quality associated with abandonment activities, it is assumed each well abandonment would last approximately two weeks (i.e., 10 workdays), and on-site equipment would include one workover rig, one cement pump truck, one welder, and one tractor/loader/backhoe. On-road activity was estimated to include 10 worker trips per day (travel to and from the well locations) and 3 truck trips per day. This analysis conservatively assumes that all pieces of equipment would operate concurrently on a peak day, presenting a worst-case impact scenario.

Abandonment activities would generate short-term emissions of criteria air pollutants. The criteria pollutants of primary concern include ozone-precursor pollutants (i.e., ROG and NOx), PM10, and PM2.5. Abandonment-generated emissions are short term and of temporary duration, lasting only as long as activities occur, but would be considered a significant air quality impact if the volume of pollutants generated exceeds the SCAQMD's thresholds of significance. Abandonment activities would be required to comply with all applicable SCAQMD Rules, which may include but not be limited to: Rule 401 (Visible Emissions), Rule 402 (Nuisance), Rule 403 (Fugitive Dust – Trucks and Unpaved Roads), Rule 1186 (PM10 Emissions from Paved and Unpaved Roads), Rule 1148 (Thermally Enhanced Oil Recovery Wells), Rule 1148.1 (Oil and Gas Extraction Wells), Rule 1148.2 (Notification and Reporting Requirements for Oil and Gas Wells and Chemical Suppliers), and Rule 1470 (Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines). These Rules are discussed in greater detail in **Section 2.4, Regulatory Framework**, above. The estimated maximum daily abandonment related air

29 When a drilling or maintenance rig is not on the well site, a rig will need to be brought to the site to complete the abandonment process.

quality emissions are summarized in **Table 9, Oil & Gas Well Abandonment Emissions (Per Well) – Pounds Per Day.**

Table 9
Oil & Gas Well Abandonment Emissions (Per Well) – Pounds Per Day

Source	ROG	NOx	CO	SO2	PM10	PM2.5
Off-Road Equipment	0.51	4.69	5.79	0.01	0.19	0.17
Worker Trips	0.09	0.10	1.51	0.00	0.02	0.00
Truck Trips	0.01	0.31	0.14	0.01	0.02	0.01
Total Emissions	0.61	5.10	7.44	0.02	0.23	0.18
Regional Threshold	**75**	**100**	**550**	**150**	**150**	**55**
Exceed?	*No*	*No*	*No*	*No*	*No*	*No*

Source: Impact Sciences, September 2022. See Appendix B to this report.

As shown in **Table 8**, on a per-well basis, the peak daily emissions generated during abandonment would not exceed any of the regional emission thresholds recommended by the SCAQMD. As discussed previously, abandonment of individual wells may occur at any time during the 20-year timeframe, and potentially beyond the 20-year timeframe. It would be speculative to assess how many wells would be abandoned during a given year, month, or peak day. Nevertheless, for illustrative purposes, based on the peak daily emissions identified in **Table 8** for a single well, it is possible for up to approximately 19 wells to be abandoned concurrently (i.e., overlapping on a peak day) without exceeding any of the regional emission thresholds recommended by the SCAQMD. Therefore, the Ordinance would not result in a cumulatively considerable net increase of any criteria air pollutant for which the region is in nonattainment and this impact is ***less than significant***.

Long-Term Air Quality Emissions

As discussed previously, oil and gas operations throughout the City contribute to local and regional air quality conditions. Upon full implementation of the Ordinance, existing emission sources associated with oil and gas wells would no longer occur, and long-term air quality emissions would be decreased compared to existing emissions associated with oil and gas extraction throughout the City. The following discussion identifies the potential air quality emissions that may be avoided as a result of the Ordinance.

Long-term air quality emissions fall into two general categories: 1) worker commutes and 2) fugitive emissions. Typical emissions from worker commutes (i.e., motor vehicle trips) include ROG, NOx, CO, SOx, PM10 and PM2.5. Fugitive emissions include ROGs (also referred to as volatile organic compounds)

which may include but not be limited to pentane, n-pentane, hexane, ethane, and other longer-chain hydrocarbons. In general, fugitive emissions from oil and gas activities may be attributed to the following primary types of sources: fugitive equipment leaks; process venting; evaporation losses; disposal of waste gas streams (e.g., by venting or flaring), and accidents and equipment failures. Fugitive leaks from piping and equipment are typically small yet detectable emissions from equipment where there are joints, flanges, and seals. Although joints and flanges are typically bolted, small amounts of hydrocarbons may be emitted through leaky joints.

It should be noted that fugitive emissions are difficult to quantify with a high degree of accuracy and there remains substantial uncertainty in the emission factors and calculation methodologies for oil and gas activities. This is due to the numerous types of sources and many variables to be considered. The key emission assessment issues are: (a) use of simple extraction based emission factors is susceptible to excessive errors; (b) use of rigorous bottom-up approaches requires expert knowledge to apply and relies on detailed data which may be difficult and costly to obtain; and (c) measurement programs are time consuming and very costly to perform.[30] Nevertheless, **Table 10, Avoided Oil & Gas Air Quality Emissions – Pounds per Day**, has been included in an effort to illustrate the potential scope of air quality emissions that may be avoided as a result of the Ordinance.[31] Due to the programmatic nature of this analysis and the many variables at each oil and gas well throughout the City, the quantified estimates in **Table 9** are included as a good-faith effort for illustrative purposes.

Table 10
Avoided Oil & Gas Air Quality Emissions – Pounds per Day

Source	ROG	NOx	CO	SO2	PM10	PM2.5
Worker Emissions	1.12	1.11	16.60	0.06	2.71	0.50
Fugitive Emissions	807.66	--	--	--	--	--
Total Avoided Emissions	**808.78**	1.11	16.60	**0.06**	**2.71**	**0.50**

*Source: Impact Sciences, September 2022. See **Appendix B** to this report.*

Furthermore, while it is clear the Ordinance would result in a net benefit to local and regional air quality conditions, the degree to which air quality emissions may be avoided under the Ordinance is not the basis for the impact determination. Because the Ordinance would reduce long-term air quality emissions

30 Intergovernmental Panel on Climate Change, Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories, Fugitive Emissions From Oil and Natural Gas Activities.

31 See **Appendix B** to this report for further information related to calculations and assumptions utilized to prepare these estimates.

compared to existing emissions associated with oil and gas extraction throughout the City, the Ordinance would not result in a cumulatively considerable net increase of any criteria air pollutant for which the region is in nonattainment and this impact is ***less than significant***.

AQ Impact 3 **Would implementation of the project expose sensitive receptors to substantial air pollutant concentrations? (*Less than Significant).***

Localized Air Quality Emissions

The SCAQMD has developed localized significance thresholds (LST) that represent the maximum emissions from a project that are not expected to cause or contribute to an exceedance of the applicable federal or State ambient air quality standard. LSTs are provided for each source receptor area (SRA) and various distances from the source of emissions. As the Ordinance is citywide, activities under the Ordinance could occur in parts of eight SRAs in the Coastal, Metropolitan, San Fernando Valley, and San Gabriel Valley areas.[32] The LSTs applicable to the Ordinance were presented previously in **Table 7**. The closest receptor distance in the SCAQMD's mass rate look-up tables is 25 meters. Projects that are located closer than 25 meters to the nearest receptor are directed to use the LSTs for receptors located within 25 meters. Abandonment activities would generate short-term localized emissions of criteria air pollutants. While abandonment-generated emissions are short term and of temporary duration, the emissions could be considered a significant air quality impact if the pollutants exceed the SCAQMD's LSTs.

As shown in **Table 11, Localized Oil & Gas Well Abandonment Emissions (Per Well) – Pounds Per Day**, the Ordinance would not exceed any of the identified localized thresholds of significance during abandonment. Therefore, the Ordinance would not expose sensitive receptors to substantial air pollutant concentrations and these impacts would be ***less than significant***.

[32] The SRAs include: SRA 1, described as Central Los Angeles County; SRA 2, described as Northwest Los Angeles County Coastal; SRA 3, described as Southwest Los Angeles County Coastal; SRA 4, described as South Los Angeles County Coastal; SRA 6, described as West San Fernando Valley; SRA 7, described as East San Fernando Valley; SRA 8, described as West San Gabriel Valley; and SRA 12, described as South Central Los Angeles County.

Table 11
Localized Oil & Gas Well Abandonment Emissions (Per Well) – Pounds Per Day

Activity	NOx	CO	PM10	PM2.5
Abandonment	**4.69**	**5.79**	**0.19**	**0.17**
SCAQMD Localized Thresholds	*46.00*	*231.00*	*4.00*	*3.00*
Exceed Thresholds?	**No**	**No**	**No**	**No**

Note: Based on the data in Table 7, the lowest (i.e., most restrictive) LST foy each pollutant in any SRA citywide has been identified to present a conservative analysis.
Source: Impact Sciences, September 2022. See Appendix B to this report.

Diesel Particulate Matter

The use of diesel-powered equipment and trucks during abandonment would result in the generation of diesel particulate matter (diesel PM) emissions. The amount to which the sensitive receptors are exposed (a function of concentration and duration of exposure) is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). Health-related risks associated with diesel-exhaust emissions are primarily linked to long-term exposure and the associated risk of contracting cancer.

The use of diesel-powered construction equipment and trucks would be temporary and episodic. The duration of exposure would be short and exhaust from construction equipment dissipates rapidly. Current methodologies for conducting health risk assessments are associated with long term exposure periods (9, 30, and 70 years). As discussed previously, typical abandonment activities are expected to last for approximately 10 work days. Therefore, short-term abandonment activities would not have the potential to generate a significant health risk. Furthermore, abandonment activities would be subject to and would comply with California regulations limiting the idling of heavy-duty construction equipment to no more than 5-minutes, which would further reduce nearby sensitive receptors' exposure to temporary and variable DPM emissions.[33] For these reasons, DPM emissions associated with abandonment would not expose sensitive receptors to substantial amounts of air toxics and this impact is ***less than significant***.

[33] California Air Resources Board. 2015. *Frequently Asked Questions Regulation for In-Use Off-Road Diesel-Fueled (Off-Road Regulation)*. Available online at: https://ww3.arb.ca.gov/msprog/ordiesel/faq/idlepolicyfaq.pdf, accessed August 16, 2022

AQ Impact 4 **Would the proposed project include sources that could create other emissions (such as those leading to odors) adversely affecting a substantial number of people? (*Less than Significant).***

The SCAQMD *CEQA Air Quality Handbook* (1993) identifies certain land uses as sources of odors. These land uses include agriculture (farming and livestock), wastewater treatment plants, food processing plants, chemical plants, composting facilities, refineries, landfills, dairies, and fiberglass molding.

Existing oil and gas operations throughout the City contribute to localized emissions that lead to odors. Several compounds associated with the oil and gas industry can produce nuisance odors. Sulfur compounds found in oil and gas have very low odor detection levels. Many volatile compounds found in oil and gas (e.g., pentane, n-pentane, hexane, ethane, and other longer-chain hydrocarbons) typically have a petroleum or gasoline-type odor. An odor "event" is generally considered a scenario where odors are released and negatively impact the surrounding community, measured as generating odor complaints to the SCAQMD and confirmed by the SCAQMD as attributable to a specific source.

During abandonment activities, the two primary sources of potential odors are fugitive well emissions and diesel exhaust from equipment and trucks. As abandonment activities are anticipated to last approximately 10 work days, these emission sources and associated odors would be temporary and intermittent, and affecting only those receptors located in proximity to the wells. In addition, abandonment activities would be subject to SCAQMD Rule 402 (Nuisance) and California Code of Regulations, Title 13, sections 2449(d)(3) and 2485, which minimizes the idling time of construction equipment either by shutting it off when not in use or by reducing the time of idling to no more than five minutes. These regulations would serve to minimize temporary and intermittent odors. As oil and gas operations cease, existing oil and gas well emissions leading to odors would no longer occur, and long-term odors would be decreased compared to existing conditions. Therefore, the Ordinance would not create other emissions leading to odors adversely affecting a substantial number of people, and this impact is ***less than significant***.

3.0 GREENHOUSE GAS

3.1 GREENHOUSE GAS SETTING

Global climate change refers to any significant change in climate measurements, such as temperature, precipitation, or wind, lasting for an extended period (i.e., decades or longer).[34] Climate change may result from:

- Natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun;
- Natural processes within the climate system (e.g., changes in ocean circulation, reduction in sunlight from the addition of GHG and other gases to the atmosphere from volcanic eruptions); and
- Human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., deforestation, reforestation, urbanization, desertification).

In recent decades, changes in climate have caused impacts on natural and human systems on all continents and across the oceans. Impacts are due to observed climate change, irrespective of its cause, indicating the sensitivity of natural and human systems to changing climate.[35] Continuing changes to the global climate system and ecosystems, and to California, are projected to include:

- Rapidly diminishing sea ice and mountain snowpack levels, thereby increasing sea levels and sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures[36];
- Rising average global sea levels primarily due to thermal expansion and the melting of glaciers, ice caps, and ice sheets;
- Changing weather patterns, including changes to precipitation, ocean salinity, and wind patterns, and more energetic aspects of extreme weather, including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones;

34 US EPA. Overview of Greenhouse Gases. Available online at: https://www.epa.gov/ghgemissions/overview-greenhouse-gases, accessed on August 16, 2022.

35 Intergovernmental Panel on Climate Change. 2013. "Climate Change 2013: The Physical Science Basis." Available online at: https://www.ipcc.ch/report/ar5/wg1/ , accessed August 16, 2022.

36 Intergovernmental Panel on Climate Change. 2013. "Climate Change 2013: The Physical Science Basis." Available online at: https://www.ipcc.ch/report/ar5/wg1/ , accessed August 16, 2022.

- Changing levels in snowpack, river flow and sea levels indicating that climate change is already affecting California's water resources[37];
- Dry seasons that start earlier and end later, evoking more frequent and intense wildland fires[38]; and
- Increasing demand for electricity due to rising temperatures.[39]

The natural process through which heat is retained in the troposphere[40] is called the "greenhouse effect." Various gases in the Earth's atmosphere, classified as atmospheric greenhouse gases, play a critical role in determining the Earth's surface temperature. Solar radiation enters Earth's atmosphere as short wave radiation. It travels through the atmosphere without warming it and is absorbed by the Earth's surface. When the Earth re-emits this radiation back toward space, the radiation changes to long wave radiation. GHGs are transparent to incoming short wave solar radiation but absorb outgoing long wave radiation. As a result, radiation that otherwise would escape back into space is now retained, warming the atmosphere. This phenomenon is known as the greenhouse effect.

Greenhouse Gas Compounds

California State law defines GHGs to include the following six compounds:

- **Carbon Dioxide** (CO_2) is an odorless, colorless GHG, which has both natural and man-made sources. Natural sources include the following: decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing; man made sources of CO_2 are burning coal, oil, natural gas, and wood.
- **Methane** (CH_4) is a flammable gas and is the main component of natural gas. When one molecule of CH_4 is burned in the presence of oxygen, one molecule of CO_2 and two molecules of water are released. There are no ill health effects from CH_4. A natural source of CH_4 is the anaerobic decay of organic matter. Geological deposits, known as natural gas fields, also contain CH_4, which is extracted for fuel. Other sources are from landfills, fermentation of manure, and cattle.

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37 California Environmental Protection Agency (Cal EPA). 2010. Climate Action Team Report to Governor Schwarzenegger and the Legislature.

38 California Environmental Protection Agency (Cal EPA). 2010. Climate Action Team Report to Governor Schwarzenegger and the Legislature.

39 California Environmental Protection Agency (Cal EPA). 2010. Climate Action Team Report to Governor Schwarzenegger and the Legislature.

40 The troposphere is the bottom layer of the atmosphere, which varies in height from the Earth's surface from 6- to 7-miles).

- **Nitrous Oxide** (N_2O) is a colorless GHG. High concentrations can cause dizziness, euphoria, and sometimes slight hallucinations. N_2O is produced by microbial processes in soil and water, including those reactions which occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. It is used in rocket engines, race cars, and as an aerosol spray propellant.

- **Hydrofluorocarbons** (HFCs) are synthetic man-made chemicals that are used as a substitute for chlorofluorocarbons (CFCs) for automobile air conditioners and refrigerants. CFCs are gases formed synthetically by replacing all hydrogen atoms in methane or ethane with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at Earth's surface). CFCs were first synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. Because they destroy stratospheric ozone, the production of CFCs was stopped as required by the Montreal Protocol in 1987.

- **Perfluorocarbons** (PFCs) have stable molecular structures and do not break down through the chemical processes in the lower atmosphere. High-energy ultraviolet rays about 60 kilometers above Earth's surface are able to destroy the compounds. PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane and hexafluoroethane. The two main sources of PFCs are primary aluminum production and semiconductor manufacture.

  Sulfur Hexafluoride (SF_6) is an inorganic, odorless, colorless, non-toxic, and nonflammable gas. SF_6 is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

- **Black Carbon** is the most strongly light-absorbing component of particulate matter emitted from burning fuels such as coal, diesel, and biomass. It contributes to global warming, but is a solid particle or aerosol, not a gas.

Global Warming Potential

Global Warming Potential (GWP) is one type of simplified index based upon radiative properties that is used to estimate the potential future impacts of emissions of different gases upon the climate system in a relative sense. GWP is based on a number of factors, including the radiative efficiency (heat-absorbing ability) of each gas relative to that of CO_2, as well as the decay rate of each gas (the amount removed from the atmosphere over a given number of years) relative to that of CO_2. A summary of the atmospheric lifetime and GWP of selected gases is presented in **Table 12, Atmospheric Lifetimes and Global Warming Potential for Greenhouse Gases**.

Table 12
Atmospheric Lifetimes and Global Warming Potential for Greenhouse Gases

Greenhouse Gas	Lifetime (Years)	Global Warming Potential Factor (20-Year)	Global Warming Potential Factor (100-Year)
Carbon Dioxide	100	1	1
Nitrous Oxide	121	264	298
Nitrogen Trifluoride	500	12,800	16,100
Sulfur Hexafluoride	3,200	17,500	23,500
Perfluorocarbons	3,000-50,000	5,000-8,000	7,000-11,000
Black Carbon	days to weeks	270-6,200	100-1,700
Methane	12	84	25
Hydrofluorocarbons	Uncertain	100-11,000	100-12,000

Source: CARB, Climate Change Scoping Plan First Update, 2013.
Note: "Global Warming Potential" is a relative measure of how much heat a GHG traps in the atmosphere, as compared to CO_2.

Potential Effects of Climate Change

Globally, climate change has the potential to affect numerous environmental resources though potential impacts related to future air temperatures and precipitation patterns. Scientific modeling predicts that continued GHG emissions at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. Long-term trends have found that each of the past three decades has been warmer than all the previous decades in the instrumental record, and the decade from 2000 through 2010 has been the warmest. The observed global mean surface temperature for the decade from 2006 to 2015 was approximately 0.87 °C (0.75°C to 0.99°C) higher than the average over the period from 1850 to 1900. Furthermore, several independently analyzed data records of global and regional Land-Surface Air Temperature obtained from station observations are in agreement that air and sea surface temperatures have increased. Due to past and current activities, anthropogenic GHG emissions are increasing global mean surface temperature at a rate of 0.2°C per decade. In addition to these findings, there are identifiable signs that global warming is currently taking place, including substantial ice loss in the Arctic over the past two decades.[41,42]

According to California's Fourth Climate Change Assessment, statewide temperatures from 1986 to 2016 were approximately 1°F to 2°F higher than those recorded from 1901 to 1960. Potential impacts of climate change in California may include loss in water supply from snowpack, sea level rise, more extreme heat days per year, more large forest fires, and more drought years. While there is growing scientific consensus

41 IPCC, *5th Assessment Report*, 2014.

42 IPCC, *Special Report on the Impacts of Global Warming*, 2018.

about the possible effects of climate change at a global and statewide level, current scientific modeling tools are unable to predict what local impacts may occur with a similar degree of accuracy. In addition to statewide projections, California's Fourth Climate Change Assessment includes regional reports that summarize climate impacts and adaptation solutions for nine regions of the state as well as regionally-specific climate change case studies.[43] Below is a summary of some of the potential effects that could be experienced in California as a result of climate change.

Air Quality. Higher temperatures, which are conducive to air pollution formation, could worsen air quality in California. Climate change may increase the concentration of ground-level ozone, but the magnitude of the effect, and therefore its indirect effects, are uncertain. As temperatures have increased in recent years, the areas burned by wildfires throughout the state has increased, and wildfires have been occurring at higher elevations in the Sierra Nevada Mountains.[44] If higher temperatures continue to be accompanied by an increase in the incidence and extent of large wildfires, air quality would worsen. However, if higher temperatures are accompanied by wetter, rather than drier conditions, the rains would tend to temporarily clear the air of particulate pollution and reduce the incidence of large wildfires, thereby ameliorating the pollution associated with wildfires. Additionally, severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout the state.[45]

Water Supply. Analysis of paleoclimatic data (such as tree-ring reconstructions of stream flow and precipitation) indicates a history of naturally and widely varying hydrologic conditions in California and the west, including a pattern of recurring and extended droughts. Uncertainty remains with respect to the overall impact of climate change on future precipitation trends and water supplies in California. For example, many southern California cities have experienced their lowest recorded annual precipitation twice within the past decade; however, in a span of only two years, Los Angeles experienced both its driest and wettest years on record.[46] This uncertainty regarding future precipitation trends complicates the analysis of future water demand, especially where the relationship between climate change and its potential effect on water demand is not well understood. However, the average early spring snowpack in the western United States, including the Sierra Nevada Mountains, decreased by about 10 percent during the last century. During the same period, sea level rose over 5.9 inches along the central and southern California coast.[47] The Sierra snowpack provides the majority of California's water supply by accumulating

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43 State of California, *California's Fourth Climate Change Assessment Statewide Summary Report*, 2018.

44 State of California, *California's Fourth Climate Change Assessment Statewide Summary Report*, 2018.

45 California Natural Resources Agency, *California Climate Adaptation Strategy*, 2009.

46 California Department of Water Resources, *Managing an Uncertain Future: Climate Change Adaption Strategies for California's Water*, 2008.

47 State of California, *California's Fourth Climate Change Assessment Statewide Summary Report*, 2018.

snow during the state's wet winters and releasing it slowly during the state's dry springs and summers. A warmer climate is predicted to reduce the fraction of precipitation falling as snow and result in less snowfall at lower elevations, thereby reducing the total snowpack.[48,49] The State of California projects that average spring snowpack in the Sierra Nevada and other mountain catchments in central and northern California will decline by approximately 66 percent from its historical average by 2050.[50]

Hydrology and Sea Level Rise. As discussed above, climate change could potentially affect the amount of snowfall, rainfall, and snowpack; the intensity and frequency of storms; flood hydrographs (flash floods, rain or snow events, coincidental high tide and high runoff events); sea level rise and coastal flooding; coastal erosion; and the potential for saltwater intrusion. Climate change has the potential to induce substantial sea level rise in the coming century.[51] The rising sea level increases the likelihood and risk of flooding. The rate of increase of global mean sea levels over the 2001-2010 decade, as observed by satellites, ocean buoys and land gauges, was approximately 3.2 millimeter per year, which is double the observed 20th century trend of 1.6 millimeter per year.[52] As a result, global mean sea levels averaged over the last decade were about 8 inches higher than those of 1880.[53]

Sea levels are rising faster now than in the previous two millennia, and the rise is expected to accelerate, even with robust GHG emission control measures. The most recent Intergovernmental Report on Climate Change (IPCC) report predicts a mean sea–level rise of 10 to 37 inches by 2100.[54] A rise in sea levels could completely erode 31 to 67 percent of southern California beaches, result in flooding of approximately 370 miles of coastal highways during 100-year storm events, jeopardize California's water supply due to salt water intrusion, and induce groundwater flooding and/or exposure of buried infrastructure.[55] In addition, increased CO_2 emissions can cause oceans to acidify due to the carbonic acid it forms. Increased storm intensity and frequency could affect the ability of flood-control facilities, including levees, to handle storm events.

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48 California Department of Water Resources, *Managing an Uncertain Future: Climate Change Adaption Strategies for California's Water*, 2008.

49 State of California, *California's Fourth Climate Change Assessment Statewide Summary Repor*t, 2018.

50 State of California, *California's Fourth Climate Change Assessment Statewide Summary Repor*t, 2018.

51 State of California, *California's Fourth Climate Change Assessment Statewide Summary Repor*t, 2018.

52 World Meteorological Organization, *A Summary of Current and Climate Change Findings and Figures: A WMO Information Note*, 2013.

53 World Meteorological Organization, *A Summary of Current and Climate Change Findings and Figures: A WMO Information Note*, 2013.

54 IPCC, *Special Report on the Impacts of Global Warming*, 2018.

55 State of California, *California's Fourth Climate Change Assessment Statewide Summary Report*, 2018.

Agriculture. California has a $50 billion annual agricultural industry that produces over a third of the country's vegetables and two-thirds of the country's fruits and nuts.[56] Higher CO_2 levels can stimulate plant production and increase plant water-use efficiency. However, if temperatures rise and drier conditions prevail, certain regions of agricultural production could experience water shortages of up to 16 percent; water demand could increase as hotter conditions lead to the loss of soil moisture; crop-yield could be threatened by water-induced stress and extreme heat waves; and plants may be susceptible to new and changing pest and disease outbreaks.[57] In addition, temperature increases could change the time of year certain crops, such as wine grapes, bloom or ripen, and thereby affect their quality.[58]

Ecosystems and Wildlife. Climate change and the potential resulting changes in weather patterns could have ecological effects on a global and local scale. Increasing concentrations of GHGs are likely to accelerate the rate of climate change. Scientists project that the annual average maximum daily temperatures in California could rise by 4.4 to 5.8°F in the next 50 years and by 5.6 to 8.8°F in the next century.[59] Soil moisture is likely to decline in many regions, and intense rainstorms are likely to become more frequent. Rising temperatures could have four major impacts on plants and animals related to (1) timing of ecological events; (2) geographic distribution and range; (3) species' composition and the incidence of nonnative species within communities; and (4) ecosystem processes, such as carbon cycling and storage.[60,61]

Statewide GHG Emissions

CalEPA published a report titled Scenarios of Climate Change in California: An Overview (Climate Scenarios report) in February 2006 that, while not adequate for a CEQA project-specific or cumulative analysis, is generally instructive about the future impacts of global warming on California. In addition, on December 2, 2009, the California Natural Resources Agency released its California Climate Adaptation Strategy report that details many vulnerabilities arising from climate change with respect to matters such as temperature extremes, sea level rise, wildfires, floods and droughts and precipitation changes. According to these reports, substantial temperature increases arising from increased GHG emissions potentially could result in a variety of impacts to the people, economy, and environment of California. This includes an associated projected increase in extreme conditions, with the severity of the impacts depending upon actual future emissions of GHGs and associated warming. Under the emissions scenarios of the Climate Scenarios report, the impacts of global climate change in California have the potential to include,

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56 California Department of Food and Agriculture, *California Agricultural Production Statistics*, 2018.

57 State of California, *California's Fourth Climate Change Assessment Statewide Summary Report*, 2018.

58 California Climate Change Center, *Climate Scenarios for California*, 2006.

59 State of California, *California's Fourth Climate Change Assessment Statewide Summary Report*, 2018.

60 Parmesan, C. August, *Ecological and Evolutionary Responses to Recent Climate Change*, 2006.

61 State of California, *California's Fourth Climate Change Assessment Statewide Summary Report*, 2018.

but are not limited to, the areas of public health, water resources, agriculture, forests and landscapes, and rising sea levels. The potential effects of climate change are detailed in the section below.

CARB publishes an annual statewide emissions inventory trends report with the most recent iteration covering the years 2000–2019. Emission inventory trends over the past decade demonstrate that GHG emissions have decreased by eight percent over that period, as shown in **Table 13**.[62] The units of GHG emissions presented in the table are in million metric tons of carbon dioxide equivalents ($MMTCO_2e$). The transportation sector represents California's largest source of GHG emissions and contributed approximately 40 percent of total annual emissions in 2019.

Table 13
California Greenhouse Gas Emissions Inventory

Sector	CO_2e Emissions (Million Metric Tons)										
	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Transportation	168.0	165.1	161.8	161.4	161.3	162.6	166.2	169.8	171.2	169.6	166.1
Industrial	87.2	91.1	89.4	88.9	91.7	92.5	90.3	89.0	88.8	89.2	88.2
Electric Power	101.3	90.3	89.2	98.2	91.4	88.9	84.8	68.6	62.1	63.1	58.8
Commercial and Residential	44.5	45.9	46.0	43.5	44.2	38.2	38.8	40.6	41.3	41.4	43.8
Agriculture	32.9	33.7	34.4	35.5	33.8	34.7	33.5	33.3	32.5	32.7	31.8
High GWP Sources	12.3	13.5	14.5	15.5	16.8	17.7	18.6	19.2	20.0	20.4	20.6
Recycling and Waste	8.2	8.3	8.4	8.3	8.4	8.4	8.5	8.6	8.7	8.7	8.9
Emissions Total	**454.4**	**447.9**	**443.7**	**451.3**	**447.6**	**443.**	**440.7**	**429.1**	**424.6**	**425.1**	**418.2**

Source: CARB, California Greenhouse Gas Emission Inventory - 2021 Edition, July 2021. Available at: https://ww3.arb.ca.gov/cc/inventory/data/data.htm. Accessed August 2022.

The data in **Table 14** convey a steady increase in GHG emissions from the transportation sector between 2013 and 2017, followed by sequential years of reductions in 2018 and 2019. This recent decline is consistent with the long-term direction of transportation-related GHG emissions resulting from statewide reduction initiatives, as evidenced by 2019 transportation emissions being lower than 2009 levels despite the growing population. Transportation sector GHG emissions have declined as a material benefit of more stringent fuel economy standards and enhanced alternative fuel vehicle programs mandated and enforced by the CARB.

62 CARB, *California Greenhouse Gas Emission Inventory - 2021 Edition*, July 2021. Available at: https://ww3.arb.ca.gov/cc/inventory/data/data.htm, accessed August 16, 2022.

Local GHG Emissions

As part of the Sustainable City pLAn, the City began tracking its GHG emissions inventory and progress in control strategies to reduce emissions in annual reports. L.A.'s Green New Deal is an expanded vision of the Sustainable City pLAn. Consistent with state-level regulatory initiatives to reduce GHG emissions, the City selected the 1990 GHG emissions level of 54.1 $MMTCO_2e$ as the comparative baseline for determining the efficacy of emission control strategies. According to L.A.'s Green New Deal third Annual Report (2021–2022), the City has reduced GHG emissions to 36 percent below 1990 levels as of 2020.[63] Coal generation decreased 25% from 20119 to 2020. The City is striving to be coal-free by 2025. Between 2014 and 2020, the carbon intensity of L.A.'s electricity grid has decreased by 46 percent, and 59 percent compared to a 1990 baseline. Los Angeles utilizes 43 percent renewable energy, and has the goal of reaching 60percent renewables by 2030 and to be carbon free by 2045.[64] The Sustainable City pLAn is described in more detail above under Regulatory Framework.

3.2 REGULATORY FRAMEWORK

International

Intergovernmental Panel on Climate Change. The World Meteorological Organization (WMO) and United Nations Environmental Program (UNEP) established the IPCC in 1988. The goal of the IPCC is to evaluate the risk of climate change caused by human activities. Rather than performing research or monitoring climate, the IPCC relies on peer-reviewed and published scientific literature to make its assessment. While not a regulatory body, the IPCC assesses information (i.e., scientific literature) regarding human-induced climate change and the impacts of human-induced climate change and recommends options to policy makers for the adaptation and mitigation of climate change. The IPCC reports its evaluations in special reports called assessment reports. The latest assessment report (i.e., Fifth Assessment Report, consisting of three working group reports and a synthesis report based on the first three reports) was published in 2013. In its 2013 report, the IPCC stated that global temperature increases since 1951 were extremely likely attributable to man-made activities (greater than 95 percent certainty).[65] The IPCC anticipates the release of the Sixth Assessment Report in 2022.[66]

63 City of Los Angeles, *L.A.'s Green New Deal. Annual Report 2021-2022*, 2022.

64 City of Los Angeles, *L.A.'s Green New Deal. Annual Report 2021-2022*, 2022.

65 IPCC, Climate Change 2013 The Physical Science Basis, 2013.

66 IPCC, *AR6 Synthesis Report: Climate Change 2022.* Available online at: https://www.ipcc.ch/report/sixth-assessment-report-cycle/, accessed August 16, 2022.

U.S.–China Climate Agreement. In November 2014, the United States and China made a joint announcement to cooperate on combating climate change and promoting clean energy. In the United States, President Barack Obama announced a climate target to reduce GHG emissions by 26 to 28 percent below 2005 levels by 2025. In China, President Xi Jinping announced a climate target to reduce peak CO_2 emissions by 2030 and to increase the renewable energy share across all sectors to 20 percent by 2030. China will need to build an additional 800 to 1,000 gigawatts of nuclear, wind, solar, and other zero emission generation capacity by 2030 to reach this target. Together, the United States and China have agreed to: expand joint clean energy research and development at the U.S.-China Clean Energy Research Center, advance major carbon capture, use and storage demonstrations, enhance cooperation on HFCs, launch a climate-smart/low-carbon cities initiative, promote trade in green goods, and demonstrate clean energy on the ground.[67]

Paris United Nations Framework Convention on Climate Change (Paris Accord). A new international climate change agreement was adopted at the Paris United Nations Framework Convention on Climate Change conference in December 2015. The last two climate conferences in Warsaw (2013) and Lima (2014) decided that countries were to submit their proposed emissions reduction targets for the 2015 conference as "intended nationally determined contributions" prior to the Paris conference. The European Union has committed to an economy-wide, domestic GHG reduction target of 40 percent below 1990 levels by 2030. The United States has set its intended nationally determined contribution to reduce its GHG emissions by 26 to 28 percent below its 2005 level in 2025 and to make best efforts to reduce its emissions by 28 percent. These targets are set with the goal of limiting global temperature rise to well below 2 degrees Celsius and getting to the 80 percent emission reduction by 2050.

In June 2017, the U.S. announced its intent to withdraw from the Paris Accord with an effective date of withdrawal of November 2020. On Friday, February 19, 2021, the United States formally rejoined the Paris Agreement.

In an effort to reach the goals set by the Paris Accord, over 9,000 cities and local governments from 132 countries across the world formed the Global Covenant of Mayors (GCoM) with the goal of collectively reducing 1.3 billion tons of CO_2 emissions per year by 2030.[68] 158 cities within the United States joined the GCoM (prior to the US formally rejoining the Paris Accord), including the City of Los Angeles.[69]

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67 The White House, *Fact Sheet: U.S.-China Joint Announcement on Climate Change and Clean Energy Cooperation*, November 11, 2014.

68 Global Covenant of Mayors for Climate & Energy Change. *About Us*. Available online at: https://www.globalcovenantofmayors.org/about/, accessed August 16, 2022

69 Global Covenant of Mayors for Climate & Energy. *USA*. Available online at: https://www.globalcovenantofmayors.org/region/usa/ , accessed August 16, 2022

North American Climate, Clean Energy, and Environment Partnership Action Plan. The North American Climate, Clean Energy, and Environment Partnership Action Plan was announced by Prime Minister Justin Trudeau, President Barack Obama, and President Enrique Peña Nieto on June 29, 2016, at the North American Leaders Summit in Ottawa, Canada. This Action Plan identifies the deliverables to be achieved and activities to be pursued by the three countries as part of this enduring Partnership. The three leaders declared their common vision in a historic North American Climate, Clean Energy, and Environment Partnership, described in a Leaders' Statement and Action Plan that details the actions our leaders will pursue. These actions include:

- Setting a target to increase clean power to 50 percent of the electricity generated across North America by 2025;
- Reducing methane emissions from the oil and gas sector by 40 to 45 percent by 2025;
- Strengthening standards for energy efficiency and vehicle emissions, including aligning energy efficiency standards that will amount to over four billion per year in annual savings for United States businesses and consumers by 2025;
- Strengthening vehicle efficiency, improving fuel quality, and reducing tailpipe pollutants;
- Affirming their support for joining and implementing the Paris Agreement this year and committing to work together to address climate issues through the Montreal Protocol, International Civil Aviation Organization, G-20, and other forums; and
- Celebrating our strong environmental cooperation, including expanding cooperation on early warning systems for natural disasters, supporting habitat for migratory species including Monarchs and birds, and developing action plans to combat wildlife trafficking.

Federal

Federal Clean Air Act. The United States Environmental Protection Agency (U.S. EPA) is responsible for implementing federal policy to address GHGs. The United States Supreme Court (Supreme Court) ruled in *Massachusetts v. Environmental Protection Agency*, 127 S.Ct. 1438 (2007), that CO_2 and other GHGs are pollutants under the federal Clean Air Act (CAA), which the U.S. EPA must regulate if it determines they pose an endangerment to public health or welfare. In December 2009, U.S. EPA issued an endangerment finding for GHGs under the Clean Air Act, setting the stage for future regulation.

The Federal Government administers a wide array of public-private partnerships to reduce the GHG intensity generated in the United States. These programs focus on energy efficiency, renewable energy,

methane and other non-CO_2 gases, agricultural practices, and implementation of technologies to achieve GHG reductions. U.S. EPA implements numerous voluntary programs that contribute to the reduction of GHG emissions. These programs (e.g., the ENERGY STAR labeling system for energy-efficient products) play a significant role in encouraging voluntary reductions from large corporations, consumers, industrial and commercial buildings, and many major industrial sectors.

Corporate Average Fuel Economy (CAFE) Standards. In response to the *Massachusetts v. Environmental Protection Agency* ruling, President George W. Bush issued Executive Order 13432 in 2007, directing the U.S. EPA, the United States Department of Transportation (USDOT), and the United States Department of Energy (USDOE) to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. The National Highway Traffic Safety Administration (NHTSA) subsequently issued multiple final rules regulating fuel efficiency for and GHG emissions from cars and light-duty trucks for model year 2011 and later for model years 2012-2016, and 2017-2021. In March 2020, the USDOT and the U.S. EPA issued the final Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule, which amends existing CAFE standards and tailpipe carbon dioxide emissions standards for passenger cars and light trucks and establishes new standards covering model years 2021 through 2026.[70] These standards set a combined fleet wide average of 36.9 to 37 for the model years affected.[71]

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011 the U.S. EPA and NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014–2018. The standards for CO_2 emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. According to the U.S. EPA, this regulatory program would reduce GHG emissions and fuel consumption for the affected vehicles by 6 to 23 percent over the 2010 baselines. Building on the first phase of standards, in August 2016, the EPA and NHTSA finalized Phase 2 standards for medium and heavy-duty vehicles through model year 2027 that will improve fuel efficiency and cut carbon pollution. The Phase 2 standards are expected to lower CO_2 emissions by approximately 1.1 billion metric tons.[72]

Energy Independence and Security Act. The Energy Independence and Security Act of 2007 (EISA) facilitates the reduction of national GHG emissions by requiring the following:

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70 U.S. Environmental Protection Agency, *Final Rule for Model Year 2021 - 2026 Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards.* April 30, 2020.

71 National Highway Traffic Safety Administration (NHTSA), *Corporate Average Fuel Economy standards.*

72 U.S. EPA, *EPA and NHTSA Adopt Standards to Reduce GHG and Improve Fuel Efficiency of Medium- and Heavy-Duty Vehicles for Model Year 2018 and Beyond, August 2016.*

- Increasing the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) that requires fuel producers to use at least 36 billion gallons of biofuel in 2022;

- Prescribing or revising standards affecting regional efficiency for heating and cooling products, procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances;

- Requiring approximately 25 percent greater efficiency for light bulbs by phasing out incandescent light bulbs between 2012 and 2014; requiring approximately 200 percent greater efficiency for light bulbs, or similar energy savings, by 2020; and

- While superseded by the U.S. EPA and NHTSA actions described above, (i) establishing miles per gallon targets for cars and light trucks and (ii) directing the NHTSA to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for trucks.

Additional provisions of EISA address energy savings in government and public institutions, promote research for alternative energy, additional research in carbon capture, international energy programs, and the creation of "green jobs."[73]

Global Change Research Act (1990). In 1990, Congress passed—and the President signed—Public Law 101-606, the Global Change Research Act.[74] The purpose of the legislation was: "...to require the establishment of a United States Global Change Research Program aimed at understanding and responding to global change, including the cumulative effects of human activities and natural processes on the environment, to promote discussions towards international protocols in global change research, and for other purposes." To that end, the Global Change Research Information Office was established in 1991 to serve as a clearinghouse of information. The Act requires a report to Congress every four years on the environmental, economic, health and safety consequences of climate change; however, the first and only one of these reports to date, the National Assessment on Climate Change, was not published until 2000. In February 2004, operational responsibility for GCRIO shifted to the U.S. Climate Change Science Program.

National Fuel Efficiency Policy. On May 19, 2009, the president announced a new National Fuel Efficiency Policy aimed at increasing fuel economy and reducing GHG pollution. This policy is expected to increase

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73 A green job, as defined by the United States Department of Labor, is a job in business that produces goods or provides services that benefit the environment or conserve natural resources.

74 Global Change Research Act (Public Law 101-606, 104 Stat. 3096-3104). 1990. Available online at: https://www.govinfo.gov/content/pkg/STATUTE-104/pdf/STATUTE-104-Pg3096.pdf, accessed August 16, 2022.

fuel economy by more than five percent by requiring a fleet-wide average of 35.5 miles per gallon by 2016 starting with model year 2012.

Fuel Economy Standards. On September 15, 2009, the U.S. EPA and the NHTSA issued a joint proposal to establish a national program consisting of new standards for model year 2012 through 2016 light-duty vehicles that will reduce GHG emissions and improve fuel economy. The proposed standards were to be phased in and require passenger cars and light-duty trucks to comply with a declining emissions standard. In 2012, passenger cars and light-duty trucks were required to meet an average emissions standard of 295 grams of CO_2 per mile and 30.1 miles per gallon. By 2016, the vehicles were required to meet an average standard of 250 grams of CO_2 per mile and 35.5 miles per gallon. The final standards were adopted on April 1, 2010.

On December 7, 2009, the U.S. EPA Administrator signed two distinct findings regarding GHGs under Section 202(a) of the CAA (42 United States Code Section 7521):

Endangerment Finding: The Administrator found that the current and projected concentrations of the six key well-mixed GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) in the atmosphere threaten the public health and welfare of current and future generations.

Cause or Contribute Finding: The Administrator found that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare.

While these findings do not impose additional requirements on industry or other entities, this action is a prerequisite to finalizing the U.S. EPA's proposed GHG emissions standards for light-duty vehicles, which were jointly proposed by the U.S. EPA and the NHTSA. On April 1, 2010, the U.S. EPA and the NHTSA issued final rules requiring that by the 2016 model-year, manufacturers must achieve a combined average vehicle emission level of 250 grams CO_2 per mile, which is equivalent to 35.5 miles per gallon as measured by U.S. EPA standards.

On November 16, 2011, EPA and NHTSA issued a joint proposal to extend the national program of harmonized GHG and fuel economy standards to model year (MY) 2017 through 2025 passenger vehicles. In August 2012, President Obama finalized standards that will increase fuel economy to the equivalent of 54.5 mpg for cars and light-duty trucks by MY 2025.

On January 12, 2017, the U.S. EPA Administrator Gina McCarthy signed her determination to maintain the GHG emissions standards for model year MY 2022-2025 vehicles. Her final determination found that automakers are well positioned to meet the standards at lower costs than previously estimated.[75]

On March 15, 2017, the new U.S. EPA Administrator Scott Pruitt and Department of Transportation Secretary Elaine Chao announced that the U.S. EPA intended to reconsider the final determination, issued on January 12, 2017, that recommended no change to the greenhouse gas standards for light duty vehicles for model years 2022- 2025.[76]

On April 2, 2018, the Administrator signed the Mid-term Evaluation Final Determination which finds that the model year 2022-2025 greenhouse gas standards are not appropriate in light of the record before EPA and, therefore, should be revised.[77]

On September 19, 2019, under the Safer, Affordable, Fuel-Efficient (SAFE) Vehicles Rule, the U.S. Department of Transportation's National Highway Traffic Safety Administration (NHSTA) and the U.S. EPA issued the final "One National Program Rule." The rule states that federal law preempts state and local laws regarding tailpipe GHG emissions standards, zero emissions vehicle mandates, and fuel economy for automobiles and light duty trucks. The rule revokes California's Clean Air Act waiver and preempts California's Advanced Clean Car Regulations and may potentially impact SCAG's Connect SoCal and transportation projects in the SCAG region.[78,79]

On September 20, 2019, a lawsuit was filed by California and a coalition of 22 other states, and the cities of Los Angeles, New York and Washington, D.C., in the United States District Court for the District of Columbia (Case 1:19-cv-02826) challenging the SAFE Rule and arguing that EPA lacks the legal authority to withdraw the California waiver. In April 2021, the U.S. EPA announced it would reconsider its previous

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75 U.S. Environmental Protection Agency. *Midterm Evaluation of Light-Duty Vehicle Greenhouse Gas Emissions Standards for Model Years 2022-2025*. Available online at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/midterm-evaluation-light-duty-vehicle-greenhouse-gas, accessed August 16, 2022.

76 U.S. Environmental Protection Agency. *Midterm Evaluation of Light-Duty Vehicle Greenhouse Gas Emissions Standards for Model Years 2022-2025*. Available online at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/midterm-evaluation-light-duty-vehicle-greenhouse-gas, accessed August 16, 2022.

77 U.S. Environmental Protection Agency. *Midterm Evaluation of Light-Duty Vehicle Greenhouse Gas Emissions Standards for Model Years 2022-2025*. Available online at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/midterm-evaluation-light-duty-vehicle-greenhouse-gas, accessed August 16, 2022.

78 U.S. Department of Transportation and U.S. EPA. 2019. *One National Program Rule on Federal Preemption of State Fuel Economy Standards*. Available online at: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100XI4W.pdf, accessed August 16, 2022.

79 Southern California Association of Governments. 2019. *Final Federal Safer, Affordable, Fuel-Efficient Vehicles Rule Part I (Supplemental Report).* Available online at: https://scag.ca.gov/sites/main/files/file-attachments/eec_item8_rc_item10_supplemental_report.pdf?1604641275, accessed August 16, 2022.

withdrawal and grant California permission to set more stringent climate requirements for cars and SUVs. On March 9, 2022, the U.S. EPA restored California's 2013 waiver to full force, including both its GHG standards and zero-emissions vehicles sales requirements.

Executive Order 13693. Issued on June 10, 2015, Executive Order 13693 — Planning for Federal Sustainability in the Next Decade. The goal of Executive Order 13693 is to maintain federal leadership in sustainability and GHG emission reductions. This Executive Order outlines forward-looking goals for federal agencies in the area of energy, climate change, water use, vehicle fleets, construction, and acquisition. Federal agencies shall, where life-cycle cost-effective, beginning in 2016:

- Reduce agency building energy intensity as measured in British Thermal Units per square foot by 2.5 percent annually through 2025;
- Improve data center energy efficiency at agency buildings;
- Ensure a minimum percentage of total building electric and thermal energy shall be from clean energy sources;
- Improve agency water use efficiency and management (including storm water management); and
- Improve agency fleet and vehicle efficiency and management by achieving minimum percentage GHG emission reductions.

Executive Order 13783. Issued on March 28, 2017, Executive Order 13783 — Promoting Energy Independence and Economic Growth — revokes multiple prior Executive Orders and memoranda including Executive Order 13653, the Power Sector Carbon Pollution Standards, Presidential Memorandum – Mitigating Impacts on Natural Resources from Development and Encouraging Related Private Investment, and Presidential Memorandum – Climate Change and National Security, as well as other federal reports and provisions. Executive Order 13783 represents a reversal on federal climate policy relative to the work of previous administrations and its objective is to reduce the regulatory framework applicable to GHG emissions to spur fossil fuel extraction. This Executive Order "established a national policy to promote the clean and safe development of our energy resources while reducing unnecessary regulatory burdens" (Federal Register 2017).[80] The order also "directs the U.S. EPA to review existing regulations, orders, guidance documents and policies that potentially burden the development or use of domestically produced energy resources." As of April 2020, the Council on Environmental Quality (CEQ) is considering updating its National Environmental Policy (NEPA) implementing regulations and has

80 Federal Register, *Executive Order 13783 of March 28, 2017: Promoting Energy Independence and Economic Growth, Vol. 82, No. 61*, March 21, 2017.

issued a Notice of Proposed Rulemaking that incorporates Executive Order 13783.[81] How these proposed rule changes will affect GHG emissions cannot be predicted at this time.

Executive Order 13795. Issued on April 28, 2017, Executive Order 13795 — Implementing an America-First Offshore Energy Strategy — directs the "policy of the United States to encourage energy exploration and production, including on the Outer Continental Shelf, in order to maintain the Nation's position as a global energy leader and foster energy security and resilience for the benefit of the American people, while ensuring that any such activity is safe and environmental responsible".[82] The objective of the order is to expand the opportunity for offshore energy development by removing restrictions on resource exploration and extraction. This Executive Order prioritizes the development of offshore energy resources over the protection of National Marine Sanctuaries and authorizes the review and potential revision or withdrawal of the Bureau of Ocean Energy Management's Proposed Rule entitled "Air Quality Control, Reporting, and Compliance," 81 Federal Register 19718 and any other related rules and guidance. The implications of implementing Executive Order 13795 with regards to the national GHG emissions inventory cannot be reasonably determined at this time.

Presidential Executive Order 13990. President Biden signed Executive Order 13990 – Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis — on January 20, 2021. The order directs all executive departments and agencies to immediately review and, as appropriate and consistent with applicable law, take action to address the promulgation of Federal regulations and other actions during the 2017–2021 executive tenure that conflict with the following national objectives: to improve public health and protect the environment; to ensure access to clean air and water; to limit exposure to dangerous chemicals and pesticides; to hold polluters accountable, including those who disproportionately harm communities of color and low-income communities; to reduce GHG emissions; to bolster resilience to the impacts of climate change; to restore and expand our national treasures and monuments; and to prioritize both environmental justice and the creation of the well-paying union jobs necessary to deliver these goals.[83]

Presidential Executive Order 14008. President Biden signed Executive Order 14008 – Tackling the Climate Crisis At Home and Abroad — on January 27, 2021. The order affirmed the United States as rejoining the

81 Council on Environmental Quality, *CEQ NEPA Regulations*, 2020.

82 Federal Register, *Executive Order 13783 of March 28, 2017: Promoting Energy Independence and Economic Growth, Vol. 82, No. 61*, March 21, 2017.

83 Federal Register, *Executive Order 13990 of January 20, 2021: Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis, Vol. 86, No. 14*, January 25, 2021.

Paris Agreement and expressed its commitment to exercising leadership in promoting global climate ambition to meet the climate challenge.[84]

State

The state of California has implemented a series of greenhouse gas plans and policies aimed at reducing state greenhouse gas emissions. Measures applicable to the project are summarized below:

California Air Resources Board. The California Air Resources Board (CARB), a part of the California Environmental Protection Agency (CalEPA), is responsible for the coordination and administration of both federal and state air pollution control programs within California. In this capacity, CARB conducts research, sets the California Ambient Air Quality Standards (CAAQS), compiles emission inventories, develops suggested control measures, and provides oversight of local programs. CARB establishes emissions standards for motor vehicles sold in California, consumer products (such as hairspray, aerosol paints, and barbecue lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions. CARB has primary responsibility for the development of California's State Implementation Plan (SIP), for which it works closely with the Federal Government and the local air districts. The SIP is required for the State to take over implementation of the Federal Clean Air Act. CARB also has primary responsibility for adopting regulations to meet the State's goal of reducing GHG emissions. The State has met its goals to reduce GHG emissions to 1990 levels by 2020. Subsequent State goals include reducing GHG emissions to 40 percent below 1990 levels by 2030 and to 80 percent below 1990 levels by 2050.

Statewide GHG Reduction Targets and Scoping Plans. Executive Order S-3-05, Assembly Bill 32, Senate Bill 32, 2017 Scoping Plan (CARB), Executive Order B-55-18, Cap-and-Trade Program, Senate Bill 350, Senate Bill 1383, Senate Bill 97, Senate Bill 375, Emission Performance Standards, Renewable Portfolio Standards (SB 1078, SB 107, SB X 1-2, and SB 100), Assembly Bill 1493, Low Carbon Fuel Standard (Executive Order S-01-07), Advanced Clean Cars Program, Senate Bill 743, California Integrated Waste Management Act (AB 341), California Appliance Efficiency Regulations, California Green Building Code (California Code of Regulations Title 24).

Executive Order S-3-05. Executive Order S-3-05, issued in June 2005, established GHG emissions targets for the State, as well as a process to ensure the targets are met. The order directed the Secretary for the CalEPA to report every two years on the State's progress toward meeting the Governor's GHG emission reduction targets. As a result of this executive order, the California Climate Action Team (CCAT), led by

84 Federal Register, *Executive Order 14008 of January 27, 2021: Tackling the Climate Crisis at Home and Abroad, Vol. 86, No. 19*, February 1, 2021.

the Secretary of the CalEPA, was formed. The CCAT is made up of representatives from a number of State agencies and was formed to implement global warming emission reduction programs and reporting on the progress made toward meeting statewide targets established under the Executive Order. The CCAT reported several recommendations and strategies for reducing GHG emissions and reaching the targets established in the Executive Order (CalEPA 2006). The statewide GHG targets are as follows:

- By 2010, reduce to 2000 emission levels;
- By 2020, reduce to 1990 emission levels; and
- By 2050, reduce to 80 percent below 1990 levels.

However, with the adoption of the California Global Warming Solutions Act of 2006 (also known as Assembly Bill [AB] 32), discussed below, the Legislature did not adopt the 2050 horizon-year goal from Executive Order No. S-3-05. In the last legislative session, the Legislature rejected legislation to enact the Executive Order's 2050 goal.[85]

The original mandate for the CCAT was to develop proposed measures to meet the emission reduction targets set forth in E.O. S-3-05. The CAT has since expanded and currently has members from 18 state agencies and departments. The CCAT also has ten working groups, which coordinate policies among their members. The working groups and their major areas of focus are:

- Agriculture: Focusing on opportunities for agriculture to reduce GHG emissions through efficiency improvements and alternative energy projects, while adapting agricultural systems to climate change;
- Biodiversity: Designing policies to protect species and natural habitats from the effects of climate change;
- Energy: Reducing GHG emissions through extensive energy efficiency policies and renewable energy generation;
- Forestry: Coupling GHG mitigation efforts with climate change adaptation related to forest preservation and resilience, waste to energy programs and forest offset protocols;

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85 The original version of SB 32 as introduced in the Legislature contained a commitment to the 2050 goal, but this commitment was not included in the final version of the bill. See: *https://leginfo.legislature.ca.gov/faces/billVersionsCompareClient.xhtml?bill_id=201520160SB32&cversion=20150SB3299INT*. In addition, the Supreme Court recently held in Cleveland National Forest Foundation et al. v San Diego Association of Governments (SANDAG)(S223603, July 13, 2017) that SANDAG did not abuse its discretion in declining to adopt the 2050 goal as a measure of significance in an analysis of the consistency of projected 2050 GHG emissions with the goals in Executive Order S-3-05.

- Land Use and Infrastructure: Linking land use and infrastructure planning to efforts to reduce GHG from vehicles and adaptation to changing climatic conditions;
- Oceans and Coastal: Evaluating the effects of sea level rise and changes in coastal storm patterns on human and natural systems in California;
- Public Health: Evaluating the effects of GHG mitigation policies on public health and adapting public health systems to cope with changing climatic conditions;
- Research: Coordinating research concerning impacts of and responses to climate change in California;
- State Government: Evaluating and implementing strategies to reduce GHG emissions resulting from state government operations; and
- Water: Reducing GHG impacts associated with the state's water.

The CCAT stated that smart land use is an umbrella term for strategies that integrate transportation and land-use decisions. Such strategies generally encourage jobs/housing proximity, transit-oriented development, and high-density residential/commercial development along transit corridors. These strategies develop more efficient land-use patterns within each jurisdiction or region to match population growth and workforce and socioeconomic needs for the full spectrum of the population. "Intelligent transportation systems" involve the application of advanced technology systems and management strategies to improve operational efficiency of transportation systems and the movement of people, goods, and service.[86]

Assembly Bill 32. The California Global Warming Solutions Act of 2006 (AB 32) was signed into law in September 2006 after considerable study and expert testimony before the Legislature. The law instructs CARB to develop and enforce regulations for the reporting and verifying of statewide GHG emissions. AB 32 directed CARB to set a GHG emission limit based on 1990 levels, to be achieved by 2020. AB 32 set a timeline for adopting a scoping plan for achieving GHG reductions in a technologically and economically feasible manner.[87]

The heart of AB 32 is the requirement to reduce statewide GHG emissions to 1990 levels by 2020. AB 32 required CARB to adopt rules and regulations in an open public process to achieve the maximum

86 California Environmental Protection Agency, *Climate Action Team Report to Governor Schwarzenegger and the Legislature*, 2006.

87 Office of Legislative Counsel of California, *The California Global Warming Solutions Act of 2006 (AB 32)*, 2006.

technologically feasible and cost-effective GHG reductions. CARB accomplished the key milestones set forth in AB 32, including the following:

- June 30, 2007. Identification of discrete early action GHG emissions reduction measures. On June 21, 2007, CARB satisfied this requirement by approving three early action measures.[88] These were later supplemented by adding six other discrete early action measures.[89]

- January 1, 2008. Identification of the 1990 baseline GHG emissions level and approval of a statewide limit equivalent to that level and adoption of reporting and verification requirements concerning GHG emissions. On December 6, 2007, CARB approved a statewide limit on GHG emissions levels for the year 2020 consistent with the determined 1990 baseline.[90]

- January 1, 2009. Adoption of a scoping plan for achieving GHG emission reductions. On December 11, 2008, CARB adopted Climate Change Scoping Plan: A Framework for Change (Scoping Plan).[91]

- January 1, 2010. Adoption and enforcement of regulations to implement the "discrete" actions. Several early action measures have been adopted and became effective on January 1, 2010. [92,93]

- January 1, 2011. Adoption of GHG emissions limits and reduction measures by regulation. On October 28, 2010, CARB released its proposed cap-and-trade regulations, which would cover sources of approximately 85 percent of California's GHG emissions.[94] CARB's Board ordered its Executive Director to prepare a final regulatory package for cap-and-trade on December 16, 2010.[95]

- January 1, 2012. GHG emissions limits and reduction measures adopted in 2011 became enforceable.

As noted above, CARB adopted the Scoping Plan in 2008 to achieve the goals of AB 32. The Scoping Plan establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions for various categories of emissions. CARB determined that achieving the 1990 emission level by

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88 CARB, *Consideration of Recommendations for Discrete Early Actions for Climate Change Mitigation in California*, 2007.

89 CARB, *Public Meeting to Consider Approval of Additions to the List of Early Action Measures to Reduce Greenhouse Gas Emissions under the California Global Warming Solutions Act of 2006 and to Discuss Concepts for Promoting and Recognizing Voluntary Early Actions*, 2007.

90 CARB, *California 1990 Greenhouse Gas Emissions Level and 2020 Emissions Limit*, 2007.

91 CARB, *Climate Change Scoping Plan*, 2008.

92 CARB, *Consideration of Recommendations for Discrete Early Actions for Climate Change Mitigation in California*, 2007.

93 CARB, *Public Meeting to Consider Approval of Additions to the List of Early Action Measures to Reduce Greenhouse Gas Emissions under the California Global Warming Solutions Act of 2006 and to Discuss Concepts for Promoting and Recognizing Voluntary Early Actions*, 2007.

94 CARB, *Cap and Trade 2010*, 2011.

95 CARB, *California Cap-and-Trade Program, Resolution 10-42*, 2010.

2020 would require an approximately 28.5 percent reduction of GHG emissions in the absence of new laws and regulations (referred to as "business as usual" or "No Action Taken"). The Scoping Plan evaluates opportunities for sector-specific reductions, integrates all CARB and Climate Action Team early actions and additional GHG reduction measures by both entities, and identifies additional measures to be pursued as regulations, and outlines the role of a cap-and-trade program. Key elements of the Scoping Plan include the following:[96]

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewable 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 and caps sources contributing 85 percent of California's GHG emissions;
- Establishing targets for transportation-related GHG 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, such as 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 of California's long-term commitment to AB 32 implementation.

In connection with the preparation of the environmental impact analyses (referred to as the Functional Equivalent Document [FED] and the Supplement to the FED) to support AB 32 Scoping Plan, CARB released revised estimates of the expected 2020 emission reductions in consideration of the economic recession and the availability of updated information from development of measure specific regulations. Incorporation of revised estimates in consideration of the economic recession reduced the projected 2020 emissions from 596 metric tons of CO_2 equivalent ($MTCO_2e$) to 545 million $MTCO_2e$ ($MMTCO_2e$) (CARB 2011c). Under this scenario, achieving the 1990 emissions level in 2020 would require a reduction of GHG emissions of 118 $MMTCO_2e$, or 21.7 percent. This revised reduction represents a 6.8 percentage point reduction from the 28.5 percent level determined in CARB's 2008 Scoping Plan. The 2020 AB 32 baseline was also updated to account for measures incorporated into the inventory, including Pavley (vehicle

96 CARB, *Climate Change Scoping Plan*, 2008.

model-years 2009 to 2016) and the renewable portfolio standard (12 percent to 20 percent). Inclusion of these measures further reduced the 2020 baseline to 507 $MMTCO_2e$.

Executive Order B-30-15. On April 29, 2015, Governor Brown issued Executive Order B-30-15. Therein, the Governor directed the following:

- Established a new interim statewide reduction target to reduce GHG emissions to 40 percent below 1990 levels by 2030.
- Ordered all state agencies with jurisdiction over sources of GHG emissions to implement measures to achieve reductions of GHG emissions to meet the 2030 and 2050 reduction targets.
- Directed CARB to update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of carbon dioxide equivalent.

Senate Bill 32. In 2016, the Legislature passed Senate Bill (SB) 32 with the companion bill AB 197, which further requires California to reduce GHG emissions to 40 percent below 1990 levels by 2030. The bill targets reductions from the leading GHG emitters in the State. Transportation is the largest sector of GHG emissions in California and will be a primary subject for reductions. Through advances in technology and improved public transportation, the State plans to reduce GHG emissions from transportation sources to assist in meeting the 2030 reduction goal. AB 197, signed September 8, 2016, is a bill linked to SB 32 and signed on September 8, 2016, prioritizes efforts to cut GHG emissions in low-income or minority communities. AB 197 requires CARB to make available, and update at least annually, on its website the emissions of GHGs, criteria pollutants, and toxic air contaminants for each facility that reports to CARB and air districts. In addition, AB 197 adds two Members of the Legislature to the CARB board as ex officio, non- voting members and creates the Joint Legislative Committee on Climate Change Policies to ascertain facts and make recommendations to the Legislature and the houses of the Legislature concerning the State's programs, policies, and investments related to climate change.

2017 Scoping Plan. In response to the passage of SB 32 and the identification of the 2030 GHG reduction target, CARB adopted the 2017 Climate Change Scoping Plan in December 2017.[97] The 2017 Update builds upon the framework established by the 2008 Climate Change Scoping Plan and the First Update while identifying new, technologically feasible, and cost-effective strategies to ensure that California meets its GHG reduction targets in a way that promotes and rewards innovation, continues to foster economic growth, and delivers improvements to the environment and public health. The 2017 Update includes policies to require direct GHG reductions at some of the State's largest stationary sources and mobile

97 CARB, *California's 2017 Climate Change Scoping Plan*, November 2017.

sources. These policies include the use of lower GHG fuels, efficiency regulations, and the Cap-and-Trade program, which constraints and reduces emissions at covered sources.[98]

CARB's projected Statewide 2030 emissions takes into account 2020 GHG reduction policies and programs.[99] The 2017 Scoping Plan also addresses GHG emissions from natural and working lands of California, including the agriculture and forestry sectors. Under the Scoping Plan Scenario, the majority of the reductions would result from the continuation of the Cap-and-Trade regulation. Additional reductions would be achieved from electricity sector standards (i.e., utility providers to supply 50 percent renewable electricity by 2030), doubling the energy efficiency savings at end uses, additional reductions from the LCFS, implementing the short-lived GHG strategy (e.g., hydrofluorocarbons), and implementing the mobile source strategy and sustainable freight action plan. Implementation of mobile source strategies (cleaner technology and fuels) include the following:

- At least 1.5 million zero emission and plug-in hybrid light-duty electric vehicles by 2025
- At least 4.2 million zero emission and plug-in hybrid light-duty electric vehicles by 2030
- Further increase GHG stringency on all light-duty vehicles beyond existing Advanced
- Clean Cars regulations
- Medium- and heavy-duty GHG Phase 2
- Innovative Clean Transit: Transition to a suite of to-be-determined innovative clean transit options. Assumed 20 percent of new urban buses purchased beginning in 2018 will be zero emission buses with the penetration of zero-emission technology ramped up to 100 percent of new sales in 2030. Also, new natural gas buses, starting in 2018, and diesel buses, starting in 2020, meet the optional heavy-duty low- NOX standard.
- Last Mile Delivery: New regulation that would result in the use of low NOX or cleaner engines and the deployment of increasing numbers of zero-emission trucks primarily for Class 3–7 last mile delivery trucks in California. This measure assumes ZEVs comprise 2.5 percent of new Class 3–7 truck sales in local fleets starting in 2020, increasing to 10 percent in 2025 and remaining flat through 2030.
- Further reduce VMT through continued implementation of SB 375 and regional Sustainable Communities Strategies; forthcoming statewide implementation of SB 743; and potential additional

98 CARB, *California's 2017 Climate Change Scoping Plan*, November 2017.

99 CARB, *California's 2017 Climate Change Scoping Plan*, November 2017.

VMT reduction strategies not specified in the Mobile Source Strategy but included in the document "Potential VMT Reduction Strategies for Discussion."

The alternatives in the Scoping Plan are designed to consider various combinations of these programs, as well as consideration of a carbon tax in the event the Cap-and-Trade regulation is not continued. However, in July 2017, the California Legislature voted to extend the Cap-and-Trade regulation to 2030.

The 2017 Scoping Plan discusses the role of local governments in meeting the State's GHG reductions goals because local governments have jurisdiction and land use authority related to: community-scale planning and permitting processes, local codes and actions, outreach and education programs, and municipal operations.[100]. Furthermore, local governments may have the ability to incentivize renewable energy, energy efficiency, and water efficiency measures.[101]

For individual projects under CEQA, the 2017 Scoping Plan states that local governments can support climate action when considering discretionary approvals and entitlements. According to the 2017 Scoping Plan, lead agencies have the discretion to develop evidence-based numeric thresholds consistent with the Scoping Plan, the State's long-term goals, and climate change science (CARB 2017).

The City of Los Angeles has not developed per capita targets for 2030 or 2050; however, the City recognizes that GHG emissions reductions are necessary in the public and private sectors. The City has taken the initiative in combating climate change by developing programs such as the Green New Deal and Green Building Code. Each of these programs is discussed further below.

A summary of the required estimated GHG emissions reductions is provided in **Table 14**.

100 CARB, *California's 2017 Climate Change Scoping Plan*, November 2017.

101 CARB, *California's 2017 Climate Change Scoping Plan*, November 2017.

Table 14
Required Estimated Statewide Greenhouse Gas Emissions Reductions

Emissions Scenario	GHG Emissions ($MMTCO_2E$)
2008 Scoping Plan (IPCC SAR)	
2020 BAU Forecast (2008 Scoping Plan Estimate)	596
2020 Emissions Target Set by AB 32 (i.e., 1990 level)	427
Reduction below Business-As-Usual necessary to achieve 1990 levels by 2020	169 (28.4%)[1]
2014 Scoping Plan Update (IPCC AR4)	
2020 BAU Forecast (CARB 2014 Scoping Plan Estimate)	509.4
2020 Emissions Target Set by AB 32 (i.e., 1990 level)	431
Reduction below Business-As-Usual necessary to achieve 1990 levels by 2020	78.4 (15.4%)[2]
2017 Scoping Plan Update	
2030 BAU Forecast ("Reference Scenario" – 2020 GHG reduction policies and programs)	389
2030 Emissions Target (i.e., 40% below 1990 Level)	260
Reduction below Business-As-Usual to Achieve 40% below 1990 Level by 2030	129 (33.2%)[3]

MMTCO2e = million metric tons of carbon dioxide equivalents

[1] 596 – 427 = 169 / 596 = 28.4%

[2] 509.4 – 431 = 78.4 / 509.4 = 15.4%

[3] 389 – 260 = 129 / 389 = 33.2%

Source: CARB, Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document (FED), Attachment D, August 19, 2011; CARB, 2020 Business-as-Usual (BAU) Emissions Projection, 2014 Edition, 2017, http://www.arb.ca.gov/cc/inventory/data/bau.htm. Accessed May 2022; CARB, California's 2017 Climate Change Scoping Plan, November 2017.

Under the Scoping Plan Scenario, continuation of the Cap-and-Trade regulation (or carbon tax) is expected to cover approximately 34 to 79 $MMTCO_2$ of the 2030 reduction obligation.32 The State's short-lived climate pollutants strategy, which is for GHGs that remain in the atmosphere for shorter periods of time compared to longer-lived GHGs like CO_2, is expected to cover approximately 17 to 35 $MMTCO_2e$. The Renewables Portfolio Standard with 50 percent renewable electricity by 2030 is expected to cover approximately 3 $MMTCO_2$. The mobile source strategy and sustainable freight action plan includes maintaining the existing vehicle GHG emissions standards, increasing the number of zero emission vehicles and improving the freight system efficiency, and is expected to cover approximately 11 to 13 $MMTCO_2$. Under the Scoping Plan Scenario, CARB expects that the reduction in GHGs from doubling of the energy efficiency savings in natural gas and electricity end uses in the CEC 2015 Integrated Energy Policy Report by 2030 would cover approximately 7 to 9 $MMTCO_2$ of the 2030 reduction obligation. The other strategies would be expected to cover the remaining 2030 reduction obligations.

Draft 2022 Scoping Plan. CARB released the Draft 2022 Scoping Plan Update in May 2022.[102] The Draft 2022 Scoping Plan Update identifies a technologically feasible, cost-effective and equity-focused path to

[102] CARB, *Draft 2022 Scoping Plan Update*, May 2022.

achieve carbon neutrality by 2045, or earlier, while also assessing the progress the State is making toward reducing its GHG emissions by at least 40 percent below 1990 levels by 2030, as called for in SB 32 and laid out in the 2017 Scoping Plan. The Draft 2022 Update builds upon current and previous environmental justice efforts to integrate environmental justice directly into the plan to ensure that no community is left behind. Specifically, the Draft 2022 Update:

- Identifies a path to keep California on track to meet its SB 32 GHG reduction target of at least 40 percent below 1990 emissions by 2030;
- Identifies a technologically feasible, cost-effective path to achieve carbon neutrality by 2045 or earlier;
- Focuses on strategies for reducing California's dependency on petroleum to provide consumers with clean energy options that address climate change, improve air quality, and support economic growth and clean sector jobs;
- Integrates equity and protecting California's most impacted communities as a driving principle;
- Incorporates the contribution of natural and working lands to the state's GHG emissions inventory, as well as its role in achieving carbon neutrality;
- Relies on the contemporary science, including the need to deploy all viable tools to address the existential threat that climate change poses, including carbon capture and sequestration as well as direct air capture.
- Evaluates multiple options for achieving GHG and carbon neutrality targets, as well as the public health benefits and economic impacts associated with each.

The Draft 2022 Update evaluated four scenarios to reach carbon neutrality and the most viable path to achieve the State's 2030 interim GHG reduction and 2035/2045 GHG neutrality targets. Ultimately, CARB staff selected Scenario 3 as the "Proposed Scenario," which achieves carbon neutrality by 2045 by deploying a broad portfolio of existing and emerging fossil fuel alternatives and clean technologies. Among the proposed actions by sector are the following:

- VMT per capita to be reduced 12% below 2019 levels by 2030 and 22% below 2019 levels by 2045.
- 100% of light duty vehicle (LDV) sales to be zero emission (ZEV) by 2035.
- New buildings, all electric appliances beginning in 2026 (residential) and 2029 (commercial).
- Existing residential buildings 80% of appliance sales are electric by 2030 and 100% by 2035.

- Existing commercial buildings 80% of appliance sales are electric by 2030 and 100% by 2045.
- Construction equipment 25% energy demand electrified by 2030 and 75% by 2045.

Executive Order B-55-18. On September 10, 2018, the governor issued Executive Order B-55-18, which established a new statewide goal of achieving carbon neutrality by 2045 and maintaining net negative emissions thereafter. This goal is in addition to the existing statewide GHG reduction targets established by SB 375, SB 32, SB 1383, and SB 100.

Cap-and-Trade Program. As mentioned above, the Scoping Plan identifies a cap-and-trade program as one of the strategies the State will employ to reduce GHG emissions that cause climate change. The cap-and-trade program is implemented by CARB and "caps" GHG emissions from the industrial, utility, and transportation fuels sections, which account for roughly 85 percent of the State's GHG emissions. The program works by establishing a hard cap on about 85 percent of total statewide GHG emissions. The cap starts at expected business-as-usual emissions levels in 2012 and declines two to three percent per year. Originally with a planning horizon of 2020, the recent approval of AB 398 in July 2017 extended the program until 2030. Fewer GHG emissions allowances are available each year, requiring covered sources to reduce their emissions or pay increasingly higher prices for those allowances. The cap level is set in 2030 to ensure California complies with SB 32's emission reduction target of 40 percent below 1990 GHG emission levels.

The scope of GHG emission sources subject to cap-and-trade in the first compliance period (2013-2014) includes all electricity generated and imported into California (the first deliverer of electricity into the State is the "capped" entity and the *one that* will have to purchase allowances as appropriate), and large industrial facilities emitting more than 25,000 $MTCO_2e$ per year (e.g., oil refineries and cement manufacturers). The scope of GHG emission sources subjected to cap-and-trade during the second compliance period (2015 onward) expands to include distributors of transportation fuels (including gasoline and diesel), natural gas, and other fuels. The regulated entity will be the fuel provider that distributes the fuel upstream (not the gas station). In total, the cap-and-trade program is expected to include roughly 350 large businesses, representing about 600 facilities. Individuals and small businesses will not be regulated.

Under the program, companies do not have individual or facility-specific reduction requirements. Rather, all companies covered by the regulation are required to turn in allowances[103] in an amount equal to their total GHG emissions during each phase of the program. The program gives companies the flexibility to either trade allowances with others or take steps to cost-effectively reduce emissions at their own facilities. Companies that emit more will have to turn in more allowances, and companies that can cut their emissions

[103] "Allowance" means a limited tradable authorization to emit up to one metric ton of carbon dioxide equivalent.

will have to turn in fewer allowances. Furthermore, as the cap declines, total GHG emissions are reduced. On October 20, 2011, CARB's Board adopted the final cap-and-trade regulation. The cap-and-trade program began on January 1, 2012, with an enforceable compliance obligation beginning with the 2013 GHG emissions.[104] In July 2017, the Legislature passed legislation to extend the cap-and-trade program to 2030.[105]

Senate Bill 350. Adopted on October 7, 2015, SB 350 supports the reduction of GHG emissions from the electricity sector through a number of measures, including requiring electricity providers to achieve a 50 percent renewables portfolio standard by 2030, a cumulative doubling of statewide energy efficiency savings in electricity and natural gas by retail customers by 2030.

Senate Bill 1383. Approved by the governor in September 2016, SB 1383 requires the CARB to approve and begin implementing a comprehensive strategy to reduce emissions of short-lived climate pollutants. The bill requires the strategy to achieve the following reduction targets by 2030:

- Methane – 40 percent below 2013 levels
- Hydrofluorocarbons – 40 percent below 2013 levels
- Anthropogenic black carbon – 50 percent below 2013 levels

The bill also requires California Department of Resources Recycling and Recovery (CalRecycle), in consultation with the State board, to adopt regulations that achieve specified targets for reducing organic waste in landfills.

Senate Bill 97. Per SB 97, which was signed into law in 2007, the California Natural Resources Agency adopted amendments to the *State CEQA Guidelines*, which address the specific obligations of public agencies when analyzing GHG emissions under CEQA to determine a project's effects on the environment (codified as Public Resources Code [PRC] 21083.05). Specifically, PRC 21083.05 states, "[t]he Office of Planning and Research and the Natural Resources Agency shall periodically update the guidelines for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions."

Sustainable Communities and Climate Protection Act (Senate Bill 375). The Sustainable Communities and Climate Protection Act of 2008, or SB 375 (Chapter 728, Statutes of 2008), establishes mechanisms for the development of regional targets for reducing passenger vehicle GHG emissions, was adopted by the

104 CARB, *California Cap-and-Trade Program*, Resolution 10-42, 2015.

105 Office of the Governor, *Governor Brown Signs Landmark Climate Bill to Extend California's Cap-and-Trade Program*, 2017.

State on September 30, 2008. SB 375 finds that the "transportation sector is the single largest contributor of greenhouse gases of any sector."[106] Under SB 375, CARB is required, in consultation with the Metropolitan Planning Organizations, to set regional GHG reduction targets for the passenger vehicle and light-duty truck sector for 2020 and 2035. SCAG is the Metropolitan Planning Organization in which the City of Los Angeles is located in. CARB set targets for 2020 and 2035 for each of the 18 metropolitan planning organization regions in 2010, and updated them in 2018.[107] In March 2018, the CARB updated the SB 375 targets for the SCAG region to require an 8 percent reduction by 2020 and a 19 percent reduction by 2035 in per capita passenger vehicle GHG emissions.[108] As discussed further below, SCAG has adopted an updated Regional Transportation Plan / Sustainable Community Strategies (RTP/SCS) subsequent to the update of the emission targets. The 2020–2045 RTP/SCS is expected to reduce per capita transportation emissions by 19 percent by 2035, which is consistent with SB 375 compliance with respect to meeting the State's GHG emission reduction goals.[109]

Under SB 375, the target must be incorporated within that region's Regional Transportation Plan (RTP), which is used for long-term transportation planning, in a Sustainable Communities Strategy (SCS). Certain transportation planning and programming activities would then need to be consistent with the SCS; however, SB 375 expressly provides that the SCS does not regulate the use of land, and further provides that local land use plans and policies (e.g., general plans) are not required to be consistent with either the RTP or SCS.

Emission Performance Standards. SB 1368, signed September 29, 2006, is a companion bill to AB 32, which requires the CPUC and the CEC to establish GHG emission performance standards for the generation of electricity. These standards also generally apply to power that is generated outside of California and imported into the State. SB 1368 provides a mechanism for reducing the emissions of electricity providers, thereby assisting CARB to meet its mandate under AB 32.

Renewable Portfolio Standards (SB 1078, SB 107, SB X 1-2, and SB 100). Established in 2002 under SB 1078, and accelerated in 2006 under SB 107,in 2011 under SB X 1-2, and again in 2018 under SB 100, California's Renewable Portfolio Standards (RPS) require retail sellers of electric services to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020, 44 percent

106 State of California, Senate Bill No. 375, September 30, 2008.

107 CARB, Sustainable Communities & Climate Protection Program – About. https://ww2.arb.ca.gov/our-work/programs/sustainable-communities-climate-protection-program#:~:text=The%20Sustainable%20Communities%20and%20Climate,housing%2C%20and%20land%20use%20planning, accessed August 16, 2022.

108 CARB, SB 375 Regional Greenhouse Gas Emissions Reduction Targets, https://www.arb.ca.gov/cc/sb375/finaltargets2018.pdf., accessed August 16, 2022.

109 SCAG, Final 2020–2045 RTP/SCS, Chapter 0: Making Connections, p. 5, May 7, 2020.

by 2024, 52 percent by 2027, and 60 percent in 2030.[110, 111] Additionally, the State has made a commitment that renewable energy resources and zero-carbon resources supply 100 percent of all retail sales of electricity by 2045.[112] Initially, the RPS provisions applied to investor-owned utilities, community choice aggregators, and electric service providers. SB X 1-2 added, for the first time, publicly-owned utilities to the entities subject to RPS.

Assembly Bill 1493. Mobile Source Reductions Assembly Bill 1493, the "Pavley Standard," required CARB to adopt regulations by January 1, 2005, to reduce GHG emissions from non-commercial passenger vehicles and light-duty trucks of model year 2009 through 2016. The bill also required the California Climate Action Registry to develop and adopt protocols for the reporting and certification of GHG emissions reductions from mobile sources for use by CARB in granting emission reduction credits. The bill authorizes CARB to grant emission reduction credits for reductions of GHG emissions prior to the date of enforcement of regulations, using model year 2000 as the baseline for reduction.[113] In 2004, CARB applied to the U.S. EPA for a waiver under the federal Clean Air Act to authorize implementation of these regulations. On June 30, 2009, the U.S. EPA granted the waiver with the following provision: CARB may not hold a manufacturer liable or responsible for any noncompliance caused by emission debits generated by a manufacturer for the 2009 model year. CARB has adopted a new approach to passenger vehicles (cars and light trucks), by combining the control of smog-causing pollutants and GHG emissions into a single coordinated package of standards. The new approach also includes efforts to support and accelerate the numbers of plug-in hybrids and zero-emission vehicles in California.

Low Carbon Fuel Standard (Executive Order S-01-07). Executive Order S-01-07 (January 18, 2007) requires a 10 percent or greater reduction in the average fuel carbon intensity for transportation fuels in California regulated by CARB. CARB identified the Low Carbon Fuel Standard (LCFS) as a Discrete Early Action item under AB 32, and the final resolution (09-31) was issued on April 23, 2009.[114] In 2009, CARB approved for adoption the LCFS regulation, which became fully effective in April 2010 and is codified at Title 17, California Code of Regulations (CCR), Sections 95480-95490. The LCFS reduced GHG emissions by reducing the carbon intensity of transportation fuels used in California by 10 percent between 2011 and 2020. In 2018, CARB approved amendments to LCFS regulations, which included strengthening and smoothing the carbon intensity benchmarks through 2030 in-line with California's 2030 GHG emission reduction target enacted through SB 32, adding new crediting opportunities to promote zero emission

110 Office of Legislative Counsel of California, *Senate Bill 1078*, 2002.

111 Office of Legislative Counsel of California, *Senate Bill 1368*, 2006.

112 Office of Legislative Counsel of California, *Clean Car Standards – Pavley, Assembly Bill 1493*, 2018.

113 CARB, *Clean Car Standards – Pavley, Assembly Bill 1493*, 2017.

114 CARB, *Initial Statement of Reasons for Proposed Regulation for the Management of High Global Warming Potential Refrigerants for Stationary Sources*, 2009.

vehicle adoption, alternative jet fuel, carbon capture and sequestration, and advanced technologies to achieve deep decarbonization in the transportation sector.

Advanced Clean Cars Program. In 2012, CARB approved the Advanced Clean Cars Program, a new emissions-control program for model year 2017 through 2025. The program combines the control of smog, soot, and GHGs with requirements for greater numbers of zero-emission vehicles. By 2025, when the rules will be fully implemented, the new automobiles will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions.

Senate Bill 743 (SB 743). SB 743, adopted September 27, 2013, encourages land use and transportation planning decisions and investments that reduce vehicle miles traveled (VMT), which contribute to GHG emissions, as required by AB 32. Key provisions of SB 743 include reforming aesthetics and parking CEQA analysis for certain urban infill projects and eliminating the measurement of auto delay, including Level of Service (LOS), as a metric that can be used for measuring traffic impacts in transit priority areas. SB 743 requires the Governor's Office of Planning and Research (OPR) to develop revisions to the *CEQA Guidelines* establishing criteria for determining the significance of transportation impacts of projects within transit priority areas that promote the "…reduction of GHG emissions, the development of multimodal transportation networks, and a diversity of land uses." It also allows OPR to develop alternative metrics outside of transit priority areas. In December 2018, the Natural Resources Agency updated the *CEQA Guidelines* and provided guidance for implementing SB 743.

California Integrated Waste Management Act (AB 341). The California Integrated Waste Management Act of 1989, as modified by AB 341, requires each jurisdiction's source reduction and recycling element to include an implementation schedule that shows: diversion of 25 percent of all solid waste by January 1, 1995, through source reduction, recycling, and composting activities; diversion of 50 percent of all solid waste on and after January 1, 2000; and diversion of 75 percent of all solid waste by 2020, and annually thereafter.

California Appliance Efficiency Regulations. The Appliance Efficiency Regulations (Title 20, Sections 1601 through 1608), adopted by the CEC, include standards for new appliances (e.g., refrigerators) and lighting, if they are sold or offered for sale in California. These standards include minimum levels of operating efficiency, and other cost-effective measures, to promote the use of energy- and water-efficient appliances.

California Green Building Code (California Code of Regulations Title 24). Although not originally aimed at reducing GHG emissions, CCR Title 24 Part 6: *California's Energy Efficiency Standards for Residential and Nonresidential Buildings* (Title 24), was first adopted in 1978 in response to a legislative mandate to reduce

California's energy consumption. Since then, Title 24 has been amended to recognize that energy-efficient buildings require less electricity and reduce fuel consumption, which subsequently reduces GHG emissions. The current 2019 Title 24 standards were adopted, among other reasons, to respond to the requirements of AB 32. Specifically, new development projects constructed within California after January 1, 2019 are subject to the mandatory planning and design, energy efficiency, water efficiency and conservation, material conservation and resources efficiency, and environmental quality measures of the California Green Building Standards (CalGreen) Code (CCR Title 24, Part 11). Title 24 standards are updated triennially; the next update is scheduled to be adopted in 2022 and will take effect on January 1, 2023.

CEQA Guidelines. In August 2007, the California State Legislature adopted Senate Bill 97 (SB 97) (Chapter 185, Statutes of 2007), requiring the Governor's Office of Planning and Research (OPR) to prepare and transmit new *CEQA Guidelines* for the mitigation of GHG emissions or the effects of GHG emissions to the Resources Agency by July 1, 2009. In response to SB 97, the OPR adopted *CEQA Guidelines* that became effective on March 18, 2010.

However, neither a threshold of significance nor any specific mitigation measures are included or provided in the guidelines.[115] The guidelines require a lead agency to make a good-faith effort, based on the extent possible on scientific and factual data, to describe, calculate, or estimate the amount of GHG emissions resulting from a project. Discretion is given to the lead agency whether to: (1) use a model or methodology to quantify GHG emissions resulting from a project, and which model or methodology to use; or (2) rely on a qualitative analysis or performance-based standards. Furthermore, three factors are identified that should be considered in the evaluation of the significance of GHG emissions:

1. The extent to which a project may increase or reduce GHG emissions as compared to the existing environmental setting;

2. Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; and

3. The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.[116]

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115 See 14 Cal. Code Regs. §§ 15064.7 (generally giving discretion to lead agencies to develop and publish thresholds of significance for use in the determination of the significance of environmental effects), 15064.4 (giving discretion to lead agencies to determine the significance of impacts from GHGs).

116 14 Cal. Code Regs. § 15064.4(b).

The administrative record for the Guidelines Amendments also clarifies "that the effects of greenhouse gas emissions are cumulative and should be analyzed in the context of California Environmental Quality Act's requirements for cumulative impact analysis."[117]

Senate Bill 1 (SB 1) and Senate Bill 1017 (SB 1017) (Million Solar Roofs). SB 1 and SB 1017, enacted in August 2006, set a goal to install 3,000 megawatts of new solar capacity by 2017 – with a stated intent to move the state toward a cleaner energy future and help lower the cost of solar systems for consumers. The Million Solar Roofs Program is a ratepayer-financed incentive program aimed at transforming the market for rooftop solar systems by driving down costs over time. It provides up to $3.3 billion in financial incentives that decline over time.

GHG Emissions Standards for Baseload Generation. SB 1368, which was signed into law on September 29, 2006, prohibits any retail seller of electricity in California from entering into a long-term financial commitment for baseload generation if the GHG emissions are higher than those from a combined-cycle natural gas power plant. This performance standard (i.e., reducing long-term GHG emissions as a result of electrical baseload generation) applies to electricity generated both within and outside of California, and to publicly owned, as well as investor-owned, electric utilities.

Senate Bill 350 (SB 350). Adopted on October 7, 2015, SB 350 supports the reduction of GHG emissions from the electricity sector through a number of measures, including requiring electricity providers to achieve a 50 percent renewable portfolio standard by 2030, a cumulative doubling of statewide energy efficiency savings in electricity and natural gas by retail customers by 2030.

California Green Building Standards Code (CalGreen Code) (California Code of Regulations [CCR], Title 24). Although not originally aimed at reducing GHG emissions, CCR Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24), was first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption. Since then, Title 24 has been amended to recognize that energy-efficient buildings require less electricity and reduce fuel consumption, which subsequently decreases GHG emissions. The current 2016 Title 24 standards were adopted, among other reasons, to respond to the requirements of AB 32. The goals of the Title 24 standards include achieving a 20 percent reduction of indoor water use and a 50 percent reduction of construction waste. Specifically, new development projects constructed within California after January 1, 2017, are subject to the mandatory planning and design, energy efficiency, water efficiency and conservation, material conservation and resources efficiency, and environmental quality measures of the CalGreen Code

[117] Letter from Cynthia Bryant, Director of the Governor's Office of Planning and Research to Mike Chrisman, California Secretary for Natural Resources, dated April 13, 2009.

(CCR, Title 24, Part 11). The outdoor water use standards of the CalGreen Code, which requires a 20 percent reduction in indoor water use, are already addressed by the City's Water Conservation Ordinance.

Regional

SCAG Regional Transportation Plan/Sustainable Communities Strategy. To implement SB 375 and reduce GHG emissions by correlating land use and transportation planning, SCAG adopted the 2020–2045 Regional Transportation Plan/Sustainable Communities Strategy (2020–2045 RTP/SCS) in October 2020. The vision for the region incorporates a range of best practices for increasing transportation choices, reducing dependence on personal automobiles, further improving air quality, and encouraging growth in walkable, mixed-use communities with ready access to transit infrastructure and employment. More and varied housing types and employment opportunities would be located in and near job centers, transit stations and walkable neighborhoods where goods and services are easily accessible via shorter trips. To support shorter trips, people would have the choice of using neighborhood bike networks, car share or micro-mobility services like shared bicycles or scooters. For longer commutes, people would have expanded regional transit services and more employer incentives to carpool or vanpool. Other longer trips would be supported by on-demand services such as micro transit, carshare, and citywide partnerships with ride hailing services. For those that choose to drive, hotspots of congestion would be less difficult to navigate due to cordon pricing and using an electric vehicle will be easier thanks to an expanded regional charging network.

The 2020–2045 RTP/SCS states that the SCAG region was home to about 18.8 million people in 2016 and currently includes approximately 6.0 million homes and 8.4 million jobs.[118] By 2045, the integrated growth forecast projects that these figures will increase by 3.7 million people, with nearly 1.6 million more homes and 1.6 million more jobs. Transit Priority Areas[119] (TPAs) will account for less than 1 percent of regional total land but are projected to accommodate 30 percent of future household growth between 2016 and 2045. The 2020–2045 RTP/SCS overall land use pattern reinforces the trend of focusing new housing and employment in the region's TPAs. TPAs are a cornerstone of land use planning best practice in the SCAG region because they concentrate roadway repair investments, leverage transit and active transportation investments, reduce regional life cycle infrastructure costs, improve accessibility, create local jobs, and have the potential to improve public health and housing affordability.

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118 2020–2045 RTP/SCS population growth forecast methodology includes data for years 2010, 2010, 2016, and 2045.

119 Defined by the 2020–2045 RTP/SCS as generally walkable transit villages or corridors that are within 0.5 mile of a major transit stop (rail or bus rapid transit station) with 15-minute or less service frequency during peak commute hours

The 2020–2045 RTP/SCS is expected to reduce per capita transportation emissions by 19 percent by 2035, which is consistent with SB 375 compliance with respect to meeting the State's GHG emission reduction goals.[120] Due to fuel economy and efficiency improvements, GHG emission rates of model year 2017 vehicles have decreased by 15 to 20 percent when compared to model year 2008 and earlier vehicles. However, for purposes of SB 375 emissions reduction targets, the fuel economy improvements have been largely excluded from the reduction calculation. The SB 375 target focuses on the amount of vehicle travel per capita. As discussed above, OPR recommended that achieving 15 percent lower per capita (residential) or per employee (office) VMT than existing development is both generally achievable and is supported by evidence that connects this level of reduction to the State's emissions goals (i.e., SB 375 goal). The reductions generated by fuel economy improvements are already included as part of the State's GHG emissions reduction program and are not double counted in the SB 375 target calculation.

South Coast Air Quality Management District CEQA Guidance. The City of Los Angeles is located in the South Coast Air Basin (Air Basin), which consists of Orange County, Los Angeles County (excluding the Antelope Valley portion), and the western, non-desert portions of San Bernardino and Riverside Counties, in addition to the San Gorgonio Pass area in Riverside County. The South Coast Air Quality Management District (SCAQMD) is responsible for air quality planning in the Air Basin and developing rules and regulations to bring the area into attainment of the ambient air quality standards. This is accomplished through air quality monitoring, evaluation, education, implementation of control measures to reduce emissions from stationary sources, permitting and inspection of pollution sources, enforcement of air quality regulations, and by supporting and implementing measures to reduce emissions from motor vehicles.

In 2008, SCAQMD released draft guidance regarding interim CEQA GHG significance thresholds.[121] A GHG Significance Threshold Working Group was formed to further evaluate potential GHG significance thresholds.[122] The SCAQMD proposed the use of a percent emission reduction target to determine significance for commercial/residential projects that emit greater than 3,000 $MTCO_2e$ per year. Under this proposal, commercial/residential projects that emit fewer than 3,000 $MTCO_2e$ per year would be assumed to have a less than significant impact on climate change. On December 5, 2008, the SCAQMD Governing Board adopted the staff proposal for an interim GHG significance threshold of 10,000 $MTCO_2e$ per year for stationary source/industrial projects where the SCAQMD is the lead agency. However, the SCAQMD has yet to adopt a GHG significance threshold for land use development projects (e.g., residential/commercial

120 SCAG, *Final 2020–2045 RTP/SCS, Chapter 0: Making Connections*, p. 5, May 7, 2020.

121 SCAQMD, Board Meeting, December 5, 2008, Agenda No. 31, http://www3.aqmd.gov/hb/2008/December/081231a.htm., accessed August 16, 2022.

122 SCAQMD, *Greenhouse Gases CEQA Significance Thresholds*, http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/ghg-significance-thresholds/page/2, accessed August 16, 2022.

projects). The Working Group has been inactive since 2011, and SCAQMD has not formally adopted any GHG significance threshold for other jurisdictions.

Local

Sustainable City pLAn (pLAn). In addition to GreenLA, Mayor Eric Garcetti released Los Angeles's first-ever Sustainable City pLAn on April 8, 2015.[123] The Sustainable City pLAn is a roadmap to achieving short-term results and sets a path to strengthen and transform the City in future decades. Actionable goals include increasing the green building standard for new construction, creating a benchmarking policy for building energy use, developing "blue, green, and black" waste bin infrastructure, reducing water use by 20 percent, and possibly requiring LEED Silver or better certification for new construction.[124] In 2019, the Sustainable City pLAn was updated with new goals, targets, and actions through adoption of L.A.'s Green New Deal as discussed in greater detail below.

Los Angeles Green New Deal. The City of Los Angeles addressed the issue of global climate change in Green LA, An Action Plan to Lead the Nation in Fighting Global Warming ("LA Green Plan/ClimateLA") in 2007. This document outlines the goals and actions the City has established to reduce the generation and emission of GHGs from both public and private activities. Released in April 2019, L.A.'s Green New Deal provides a four year update to the City's first Sustainable City pLAn that was first released in 2015.[125] While not officially adopted legislation, L.A.'s Green New Deal serves as policy guidance for City agencies.

Within the Green New Deal, "Climate Mitigation," or reduction of GHG is one of eight explicit benefits that help define its strategies and goals. These include reducing GHG emissions through near-term outcomes:

- Reduce potable water use per capita by 22.5 percent by 2025; 25 percent by 2035; and maintain or reduce 2035 per capita water use through 2050.

- Reduce building energy use per square feet for all building types 22 percent by 2025; 34 percent by 2035; and 44 percent by 2050 (from a baseline of 68 mBTU/sq.ft in 2015).

- All new buildings will be net zero carbon by 2030 and 100 percent of buildings will be net zero carbon by 2050.

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123 City of Los Angeles, *Los Angeles Sustainable City pLAn*, April 2015. Available at: https://plan.lamayor.org/background/background_plan.html, accessed August 16, 2022.

124 City of Los Angeles, *Los Angeles Sustainable City pLAn*, April 2015. Available at: https://plan.lamayor.org/background/background_plan.html, accessed August 16, 2022.

125 City of Los Angeles, Sustainable City pLAn, April 2015.

- Increase cumulative new housing unit construction to 150,000 by 2025; and 275,000 units by 2035.
- Ensure 57 percent of new housing units are built within 1,500 feet of transit by 2025; and 75 percent by 2035.
- Increase the percentage of all trips made by walking, biking, micro-mobility/matched rides, or transit to at least 35 percent by 2025, 50 percent by 2035, and maintain at least 50 percent by 2050.
- Reduce VMT per capita by at least 13 percent by 2025; 39 percent by 2035; and 45 percent by 2050.
- Increase the percentage of electric and zero emission vehicles in the city to 25 percent by 2025; 80 percent by 2035; and 100 percent by 2050.
- Increase landfill diversion rate to 90 percent by 2025; 95 percent by 2035 and 100 percent by 2050.
- Reduce municipal solid waste generation per capita by at least 15 percent by 2030, including phasing out single-use plastics by 2028 (from a baseline of 17.85 lbs. of waste generated per capita per day in 2011).
- Eliminate organic waste going to landfill by 2028.
- Reduce urban/rural temperature differential by at least 1.7 degrees by 2025; and 3 degrees by 2035.
- Ensure the proportion of Angelenos living within 1/2 mile of a park or open space is at least 65 percent by 2025; 75 percent by 2035; and 100 percent by 2050.

Mobility Plan 2035. Mobility Plan 2035, updated in September 2016, serves as the Mobility Element of the General Plan. Mobility Plan 2035 establishes new street designations, classifies each of the City's arterial streets and incorporates a "complete street" policy framework (i.e., the idea that transportation facilities should be designed for all types of users, including pedestrians, cyclists, and trucks, as well as passenger vehicles), thus providing a foundation for future policies and principles promoting residents' interaction with their streets. Discussed in detail in **Section 4.10, Land Use and Planning,** Mobility Plan 2035 also promotes equitable land use decisions that result in fewer vehicle trips by providing greater proximity and access to jobs, destinations, and other neighborhood services.

Existing Buildings Energy and Water Efficiency (EBEWE) Ordinance. Effective in 2017, the EBEWE Ordinance makes public the annual energy and water consumption of all buildings over 20,000 square feet in the City. Beginning in 2017, privately owned buildings that are 20,000 square feet or more and buildings owned by the City that are 7,500 or more are required to be benchmarked, and owners must disclose annual

energy and water consumption. Privately owned buildings that are 100,000 square feet or more must begin benchmarking reporting by December 1, 2017, and smaller buildings must begin reporting over the following two years. This Ordinance is designed to facilitate the comparison of buildings' energy and water consumption, and reduce building operating costs, leading to reduced GHG emissions.

City of Los Angeles Green Building Program. In December 2010, the Los Angeles City Council adopted various provisions of the CalGreen Code as part of Ordinance No. 181,480, thus codifying certain provisions of the CalGreen Code as the new Los Angeles Green Building Code (LA Green Building Code). As a result of continuing updates to the CalGreen Code, the City adopted the pertinent provisions of the 2019 CalGreen standards through Ordinance No. 186,488, approved December 11, 2019. The LA Green Building Code applies to the construction of every new building, every new building alteration with a permit valuation of over $200,000, and every building addition unless otherwise noted. Specific mandatory requirements and elective measures are provided for three categories: (1) low-rise residential buildings; (2) non-residential and high-rise residential buildings; and (3) additions and alterations to non-residential and high-rise residential buildings. The purpose of the City's Green Building Program is to reduce the use of natural resources, create healthier living environments and minimize the negative impacts of development on local, regional, and global ecosystems. The program consists of a Standard of Sustainability and Standard of Sustainable Excellence. The program addresses five key areas:

- Site: location, site planning, landscaping, storm water management, construction and demolition recycling;
- Water Efficiency: efficient fixtures, wastewater reuse, and efficient irrigation;
- Energy & Atmosphere: energy efficiency, and clean/renewable energy;
- Materials & Resources: materials reuse, efficient building systems, and use of recycled and rapidly renewable materials; and
- Indoor Environmental Quality: improved indoor air quality, increased natural lighting, and improved thermal comfort/control.

The Standard of Sustainability establishes a requirement for non-residential projects at or above 50,000 square feet of floor area, high-rise residential (above six stories) projects at or above 50,000 square feet of floor area, or low-rise residential (six stories or less) of 50 or more dwelling units within buildings of at least 50,000 square feet of floor area to meet the intent of the United States Green Building Council's Leadership in Energy and Environmental Design (LEED) Certified level. The Standard also applies to

existing buildings that meet the minimum thresholds described above when redevelopment construction costs exceed a valuation of 50 percent of the existing building's replacement cost.

The voluntary Standard of Sustainable Excellence establishes an incentive program for projects that register with the LEED program, contract with a certified LEED professional, and can demonstrate how the project will achieve LEED certification at a Silver or higher level. These projects are eligible for priority processing services within the Department of City Planning and expedited services within the Bureau of Engineering. The Department of Building and Safety.

City of Los Angeles Solid Waste Programs and Ordinances. The recycling of solid waste materials also contributes to reduced energy consumption. Specifically, when products are manufactured using recycled materials, the amount of energy that would have otherwise been consumed to extract and process virgin source materials is reduced as well as disposal energy averted. In 1989, California enacted AB 939, the California Integrated Waste Management Act, which establishes a hierarchy for waste management practices such as source reduction, recycling, and environmentally safe land disposal.

The City has developed and is in the process of implementing the Solid Waste Integrated Resources Plan, also referred to as the Zero Waste Plan, whose goal is to lead the City towards being a "zero waste" City by 2030. These waste reduction plans, policies, and regulations, along with Mayoral and City Council directives, have increased the level of waste diversion for the City to 76 percent as of 2013. The RENEW LA Plan, aims to achieve a zero waste goal through reducing, reusing, recycling, or converting the resources not going to disposal and achieving a diversion rate of 90 percent or more by 2025. The City has also approved the Waste Hauler Permit Program (Ordinance No. 181,519, LAMC Chapter VI, Article 6, Section 66.32-66.32.5), which requires private waste haulers to obtain AB 939 Compliance Permits to transport construction and demolition waste to City-certified construction and demolition waste processors. The City's Exclusive Franchise System Ordinance (Ordinance No. 182,986), among other requirements, sets a maximum annual disposal level and diversion requirements for franchised waste haulers to promote waste diversion from landfills and support the City's zero waste goals. These programs reduce the number of trips to haul solid waste and therefore reduce the amount of petroleum-based fuels and energy used to process solid waste.

3.3 THRESHOLDS AND METHODOLOGY

Thresholds of Significance

Consistent with Appendix G of the *State CEQA Guidelines*, a project would have a significant impact if it would:

1) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

2) Conflict with an applicable plan, policy or regulations adopted for the purpose of reducing the emissions of greenhouse gas emissions.

Neither the City nor the SCAQMD have adopted GHG significance thresholds applicable to the Ordinance. While the SCAQMD has adopted significance thresholds for industrial-type projects for which it is the lead agency under CEQA,[126] those industrial thresholds are not applicable to the Ordinance. In the absence of adopted thresholds and pursuant to *CEQA Guidelines* Section 15064.4, the City has the discretion to use a significance threshold relevant to the Ordinance. *CEQA Guidelines* Section 15064.4 is stated below:

> *Section 15064.4. Determining the Significance of Impacts from Greenhouse Gas Emissions.*
>
> *(a) The determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency consistent with the provisions in section 15064. A lead agency shall make a good- faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project. A lead agency shall have discretion to determine, in the context of a particular project, whether to:*
>
> *(1) Quantify greenhouse gas emissions resulting from a project; and/or*
>
> *(2) Rely on a qualitative analysis or performance based standards.*
>
> *(b) In determining the significance of a project's greenhouse gas emissions, the lead agency should focus its analysis on the reasonably foreseeable incremental contribution of the project's emissions to the effects of climate change. A project's incremental contribution may be cumulatively considerable even if it appears relatively small compared to statewide, national or global emissions. The agency's analysis should consider a timeframe that is appropriate for the project. The agency's analysis also must reasonably reflect evolving scientific knowledge and state regulatory schemes. A lead agency should consider the following factors, among others, when determining the significance of impacts from greenhouse gas emissions on the environment:*
>
> *(1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;*

126 SCAQMD, *SCAQMD Air Quality Significance Thresholds*, 2019.

(2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.

(3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions (see, e.g., section 15183.5(b)). Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project. In determining the significance of impacts, the lead agency may consider a project's consistency with the State's long-term climate goals or strategies, provided that substantial evidence supports the agency's analysis of how those goals or strategies address the project's incremental contribution to climate change and its conclusion that the project's incremental contribution is not cumulatively considerable.

(c) A lead agency may use a model or methodology to estimate greenhouse gas emissions resulting from a project. The lead agency has discretion to select the model or methodology it considers most appropriate to enable decision makers to intelligently take into account the project's incremental contribution to climate change. The lead agency must support its selection of a model or methodology with substantial evidence. The lead agency should explain the limitations of the particular model or methodology selected for use.

Methodology

Although not regulated by the Ordinance, well abandonment is a reasonably foreseeable outcome for many of the wells currently operating in the City, although as stated previously, no specific timeline for abandonment currently exists and the Ordinance does not include any regulations related to the timing of the abandonment of oil wells. As such, for purposes of this analysis, there are two distinct phases that would have the potential to change GHG emissions associated with oil and gas wells throughout the City: 1) Short-term and temporary abandonment related activities, and 2) Long-term changes to GHGs attributable to the cessation of oil and gas extraction and operations.

GHG emissions associated with short-term and temporary abandonment related activities were calculated using CalEEMod. Because these emissions would be short-term and temporary, they have been characterized as one-time GHG emission sources without the potential to increase long-term and recurring GHG emissions into the future. Long-term changes to GHGs attributable to the cessation of oil and gas

extraction and operations have been characterized quantitively and qualitatively, and impacts have been assessed in a manner consistent with CEQA Guidelines Section 15064.4 (Determining the Significance of Impacts from Greenhouse Gas Emissions).

The City's methodology for assessing the significance of a project's GHG impacts generally includes 1) an evaluation of a project's potential to generate GHG emissions, and 2) if a project does generate a net increase in GHG emissions, an evaluation if the project conflicts with an applicable plan, policy or regulation adopted for the purpose of reducing GHG emissions. Thus, because many projects in the City generate a net increase in GHG emissions, both GHG Checklist Questions are typically evaluated together. However, as discussed below, because the Ordinance would not have the potential to generate an increase in long-term GHG emissions, each Checklist Question has been evaluated individually under GHG Impact 1 and GHG Impact 2, respectively.

3.4 PROJECT IMPACTS

GHG Impact 1 **Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? *(Less than Significant).***

Similar to the short-term and temporary air quality impact discussion provided previously (see **Section 2.6, Project Impacts**, AQ Impact 2 discussion), activities associated with well abandonment also have the potential to generate short-term and temporary GHG emissions. Following the same assumptions utilized in the air quality impact discussion, the estimated abandonment related GHG emissions are summarized in **Table 15, Oil & Gas Well Abandonment GHG Emissions (Per Well)**. Because these emissions would be short-term and temporary, they are considered one-time GHG emission sources without the potential to increase long-term and recurring GHG emissions into the future. As discussed in further detail below, long-term and recurring GHG emissions would be decreased compared to existing GHG emissions associated with oil and gas operations throughout the City as oil and gas operations cease. Although not regulated by the Ordinance, well abandonment is a reasonably foreseeable outcome for many of the wells currently operating in the City.. As such, the one-time GHG emissions associated with abandonment are a

necessary step in the process to achieve long-term and recurring GHG reductions from terminating oil and gas operations throughout the City.

Table 15
Oil & Gas Well Abandonment GHG Emissions (Per Well)

Emissions Source	Metric Tons of Carbon Dioxide Equivalent (per year)[a]
Off-Road Equipment	3.88
Worker Trips	1.25
Truck Trips	1.05
Total GHG Emissions (Per Well)	**6.18**

[a] While abandonment would likely occur over a short period (i.e., 10 work days), the estimate is presented in metric tons per year as this is the standard unit of measurement to describe GHG emissions.
Source: Impact Sciences, September 2022. See Appendix B to this report.

As oil and gas wells cease operation, existing GHG emission sources associated with oil and gas wells and long-term GHG emissions would be decreased compared to existing emissions associated with oil and gas wells throughout the City. The following discussion identifies the potential GHG emissions that may be avoided as a result of the Ordinance.

Long-term GHG emissions fall into two general categories: 1) worker commutes and 2) fugitive emissions. In general, fugitive emissions from oil and gas activities may be attributed to the following primary types of sources: fugitive equipment leaks; process venting; evaporation losses; disposal of waste gas streams (e.g., by venting or flaring), and accidents and equipment failures. Fugitive leaks from piping and equipment are typically small yet detectable emissions from equipment where there are joints, flanges, and seals. Although joints and flanges are typically bolted, small amounts of hydrocarbons may be emitted through leaky joints.

It should be noted that fugitive emissions are difficult to quantify with a high degree of accuracy and there remains substantial uncertainty in the emission factors and calculation methodologies for oil and gas activities. This is due to the numerous types of sources and many variables to be considered. The key emission assessment issues are: (a) use of simple production-based emission factors is susceptible to excessive errors; (b) use of rigorous bottom-up approaches requires expert knowledge to apply and relies on detailed data which may be difficult and costly to obtain; and (c) measurement programs are time

consuming and very costly to perform.[127] Nevertheless, **Table 16, Avoided Oil & Gas GHG Emissions**, has been included as a good-faith effort to illustrate the potential scope of GHG emissions that may be avoided as a result of the Ordinance.[128] Due to the programmatic nature of this analysis and the many variables at each oil and gas well throughout the City, the quantified estimates in **Table 16** are included for illustrative purposes. Furthermore, while it is clear the Ordinance would result in a net benefit to local and regional GHG emissions, the degree to which GHG emissions may be avoided under the Ordinance is not the basis for the impact determination. Because the Ordinance would reduce long-term GHG emissions compared to existing emissions associated with oil and gas wells throughout the City, the Ordinance would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. Furthermore, as discussed in **GHG Impact 2**, the Ordinance would not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing GHG emissions. Therefore, this impact is ***less than significant***.

Table 16
Avoided Oil & Gas GHG Emissions

Emissions Source	Metric Tons of Carbon Dioxide Equivalent (per year)[a]
Worker Emissions	142
Fugitive Emissions	9,827
Total Avoided GHG Emissions	**9,969**

[a] *As described previously herein, abandonment of individual wells may occur at any time during the 20-year timeframe, and potentially beyond the 20-year timeframe. It would be speculative to assess how many wells would be abandoned during a given year, month, or peak day. Thus, the total avoided GHG emissions estimated here represents the annual metric tons per year upon abandonment of all wells.*
Source: Impact Sciences, September 2022. See Appendix B to this report.

GHG Impact 2 **Would implementation of the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases? *(Less than Significant).***

As discussed previously, AB 32 required CARB to adopt a scoping plan indicating how reductions in significant GHG sources will be achieved through regulations, market mechanisms, and other actions. In 2008, CARB released the Climate Change Proposed Scoping Plan in October 2008 that contained an outline

127 Intergovernmental Panel on Climate Change, Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories, Fugitive Emissions From Oil and Natural Gas Activities.

128 See **Appendix B** to this report for further information related to calculations and assumptions utilized to prepare these estimates.

of the proposed state strategies to achieve the 2020 greenhouse gas emission limits as outlined in AB 32. In response to SB 32, CARB adopted California's 2017 Climate Change Scoping Plan (2017 Update), which outlines the proposed framework of action for achieving California's SB 32 2030 GHG target: a 40 percent reduction in GHG emissions by 2030 relative to 1990 levels.[129] The 2030 target is intended to ensure that California remains on track to achieve the goal set forth by E.O. B-30-15 to reduce statewide GHG emissions by 2050 to 80 percent below 1990 levels.

The Ordinance would be consistent with the objectives of CARB's Scoping Plan, which is intended to reduce GHG emissions in accordance with AB 32 and SB 32. The Scoping Plan provides a framework for actions to reduce California's GHG emissions and requires CARB and other state agencies to adopt regulations and other strategies to reduce GHGs. Most of these measures focus on area source emissions (e.g., energy production, distribution and usage, and high-GWP GHGs in consumer products) and changes to the vehicle fleet (i.e., hybrid, electric, and more fuel-efficient vehicles) and associated fuels (e.g., Low Carbon Fuel Standard), among others. The Ordinance would comply with all regulations adopted in furtherance of the Scoping Plan to the extent required by law and to the extent that they are applicable to the Ordinance. For example, abandonment activities will utilize equipment in compliance with regulations set forth by CARB. Mobile sources during abandonment would be subject to the requirements of California Assembly Bill 1493 (Pavley Standards), the Advanced Clean Cars Program, and the Low Carbon Fuel Standard Regulation. Additionally, while the Ordinance is not a GHG reduction plan, the Ordinance is a reflection of state, regional, and local goals to move away from reliance on oil and gas energy sources which will serve to reduce long-term GHG emissions and help the State achieve the GHG reductions mandated in AB 32 and SB 32. The State has enacted numerous legislative regulations to address climate change by reducing our dependence on fossil fuels to reduce GHG emissions. California's Renewable Portfolio Standards established by Senate Bill 1078 requires that 60% of our electricity generation be produced from clean renewable sources by 2030 and become carbon-free by 2045. This has contributed to California's move away from electricity powered by coal and natural gas and a progressive increase in the use of solar and wind energy sources. This has occurred for both utility scale energy generation as well as for new single-family residential uses which are required to meet their electricity needs by installing solar panels under the State's Title 24 building standards. For passenger vehicles, Executive Order N-79-20 would ban the sales of new gasoline and diesel passenger vehicles while requiring that only new zero-emission vehicles be sold by 2035. This Executive Order is also consistent with CARB's regulations transitioning from diesel trucks and vans to zero emission trucks, and public bus fleets to be fully electric by 2040. See also Tables 4 and 5 in the Ordinance's Initial Study for a comprehensive list of state, regional, and City policies that support the Ordinance). Thus, because the Ordinance is consistent with state, regional, and local goals to move away

[129] CARB, *California's 2017 Climate Change Scoping Plan*, November 2017.

from reliance on oil and gas energy sources, the Ordinance would not have the potential to conflict with an applicable plan, policy or regulation adopted for the purpose of reducing GHG emissions and this impact is ***less than significant***.

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IMPACT
SCIENCES

APPENDIX A

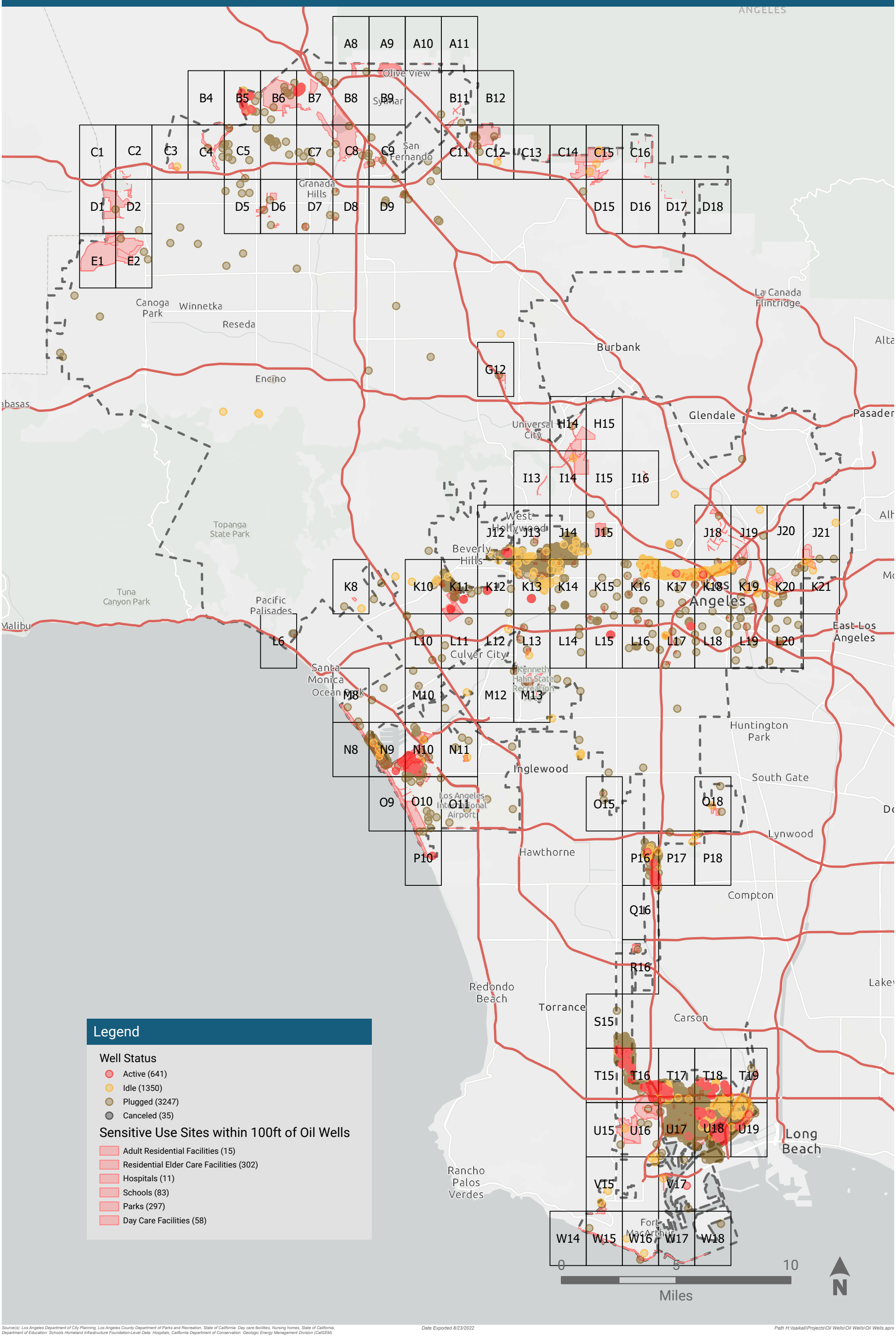
Sensitive Receptors

City of Los Angeles Oil Well Locations

Sensitive Use Sites Within 100 Feet of Oil Wells

DRAFT

LOS ANGELES CITY PLANNING



Legend

Well Status

- Active (641)
- Idle (1350)
- Plugged (3247)
- Canceled (35)

Sensitive Use Sites within 100ft of Oil Wells

- Adult Residential Facilities (15)
- Residential Elder Care Facilities (302)
- Hospitals (11)
- Schools (83)
- Parks (297)
- Day Care Facilities (58)

Source(s): Los Angeles Department of City Planning, Los Angeles County Department of Parks and Recreation, State of California: Day care facilities, Nursing homes, State of California, Department of Education: Schools Homeland Infrastructure Foundation-Level Data: Hospitals, California Department of Conservation: Geologic Energy Management Division (CalGEM)

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APPENDIX B

Air Quality & GHG Technical Data

Existing Oil & Gas Well Emissions (2022)

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2e
	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	MT/Year
Worker Emissions	1.99	3.52	34.8	0.08	2.73	0.53	
Fugitive Emissions	807.66						
Total	809.65	3.52	34.8	0.08	2.73	0.53	0

Notes:
CalEEMod used to estimate worker emissions; higher of the emissions between winter and summer presented
2022 year selected for emission factors
Assumed 641 active wells would generate an avg of 0.5 trips per well/day @ 15 miles per one way trip
Fugitive Gas Emissions based on calculations by Yorke Engineering for the Inglewood Oil Field Specific Plan
Fugitive Gas ROG emissions based on 1.26 lbs/day for 641 active wells.
As specific conditions of the 1350 idle wells are unknown at this time, fugitive emissions from these wells were not estimated.

Future Oil & Gas Well Emissions (2044) - Emissions to Be Avoided Under the Ordinance

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2e
	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	MT/Year
Worker Emissions	1.12	1.11	16.6	0.06	2.71	0.5	142
Fugitive Emissions	807.66						9,826.53
Total	808.78	1.11	16.6	0.06	2.71	0.5	9,968.53

Notes:
CalEEMod used to estimate worker emissions; lower of the emissions between winter and summer presented
2044 year selected for future year emission factors
Assumed 641 active wells would generate an avg of 0.5 trips per well/day @ 15 miles per one way trip
Fugitive Gas Emissions based on calculations by Yorke Engineering for the Inglewood Oil Field Specific Plan
Fugitive Gas ROG emissions based on 1.26 lbs/day per well for 641 active wells.
Fugitive Gas CO2e emissions based on 15.33 MT/year per well for 641 active wells.
As specific conditions of the 1350 idle wells is unknown at this time, fugitive emissions from these wells were not estimated.

Oil & Gas Well Abandonment Emissions - Per Well

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2e
	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	MT/Year
Off-Road Equipment (On-site)	0.51	4.69	5.79	0.01	0.19	0.17	3.88
Worker Trips	0.09	0.1	1.51	0	0.02	0	1.25
Vendor (HHD Trucks)	0.01	0.31	0.14	0.005	0.02	0.01	1.05
Total	0.61	5.1	7.44	0.015	0.23	0.18	6.18

Notes:
CalEEMod used to estimate emissions
Assumed 10 work days, 1 drill rig, 1 pump, 1 welder, and 1 tractor/loader/backhoe
Assumed 10 worker trips and 3 HHD truck deliveries per day

City of LA Oil & Gas - Existing Workers Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

1.2. Land Use Types

1.3. User-Selected Emission Reduction Measures by Emissions Sector

2. Emissions Summary

2.4. Operations Emissions Compared Against Thresholds

2.5. Operations Emissions by Sector, Unmitigated

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

4.3. Area Emissions by Source

4.3.2. Unmitigated

4.4. Water Emissions by Land Use

4.4.2. Unmitigated

4.5. Waste Emissions by Land Use

4.5.2. Unmitigated

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

5. Activity Data

5.9. Operational Mobile Sources

5.9.1. Unmitigated

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.2. Architectural Coatings

5.10.3. Landscape Equipment

5.11. Operational Energy Consumption

5.11.1. Unmitigated

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

5.13. Operational Waste Generation

5.13.1. Unmitigated

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

5.16.2. Process Boilers

5.17. User Defined

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

5.18.2. Sequestration

5.18.2.1. Unmitigated

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

6.2. Initial Climate Risk Scores

6.3. Adjusted Climate Risk Scores

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

7.2. Healthy Places Index Scores

7.3. Overall Health & Equity Scores

7.4. Health & Equity Measures

7.5. Evaluation Scorecard

8. User Changes to Default Data

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	City of LA Oil & Gas - Existing Workers
Lead Agency	Los Angeles
Land Use Scale	Plan/community
Analysis Level for Defaults	County
Windspeed (m/s)	0.50
Precipitation (days)	16.8
Location	34.052961595397775, -118.2471716978192
County	Los Angeles-South Coast
City	Los Angeles
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	4039
EDFZ	16
Electric Utility	Los Angeles Department of Water & Power
Gas Utility	Southern California Gas

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
User Defined Industrial	1.00	User Defined Unit	1.00	0.00	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.39	1.99	3.20	34.8	0.08	0.05	2.68	2.73	0.05	0.48	0.53	0.00	8,102	8,102	0.30	0.28	37.3	8,231
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.36	1.97	3.52	30.4	0.08	0.05	2.68	2.73	0.05	0.48	0.53	0.00	7,745	7,745	0.31	0.30	0.97	7,841
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.34	0.28	0.51	4.51	0.01	0.01	0.38	0.39	0.01	0.07	0.08	0.00	1,120	1,120	0.04	0.04	2.30	1,136
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.06	0.05	0.09	0.82	< 0.005	< 0.005	0.07	0.07	< 0.005	0.01	0.01	0.00	185	185	0.01	0.01	0.38	188

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Mobile	2.39	1.99	3.20	34.8	0.08	0.05	2.68	2.73	0.05	0.48	0.53	—	8,102	8,102	0.30	0.28	37.3	8,231
Area	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	2.39	1.99	3.20	34.8	0.08	0.05	2.68	2.73	0.05	0.48	0.53	0.00	8,102	8,102	0.30	0.28	37.3	8,231
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	2.36	1.97	3.52	30.4	0.08	0.05	2.68	2.73	0.05	0.48	0.53	—	7,745	7,745	0.31	0.30	0.97	7,841
Area	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	2.36	1.97	3.52	30.4	0.08	0.05	2.68	2.73	0.05	0.48	0.53	0.00	7,745	7,745	0.31	0.30	0.97	7,841
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.34	0.28	0.51	4.51	0.01	0.01	0.38	0.39	0.01	0.07	0.08	—	1,120	1,120	0.04	0.04	2.30	1,136
Area	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.34	0.28	0.51	4.51	0.01	0.01	0.38	0.39	0.01	0.07	0.08	0.00	1,120	1,120	0.04	0.04	2.30	1,136
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.06	0.05	0.09	0.82	< 0.005	< 0.005	0.07	0.07	< 0.005	0.01	0.01	—	185	185	0.01	0.01	0.38	188
Area	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

Project Located in a Designated Disadvantaged Community (Senate Bill 535)	Yes
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health and Equity Evaluation Scorecard not completed.

8. User Changes to Default Data

Screen	Justification
Land Use	model run for worker trips only

City of LA Oil & Gas - Future Workers Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

1.2. Land Use Types

1.3. User-Selected Emission Reduction Measures by Emissions Sector

2. Emissions Summary

2.4. Operations Emissions Compared Against Thresholds

2.5. Operations Emissions by Sector, Unmitigated

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4.3. Area Emissions by Source

4.3.2. Unmitigated

4.4. Water Emissions by Land Use

4.4.2. Unmitigated

4.5. Waste Emissions by Land Use

4.5.2. Unmitigated

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

4.10. Soil Carbon Accumulation By Vegetation Type

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4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

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5.10.1.1. Unmitigated

5.10.2. Architectural Coatings

5.10.3. Landscape Equipment

5.11. Operational Energy Consumption

5.11.1. Unmitigated

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

5.13. Operational Waste Generation

5.13.1. Unmitigated

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

5.16.2. Process Boilers

5.17. User Defined

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5.18.1. Land Use Change

5.18.1.1. Unmitigated

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

5.18.2. Sequestration

5.18.2.1. Unmitigated

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6.1. Climate Risk Summary

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6.3. Adjusted Climate Risk Scores

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

7.2. Healthy Places Index Scores

7.3. Overall Health & Equity Scores

7.4. Health & Equity Measures

7.5. Evaluation Scorecard

8. User Changes to Default Data

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	City of LA Oil & Gas - Future Workers
Lead Agency	Los Angeles
Land Use Scale	Plan/community
Analysis Level for Defaults	County
Windspeed (m/s)	0.50
Precipitation (days)	16.8
Location	34.054169352718944, -118.24457962120411
County	Los Angeles-South Coast
City	Los Angeles
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	4039
EDFZ	16
Electric Utility	Los Angeles Department of Water & Power
Gas Utility	Southern California Gas

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
User Defined Industrial	1.00	User Defined Unit	1.00	0.00	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.32	1.13	1.11	18.9	0.06	0.02	2.69	2.71	0.02	0.48	0.50	0.00	6,123	6,123	0.15	0.18	1.88	6,183
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.31	1.12	1.22	16.6	0.06	0.02	2.69	2.71	0.02	0.48	0.50	0.00	5,864	5,864	0.15	0.19	0.05	5,924
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.19	0.16	0.18	2.46	0.01	< 0.005	0.38	0.39	< 0.005	0.07	0.07	0.00	848	848	0.02	0.03	0.12	856
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.03	0.03	0.03	0.45	< 0.005	< 0.005	0.07	0.07	< 0.005	0.01	0.01	0.00	140	140	< 0.005	< 0.005	0.02	142

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Mobile	1.32	1.13	1.11	18.9	0.06	0.02	2.69	2.71	0.02	0.48	0.50	—	6,123	6,123	0.15	0.18	1.88	6,183
Area	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	1.32	1.13	1.11	18.9	0.06	0.02	2.69	2.71	0.02	0.48	0.50	0.00	6,123	6,123	0.15	0.18	1.88	6,183
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.31	1.12	1.22	16.6	0.06	0.02	2.69	2.71	0.02	0.48	0.50	—	5,864	5,864	0.15	0.19	0.05	5,924
Area	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	1.31	1.12	1.22	16.6	0.06	0.02	2.69	2.71	0.02	0.48	0.50	0.00	5,864	5,864	0.15	0.19	0.05	5,924
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.19	0.16	0.18	2.46	0.01	< 0.005	0.38	0.39	< 0.005	0.07	0.07	—	848	848	0.02	0.03	0.12	856
Area	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.19	0.16	0.18	2.46	0.01	< 0.005	0.38	0.39	< 0.005	0.07	0.07	0.00	848	848	0.02	0.03	0.12	856
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.03	0.03	0.03	0.45	< 0.005	< 0.005	0.07	0.07	< 0.005	0.01	0.01	—	140	140	< 0.005	< 0.005	0.02	142
Area	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

Total	0.03	0.03	0.03	0.45	< 0.005	< 0.005	0.07	0.07	< 0.005	0.01	0.01	0.00	140	140	< 0.005	< 0.005	0.02	142

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Mobile source emissions results are presented in Sections 2.6. No further detailed breakdown of emissions is available.

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Industrial	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00

Project Located in a Designated Disadvantaged Community (Senate Bill 535)	Yes
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health and Equity Evaluation Scorecard not completed.

8. User Changes to Default Data

Screen	Justification
Land Use	model run for worker trips only

City of LA Oil & Gas - Abandonment Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

1.2. Land Use Types

1.3. User-Selected Emission Reduction Measures by Emissions Sector

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

2.2. Construction Emissions by Year, Unmitigated

3. Construction Emissions Details

3.1. Demolition (2024) - Unmitigated

4. Operations Emissions Details

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

5. Activity Data

5.1. Construction Schedule

5.2. Off-Road Equipment

5.2.1. Unmitigated

5.3. Construction Vehicles

5.3.1. Unmitigated

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

5.5. Architectural Coatings

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

5.6.2. Construction Earthmoving Control Strategies

5.7. Construction Paving

5.8. Construction Electricity Consumption and Emissions Factors

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

5.18.2. Sequestration

5.18.2.1. Unmitigated

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

6.2. Initial Climate Risk Scores

6.3. Adjusted Climate Risk Scores

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

7.2. Healthy Places Index Scores

7.3. Overall Health & Equity Scores

7.4. Health & Equity Measures

7.5. Evaluation Scorecard

8. User Changes to Default Data

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	City of LA Oil & Gas - Abandonment
Lead Agency	Los Angeles
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	0.50
Precipitation (days)	16.8
Location	34.0545406568893, -118.24387235523815
County	Los Angeles-South Coast
City	Los Angeles
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	4039
EDFZ	16
Electric Utility	Los Angeles Department of Water & Power
Gas Utility	Southern California Gas

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
User Defined Industrial	1.00	User Defined Unit	1.00	0.00	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.73	0.60	5.10	7.43	0.01	0.19	0.32	0.51	0.18	0.08	0.25	—	1,355	1,355	0.06	0.05	1.61	1,374
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.02	0.02	0.14	0.20	< 0.005	0.01	0.01	0.01	< 0.005	< 0.005	0.01	—	36.8	36.8	< 0.005	< 0.005	0.02	37.3
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	< 0.005	< 0.005	0.03	0.04	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	6.10	6.10	< 0.005	< 0.005	< 0.005	6.18

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.73	0.60	5.10	7.43	0.01	0.19	0.32	0.51	0.18	0.08	0.25	—	1,355	1,355	0.06	0.05	1.61	1,374
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.02	0.02	0.14	0.20	< 0.005	0.01	0.01	0.01	< 0.005	< 0.005	0.01	—	36.8	36.8	< 0.005	< 0.005	0.02	37.3
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	< 0.005	< 0.005	0.03	0.04	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	6.10	6.10	< 0.005	< 0.005	< 0.005	6.18

3. Construction Emissions Details

3.1. Demolition (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.61	0.51	4.69	5.79	0.01	0.19	—	0.19	0.17	—	0.17	—	852	852	0.03	0.01	—	855
Demolition	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.01	0.13	0.16	< 0.005	0.01	—	0.01	< 0.005	—	< 0.005	—	23.3	23.3	< 0.005	< 0.005	—	23.4
Demolition	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.02	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.87	3.87	< 0.005	< 0.005	—	3.88
Demolition	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.10	1.51	0.00	0.00	0.02	0.02	0.00	0.00	0.00	—	282	282	0.01	0.01	1.11	287
Vendor	0.02	0.01	0.31	0.14	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	221	221	0.01	0.04	0.50	232
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	7.44	7.44	< 0.005	< 0.005	0.01	7.54
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	6.05	6.05	< 0.005	< 0.005	0.01	6.36
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	1.23	1.23	< 0.005	< 0.005	< 0.005	1.25
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.00	1.00	< 0.005	< 0.005	< 0.005	1.05
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Sequest	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Abandonment	Demolition	6/1/2024	6/14/2024	5.00	10.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Abandonment	Bore/Drill Rigs	Diesel	Average	1.00	8.00	33.0	0.73
Abandonment	Pumps	Diesel	Average	1.00	1.00	367	0.40
Abandonment	Welders	Diesel	Average	1.00	6.00	84.0	0.37
Abandonment	Tractors/Loaders/Backhoes	Diesel	Average	1.00	6.00	84.0	0.37

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix

Abandonment	—	—	—	—
Abandonment	Worker	20.0	18.5	LDA,LDT1,LDT2
Abandonment	Vendor	6.00	10.2	HHDT
Abandonment	Hauling	0.00	20.0	HHDT
Abandonment	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Abandonment	0.00	0.00	0.00	—	—

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	2	61%	61%
Water Demolished Area	2	36%	36%

5.7. Construction Paving

8. User Changes to Default Data

Screen	Justification
Land Use	1 acre per well site
Construction: Construction Phases	abandonment to last approximately 10 days per well.
Construction: Off-Road Equipment	equipment for abandonment
Construction: Trips and VMT	trips/deliveries per abandonment needs