Banyan Avenue Residential

GREENHOUSE GAS ANALYSIS

CITY OF RANCHO CUCAMONGA

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LIST OF ABBREVIATED TERMS

%	Percent
°C	Degrees Celsius
°F	Degrees Fahrenheit
(1)	Reference
2017 Scoping Plan	Final 2017 Scoping Plan Update
AB	Assembly Bill
AB 32	Global Warming Solutions Act of 2006
AB 1493	Pavley Fuel Efficiency Standards
AB 1881	California Water Conservation Landscaping Act of 2006
Annex I	Industrialized Nations
APA	Administrative Procedure Act
AQIA	*Banyan Avenue Residential Air Quality Impact Analysis*
BAU	Business As Usual
C_2F_6	Hexafluoroethane
C_2H_6	Ethane
CalEEMod	California Emissions Estimator Model
CALGAPS	California LBNL GHG Analysis of Policies Spreadsheet
CALGreen	California Green Building Standards Code
CAS	Climate Action Strategy
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resource Board
CBSC	California Building Standards Commission
CEC	California Energy Commission
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CEQA Guidelines	*2019 CEQA Statute and Guidelines*
CDFA	California Department of Food and Agriculture
CF_4	Tetrafluoromethane
CFC	Chlorofluorocarbons
CFC-113	Trichlorotrifluoroethane
CH_4	Methane
City	City of Rancho Cucamonga
CNRA	California Natural Resources Agency
CNRA 2009	*2009 California Climate Adaptation Strategy*
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent

Convention	United Nation's Framework Convention on Climate Change
COP	Conference of the Parties
CPUC	California Public Utilities Commission
DU	Dwelling Units
DWR	Department of Water Resources
EMFAC	Emission Factor Model
EPA	Environmental Protection Agency
FED	Functional Equivalent Document
GCC	Global Climate Change
Gg	Gigagram
GHGA	Greenhouse Gas Analysis
gpd	Gallons Per Day
gpm	Gallons Per Minute
GWP	Global Warming Potential
H_2O	Water
HFC	Hydrofluorocarbons
HDT	Heavy-Duty Trucks
HFC-23	Fluoroform
HFC-134a	1,1,1,2-tetrafluoroethane
HFC-152a	1,1-difluoroethane
IPCC	Intergovernmental Panel on Climate Change
ISO	Independent System Operator
ITE	Institute of Transportation Engineers
kWh	Kilowatt Hours
lbs	Pounds
LBNL	Lawrence Berkeley National Laboratory
LCA	Life-Cycle Analysis
LCD	Liquid Crystal Display
LCFS	Low Carbon Fuel Standard or Executive Order S-01-07
LEV III	Low-Emission Vehicle
LULUCF	Land-Use, Land-Use Change and Forestry
MMR	Mandatory Reporting Rule
$MMTCO_2e$	Million Metric Ton of Carbon Dioxide Equivalent
mpg	Miles Per Gallon
MPOs	Metropolitan Planning Organizations
$MMTCO_2e/yr$	Million Metric Ton of Carbon Dioxide Equivalent Per Year
MT/yr	Metric Tons Per Year
$MTCO_2e$	Metric Ton of Carbon Dioxide Equivalent

$MTCO_2e$/yr	Metric Ton of Carbon Dioxide Equivalent Per Year
MW	Megawatts
MWh	Megawatts Per Hour
MWELO	California Department of Water Resources' Model Water Efficient
N_2O	Nitrous Oxide
NDC	Nationally Determined Contributions
NF_3	Nitrogen Trifluoride
NHTSA	National Highway Traffic Safety Administration
NIOSH	National Institute for Occupational Safety and Health
Non-Annex I	Developing Nations
OAL	Office of Administrative Law
OPR	Office of Planning and Research
PFC	Perfluorocarbons
ppb	Parts Per Billion
ppm	Parts Per Million
ppt	Parts Per Trillion
Project	Banyan Avenue Residential
RPS	Renewable Portfolio Standards
SAFE	Safer Affordable Fuel-Efficient Vehicles Rule
SB	Senate Bill
SB 32	California Global Warming Solutions Act of 2006
SB 375	Regional GHG Emissions Reduction Targets/Sustainable Communities Strategies
SB 1078	Renewable Portfolio Standards
SB 1368	Statewide Retail Provider Emissions Performance Standards
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
Scoping Plan	California Air Resources Board Climate Change Scoping Plan
sf	Square Feet
SF_6	Sulfur Hexaflouride
SLPS	Short-Lived Climate Pollutant Strategy
SP	Service Population
SR-210	State Route 210
TDM	Transportation Demand Management

Title 20	Appliance Energy Efficiency Standards
Title 24	California Building Code
U.N.	United Nations
U.S.	United States
UNFCCC	United Nations’ Framework Convention on Climate Change
UTR	Utility Tractors
VMT	Vehicle Miles Traveled
WCI	Western Climate Initiative
WRI	World Resources Institute
ZE/NZE	Zero and Near-Zero Emissions
ZEV	Zero-Emissions Vehicles

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EXECUTIVE SUMMARY

ES.1 SUMMARY OF FINDINGS

The results of this *Banyan Avenue Residential Greenhouse Gas Analysis* (GHGA) is summarized below based on the significance criteria in Section 3 of this report consistent with Appendix G of the *California Environmental Quality Act (CEQA) Guidelines* (*CEQA Guidelines* (1). Table ES-1 shows the findings of significance for potential greenhouse gas (GHG) impacts under CEQA.

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
GHG Impact #1: The Project would not generate direct or indirect GHG emission that would result in a significant impact on the environment.	3.8	*Less Than Significant*	*n/a*
GHG Impact #2: The Project would not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.	3.8	*Less Than Significant*	*n/a*

ES.2 PROJECT REQUIREMENTS

The Project would be required to comply with regulations imposed by the State of California and the South Coast Air Quality Management District (SCAQMD) aimed at the reduction of air pollutant emissions. Those that are directly and indirectly applicable to the Project and that would assist in the reduction of GHG emissions include:

- Global Warming Solutions Act of 2006 (Assembly Bill (AB) 32) (2).
- Regional GHG Emissions Reduction Targets/Sustainable Communities Strategies (Senate Bill (SB) 375) (3).
- Pavley Fuel Efficiency Standards (AB 1493). Establishes fuel efficiency ratings for new vehicles (4).
- California Building Code (Title 24 California Code of Regulations (CCR)). Establishes energy efficiency requirements for new construction (5).
- Appliance Energy Efficiency Standards (Title 20 CCR). Establishes energy efficiency requirements for appliances (6).
- Low Carbon Fuel Standard (LCFS). Requires carbon content of fuel sold in California to be 10 percent (%) less by 2020 (7).
- California Water Conservation in Landscaping Act of 2006 (AB 1881). Requires local agencies to adopt the Department of Water Resources updated Water Efficient Landscape Ordinance or equivalent by January 1, 2010 to ensure efficient landscapes in new development and reduced water waste in existing landscapes (8).

- Statewide Retail Provider Emissions Performance Standards (SB 1368). Requires energy generators to achieve performance standards for GHG emissions (9).
- Renewable Portfolio Standards (SB 1078 – also referred to as RPS). Requires electric corporations to increase the amount of energy obtained from eligible renewable energy resources to 20% by 2010 and 33% by 2020 (10).
- California Global Warming Solutions Act of 2006 (SB 32). Requires the state to reduce statewide GHG emissions to 40% below 1990 levels by 2030, a reduction target that was first introduced in Executive Order B-30-15 (11).

Promulgated regulations that will affect the Project's emissions are accounted for in the Project's GHG calculations provided in this report. In particular, AB 1493, LCFS, and RPS, and therefore are accounted for in the Project's emission calculations.

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1 INTRODUCTION

This report presents the results of the GHGA prepared by Urban Crossroads, Inc., for the proposed Banyan Avenue Residential (Project). The purpose of this GHGA is to evaluate Project-related construction and operational emissions and determine the level of GHG impacts as a result of constructing and operating the Project.

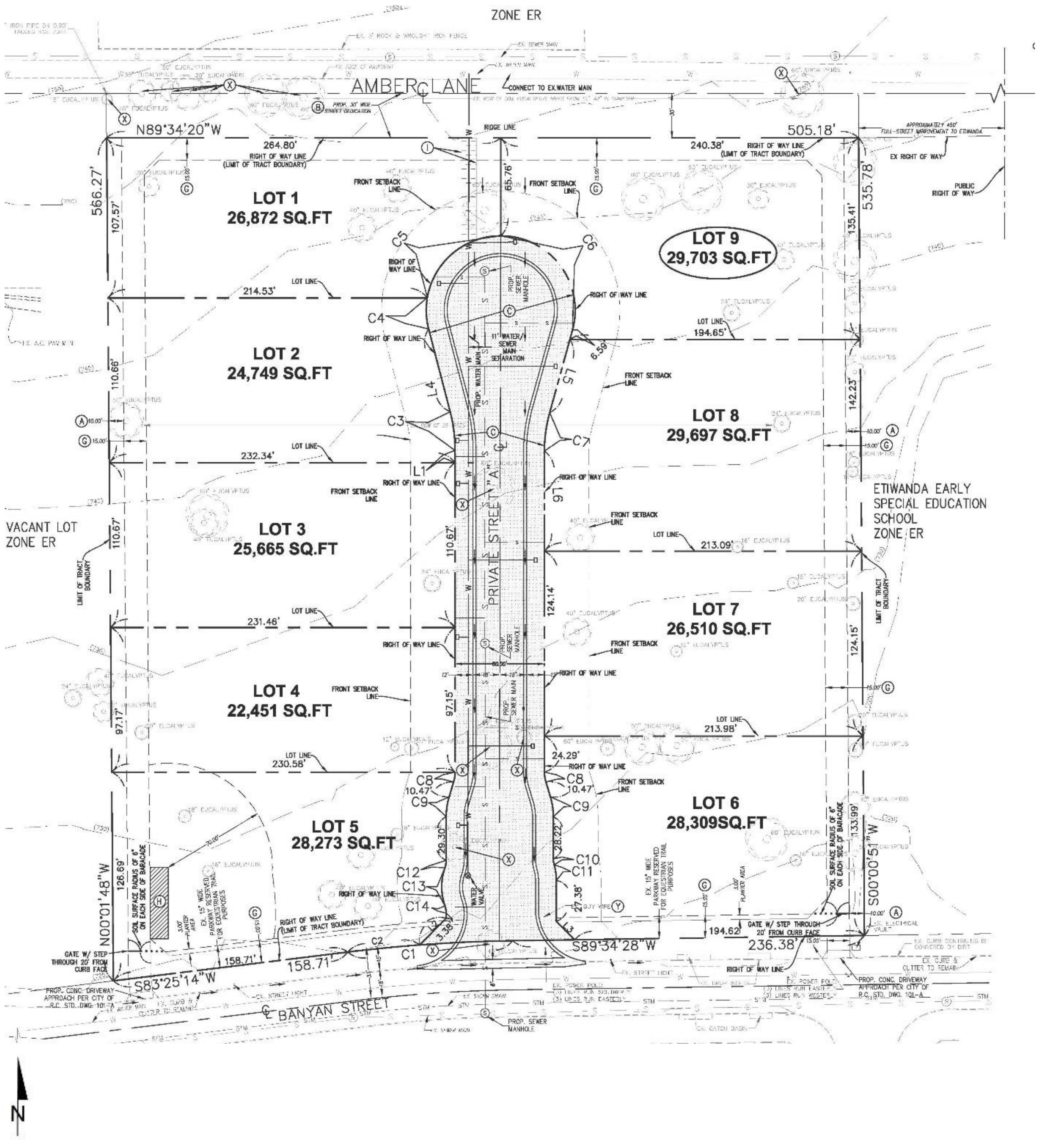
1.1 SITE LOCATION

The proposed Banyan Avenue Residential site is located at 12774 Summit Avenue (Banyan), in the City of Rancho Cucamonga. The Project site is currently vacant. Residential land uses are located north and south of the Project site. The Frost First Education Center and Etiwanda Medical Therapy Unit are located adjacent east of the Project site. Vacant land located adjacent west and south of the Project site are designated as “Very Low Density Residential” (12). The State Route 210 (SR-210) Freeway is located approximately 0.45 miles south of the Project site.

1.2 PROJECT DESCRIPTION

The Project is proposed to consist of nine (9) single family residential dwelling units (DU) on a 4.62-acre site. Exhibit 1-A illustrates the site plan for the Project.

EXHIBIT 1-A: SITE PLAN



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2 CLIMATE CHANGE SETTING

2.1 INTRODUCTION TO GLOBAL CLIMATE CHANGE

GCC is defined as the change in average meteorological conditions on the earth with respect to temperature, precipitation, and storms. The majority of scientists believe that the climate shift taking place since the Industrial Revolution is occurring at a quicker rate and magnitude than in the past. Scientific evidence suggests that GCC is the result of increased concentrations of GHGs in the earth's atmosphere, including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated gases. The majority of scientists believe that this increased rate of climate change is the result of GHGs resulting from human activity and industrialization over the past 200 years.

An individual project like the proposed Project evaluated in this GHGA cannot generate enough GHG emissions to affect a discernible change in global climate. However, the proposed Project may participate in the potential for GCC by its incremental contribution of GHGs combined with the cumulative increase of all other sources of GHGs, which when taken together constitute potential influences on GCC. Because these changes may have serious environmental consequences, Section 3.0 will evaluate the potential for the proposed Project to have a significant effect upon the environment as a result of its potential contribution to the greenhouse effect.

2.2 GLOBAL CLIMATE CHANGE DEFINED

GCC refers to the change in average meteorological conditions on the earth with respect to temperature, wind patterns, precipitation and storms. Global temperatures are regulated by naturally occurring atmospheric gases such as water vapor, CO_2, N_2O, CH_4, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). These particular gases are important due to their residence time (duration they stay) in the atmosphere, which ranges from 10 years to more than 100 years. These gases allow solar radiation into the earth's atmosphere, but prevent radioactive heat from escaping, thus warming the earth's atmosphere. GCC can occur naturally as it has in the past with the previous ice ages.

Gases that trap heat in the atmosphere are often referred to as GHGs. GHGs are released into the atmosphere by both natural and anthropogenic activity. Without the natural GHG effect, the earth's average temperature would be approximately 61 degrees Fahrenheit (°F) cooler than it is currently. The cumulative accumulation of these gases in the earth's atmosphere is considered to be the cause for the observed increase in the earth's temperature.

2.3 GHGS

2.3.1 GHGS AND HEALTH EFFECTS

GHGs trap heat in the atmosphere, creating a GHG effect that results in global warming and climate change. Many gases demonstrate these properties and as discussed in Table 2-1. For the purposes of this analysis, emissions of CO_2, CH_4, and N_2O were evaluated (see Table 3-1 later in this report) because these gases are the primary contributors to GCC from development projects.

Although there are other substances such as fluorinated gases that also contribute to GCC, these fluorinated gases were not evaluated as their sources are not well-defined and do not contain accepted emissions factors or methodology to accurately calculate these gases.

TABLE 2-1: GREENHOUSE GASES

Greenhouse Gases	Description	Sources	Health Effects
Water	Water is the most abundant, important, and variable GHG in the atmosphere. Water vapor is not considered a pollutant; in the atmosphere it maintains a climate necessary for life. Changes in its concentration are primarily considered to be a result of climate feedbacks related to the warming of the atmosphere rather than a direct result of industrialization. A climate feedback is an indirect, or secondary, change, either positive or negative, that occurs within the climate system in response to a forcing mechanism. The feedback loop in which water is involved is critically important to projecting future climate change. As the temperature of the atmosphere rises, more water is evaporated from ground storage (rivers, oceans, reservoirs, soil). Because the air is warmer, the relative humidity can be higher (in essence, the air is able to 'hold' more water when it is warmer), leading to more water vapor in the atmosphere. As a GHG, the higher concentration of water vapor is then able to absorb more thermal indirect energy radiated from the Earth, thus further warming the atmosphere. The warmer atmosphere can then hold more water vapor and so on and so on. This is referred to as a "positive feedback loop." The extent to which this positive feedback loop will continue is	The main source of water vapor is evaporation from the oceans (approximately 85%). Other sources include evaporation from other water bodies, sublimation (change from solid to gas) from sea ice and snow, and transpiration from plant leaves.	There are no known direct health effects related to water vapor at this time. It should be noted however that when some pollutants react with water vapor, the reaction forms a transport mechanism for some of these pollutants to enter the human body through water vapor.

Greenhouse Gases	Description	Sources	Health Effects
	unknown as there are also dynamics that hold the positive feedback loop in check. As an example, when water vapor increases in the atmosphere, more of it will eventually condense into clouds, which are more able to reflect incoming solar radiation (thus allowing less energy to reach the earth's surface and heat it up) (13).		
CO_2	CO_2 is an odorless and colorless GHG. Since the industrial revolution began in the mid-1700s, the sort of human activity that increases GHG emissions has increased dramatically in scale and distribution. Data from the past 50 years suggests a corollary increase in levels and concentrations. As an example, prior to the industrial revolution, CO_2 concentrations were fairly stable at 280 parts per million (ppm). Today, they are around 370 ppm, an increase of more than 30%. Left unchecked, the concentration of CO_2 in the atmosphere is projected to increase to a minimum of 540 ppm by 2100 as a direct result of anthropogenic sources (14).	CO_2 is emitted from natural and manmade sources. Natural sources include: the decomposition of dead organic matter; respiration of bacteria, plants, animals and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources include: the burning of coal, oil, natural gas, and wood. CO_2 is naturally removed from the air by photosynthesis, dissolution into ocean water, transfer to soils and ice caps, and chemical weathering of carbonate rocks (15).	Outdoor levels of CO_2 are not high enough to result in negative health effects. According to the National Institute for Occupational Safety and Health (NIOSH) high concentrations of CO_2 can result in health effects such as: headaches, dizziness, restlessness, difficulty breathing, sweating, increased heart rate, increased cardiac output, increased blood pressure, coma, asphyxia, and/or convulsions. It should be noted that current concentrations of CO_2 in the earth's atmosphere are estimated to be approximately 370 ppm, the actual reference exposure level (level at which adverse health effects typically occur) is at exposure levels of 5,000 ppm averaged over 10 hours in a 40-hour workweek and short-term reference exposure levels of 30,000 ppm averaged over a 15 minute period (16).

Greenhouse Gases	Description	Sources	Health Effects
CH_4	CH_4 is an extremely effective absorber of radiation, although its atmospheric concentration is less than CO_2 and its lifetime in the atmosphere is brief (10-12 years), compared to other GHGs.	CH_4 has both natural and anthropogenic sources. It is released as part of the biological processes in low oxygen environments, such as in swamplands or in rice production (at the roots of the plants). Over the last 50 years, human activities such as growing rice, raising cattle, using natural gas, and mining coal have added to the atmospheric concentration of CH_4. Other anthropocentric sources include fossil-fuel combustion and biomass burning (17).	CH_4 is extremely reactive with oxidizers, halogens, and other halogen-containing compounds. Exposure to high levels of CH_4 can cause asphyxiation, loss of consciousness, headache and dizziness, nausea and vomiting, weakness, loss of coordination, and an increased breathing rate.
N_2O	N_2O, also known as laughing gas, is a colorless GHG. Concentrations of N_2O also began to rise at the beginning of the industrial revolution. In 1998, the global concentration was 314 parts per billion (ppb).	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 as an aerosol spray propellant, i.e., in whipped cream bottles. It is also	N_2O can cause dizziness, euphoria, and sometimes slight hallucinations. In small doses, it is considered harmless. However, in some cases, heavy and extended use can cause Olney's Lesions (brain damage) (18).

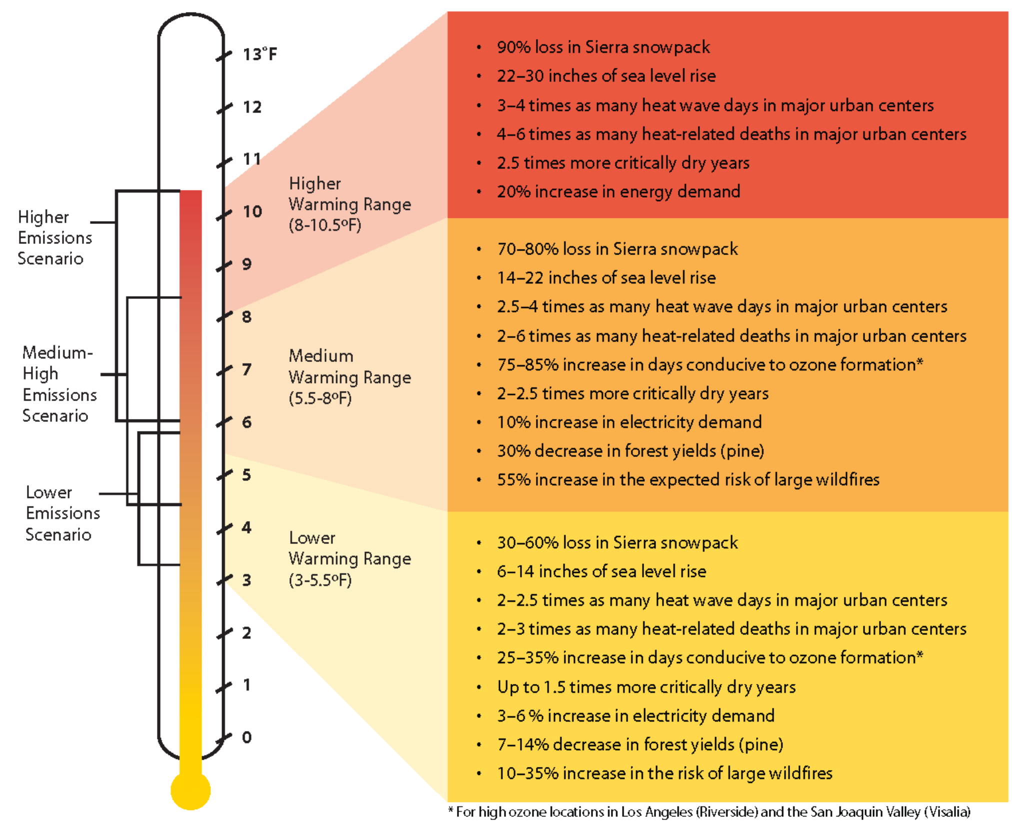
Greenhouse Gases	Description	Sources	Health Effects
		used in potato chip bags to keep chips fresh. It is used in rocket engines and in race cars. N_2O can be transported into the stratosphere, be deposited on the earth's surface, and be converted to other compounds by chemical reaction (18).	
Chlorofluorocarbons (CFCs)	CFCs are gases formed synthetically by replacing all hydrogen atoms in CH_4 or ethane (C_2H_6) with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble and chemically unreactive in the troposphere (the level of air at the earth's surface).	CFCs have no natural source but were first synthesized in 1928. They were used for refrigerants, aerosol propellants and cleaning solvents. Due to the discovery that they are able to destroy stratospheric ozone, a global effort to halt their production was undertaken and was extremely successful, so much so that levels of the major CFCs are now remaining steady or declining. However, their long atmospheric lifetimes mean that some of the CFCs will remain in the atmosphere for over 100 years (19).	In confined indoor locations, working with CFC-113 or other CFCs is thought to result in death by cardiac arrhythmia (heart frequency too high or too low) or asphyxiation.

Greenhouse Gases	Description	Sources	Health Effects
HFCs	HFCs are synthetic, man-made chemicals that are used as a substitute for CFCs. Out of all the GHGs, they are one of three groups with the highest global warming potential (GWP). The HFCs with the largest measured atmospheric abundances are (in order), fluoroform (CHF_3), 1,1,1,2-tetrafluoroethane (CH_2FCF), and 1,1-difluoroethane (CH_3CF_2). Prior to 1990, the only significant emissions were of CHF_3. CH_2FCF emissions are increasing due to its use as a refrigerant.	HFCs are manmade for applications such as automobile air conditioners and refrigerants.	No health effects are known to result from exposure to HFCs.
PFCs	PFCs have stable molecular structures and do not break down through chemical processes in the lower atmosphere. High-energy ultraviolet rays, which occur about 60 kilometers above earth's surface, are able to destroy the compounds. Because of this, PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane (CF_4) and hexafluoroethane (C_2F_6). The EPA estimates that concentrations of CF_4 in the atmosphere are over 70 parts per trillion (ppt).	The two main sources of PFCs are primary aluminum production and semiconductor manufacture.	No health effects are known to result from exposure to PFCs.
SF_6	SF_6 is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It also has the highest GWP of any gas evaluated (23,900) (20). The EPA indicates that concentrations in the 1990s were about 4 ppt.	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.	In high concentrations in confined areas, the gas presents the hazard of suffocation because it displaces the oxygen needed for breathing.

Greenhouse Gases	Description	Sources	Health Effects
Nitrogen Trifluoride (NF_3)	NF_3 is a colorless gas with a distinctly moldy odor. The World Resources Institute (WRI) indicates that NF_3 has a 100-year GWP of 17,200 (21).	NF_3 is used in industrial processes and is produced in the manufacturing of semiconductors, Liquid Crystal Display (LCD) panels, types of solar panels, and chemical lasers.	Long-term or repeated exposure may affect the liver and kidneys and may cause fluorosis (22).

The potential health effects related directly to the emissions of CO_2, CH_4, and N_2O as they relate to development projects such as the proposed Project are still being debated in the scientific community. Their cumulative effects to GCC have the potential to cause adverse effects to human health. Increases in Earth's ambient temperatures would result in more intense heat waves, causing more heat-related deaths. Scientists also purport that higher ambient temperatures would increase disease survival rates and result in more widespread disease. Climate change will likely cause shifts in weather patterns, potentially resulting in devastating droughts and food shortages in some areas (23). Exhibit 2-A presents the potential impacts of global warming (24).

EXHIBIT 2-A: SUMMARY OF PROJECTED GLOBAL WARMING IMPACT, 2070-2099 (AS COMPARED WITH 1961-1990)



Source: Barbara H. Allen-Diaz. "Climate change affects us all." *University of California, Agriculture and Natural Resources*, 2009.

2.4 GLOBAL WARMING POTENTIAL

GHGs have varying GWP values. GWP of a GHG indicates the amount of warming a gas causes over a given period of time and represents the potential of a gas to trap heat in the atmosphere. CO_2 is utilized as the reference gas for GWP, and thus has a GWP of 1. CO_2 equivalent (CO_2e) is a term used for describing the difference GHGs in a common unit. CO_2e signifies the amount of CO_2 which would have the equivalent GWP.

The atmospheric lifetime and GWP of selected GHGs are summarized at Table 2-2. As shown in the table below, GWP for the Second Assessment Report, the Intergovernmental Panel on Climate Change (IPCC)'s scientific and socio-economic assessment on climate change, range from 1 for CO_2 to 23,900 for SF_6 and GWP for the IPCC's 5th Assessment Report range from 1 for CO_2 to 23,500 for SF_6 (25).

TABLE 2-2: GWP AND ATMOSPHERIC LIFETIME OF SELECT GHGS

Gas	Atmospheric Lifetime (years)	GWP (100-year time horizon)	
		2nd Assessment Report	5th Assessment Report
CO_2	See*	1	1
CH_4	12 .4	21	28
N_2O	121	310	265
HFC-23	222	11,700	12,400
HFC-134a	13.4	1,300	1,300
HFC-152a	1.5	140	138
SF_6	3,200	23,900	23,500

*As per Appendix 8.A. of IPCC's 5th Assessment Report, no single lifetime can be given.
Source: Table 2.14 of the IPCC Fourth Assessment Report, 2007

2.5 GHG EMISSIONS INVENTORIES

2.5.1 GLOBAL

Worldwide anthropogenic GHG emissions are tracked by the IPCC for industrialized nations (referred to as Annex I) and developing nations (referred to as Non-Annex I). Human GHG emissions data for Annex I nations are available through 2018. Based on the latest available data, the sum of these emissions totaled approximately 28,768,439 gigagram (Gg) CO_2e[1] (26) (27) as summarized on Table 2-3.

[1] The global emissions are the sum of Annex I and non-Annex I countries, without counting Land-Use, Land-Use Change and Forestry (LULUCF). For countries without 2018 data, the United Nations' Framework Convention on Climate Change (UNFCCC) data for the most recent year were used U.N. Framework Convention on Climate Change, "Annex I Parties – GHG total without LULUCF," The most recent GHG emissions for China and India are from 2014 and 2010, respectively.

2.5.2 UNITED STATES

As noted in Table 2-3, the United States, as a single country, was the number two producer of GHG emissions in 2018.

TABLE 2-3: TOP GHG PRODUCING COUNTRIES AND THE EUROPEAN UNION [2]

Emitting Countries	GHG Emissions (Gg CO_2e)
China	12,300,200
United States	6,676,650
European Union (28-member countries)	4,232,274
Russian Federation	2,220,123
India	2,100,850
Japan	1,238,343
Total	**28,768,439**

2.5.3 STATE OF CALIFORNIA

California has significantly slowed the rate of growth of GHG emissions due to the implementation of energy efficiency programs as well as adoption of strict emission controls, but is still a substantial contributor to the United States (U.S.) emissions inventory total (28). The California Air Resource Board (CARB) compiles GHG inventories for the State of California. Based upon the 2019 GHG inventory data (i.e., the latest year for which data are available) for the 2000-2017 GHG emissions period, California emitted an average 424.1 million metric tons of CO_2e per year ($MMTCO_2e$/yr) (29).

2.6 EFFECTS OF CLIMATE CHANGE IN CALIFORNIA

2.6.1 PUBLIC HEALTH

Higher temperatures may increase the frequency, duration, and intensity of conditions conducive to air pollution formation. For example, days with weather conducive to ozone formation could increase from 25 to 35% under the lower warming range to 75 to 85% under the medium warming range. In addition, if global background ozone levels increase as predicted in some scenarios, it may become impossible to meet local air quality standards. Air quality could be further compromised by increases in wildfires, which emit fine particulate matter that can travel long distances, depending on wind conditions. The Climate Scenarios report indicates that large wildfires could become up to 55% more frequent if GHG emissions are not significantly reduced.

In addition, under the higher warming range scenario, there could be up to 100 more days per year with temperatures above 90°F in Los Angeles and 95°F in Sacramento by 2100. This is a large increase over historical patterns and approximately twice the increase projected if temperatures

[2] Used http://unfccc.int data for Annex I countries. Consulted the CAIT Climate Data Explorer in https://www.climatewatchdata.org site to reference Non-Annex I countries of China and India.

remain within or below the lower warming range. Rising temperatures could increase the risk of death from dehydration, heat stroke/exhaustion, heart attack, stroke, and respiratory distress caused by extreme heat.

2.6.2 WATER RESOURCES

A vast network of man-made reservoirs and aqueducts captures and transports water throughout the state from northern California rivers and the Colorado River. The current distribution system relies on Sierra Nevada snowpack to supply water during the dry spring and summer months. Rising temperatures, potentially compounded by decreases in precipitation, could severely reduce spring snowpack, increasing the risk of summer water shortages.

If temperatures continue to increase, more precipitation could fall as rain instead of snow, and the snow that does fall could melt earlier, reducing the Sierra Nevada spring snowpack by as much as 70 to 90%. Under the lower warming range scenario, snowpack losses could be only half as large as those possible if temperatures were to rise to the higher warming range. How much snowpack could be lost depends in part on future precipitation patterns, the projections for which remain uncertain. However, even under the wetter climate projections, the loss of snowpack could pose challenges to water managers and hamper hydropower generation. It could also adversely affect winter tourism. Under the lower warming range, the ski season at lower elevations could be reduced by as much as a month. If temperatures reach the higher warming range and precipitation declines, there might be many years with insufficient snow for skiing and snowboarding.

The State's water supplies are also at risk from rising sea levels. An influx of saltwater could degrade California's estuaries, wetlands, and groundwater aquifers. Saltwater intrusion caused by rising sea levels is a major threat to the quality and reliability of water within the southern edge of the Sacramento/San Joaquin River Delta – a major fresh water supply.

2.6.3 AGRICULTURE

Increased temperatures could cause widespread changes to the agriculture industry reducing the quantity and quality of agricultural products statewide. First, California farmers could possibly lose as much as 25% of the water supply needed. Although higher CO_2 levels can stimulate plant production and increase plant water-use efficiency, California's farmers could face greater water demand for crops and a less reliable water supply as temperatures rise. Crop growth and development could change, as could the intensity and frequency of pest and disease outbreaks. Rising temperatures could aggravate ozone pollution, which makes plants more susceptible to disease and pests and interferes with plant growth.

Plant growth tends to be slow at low temperatures, increasing with rising temperatures up to a threshold. However, faster growth can result in less-than-optimal development for many crops, so rising temperatures could worsen the quantity and quality of yield for a number of California's agricultural products. Products likely to be most affected include wine grapes, fruits and nuts.

In addition, continued GCC could shift the ranges of existing invasive plants and weeds and alter competition patterns with native plants. Range expansion could occur in many species while range contractions may be less likely in rapidly evolving species with significant populations already established. Should range contractions occur, new or different weed species could fill the emerging gaps. Continued GCC could alter the abundance and types of many pests, lengthen pests' breeding season, and increase pathogen growth rates.

2.6.4 FORESTS AND LANDSCAPES

GCC has the potential to intensify the current threat to forests and landscapes by increasing the risk of wildfire and altering the distribution and character of natural vegetation. If temperatures rise into the medium warming range, the risk of large wildfires in California could increase by as much as 55%, which is almost twice the increase expected if temperatures stay in the lower warming range. However, since wildfire risk is determined by a combination of factors, including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the state. In contrast, wildfires in northern California could increase by up to 90% due to decreased precipitation.

Moreover, continued GCC has the potential to alter natural ecosystems and biological diversity within the state. For example, alpine and subalpine ecosystems could decline by as much as 60 to 80% by the end of the century as a result of increasing temperatures. The productivity of the state's forests has the potential to decrease as a result of GCC.

2.6.5 RISING SEA LEVELS

Rising sea levels, more intense coastal storms, and warmer water temperatures could increasingly threaten the state's coastal regions. Under the higher warming range scenario, sea level is anticipated to rise 22 to 35 inches by 2100. Elevations of this magnitude would inundate low-lying coastal areas with saltwater, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and natural habitats. Under the lower warming range scenario, sea level could rise 12-14 inches.

2.7 REGULATORY SETTING

2.7.1 INTERNATIONAL

Climate change is a global issue involving GHG emissions from all around the world; therefore, countries such as the ones discussed below have made an effort to reduce GHGs.

IPCC

In 1988, the United Nations (U.N.) and the World Meteorological Organization established the IPCC to assess the scientific, technical and socioeconomic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts, and options for adaptation and mitigation.

UNITED NATION'S FRAMEWORK CONVENTION ON CLIMATE CHANGE (CONVENTION)

On March 21, 1994, the U.S. joined a number of countries around the world in signing the Convention. Under the Convention, governments gather and share information on GHG emissions, national policies, and best practices; launch national strategies for addressing GHG emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change.

INTERNATIONAL CLIMATE CHANGE TREATIES

The Kyoto Protocol is an international agreement linked to the Convention. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing GHG emissions at an average of 5% against 1990 levels over the five-year period 2008–2012. The Convention (as discussed above) encouraged industrialized countries to stabilize emissions; however, the Protocol commits them to do so. Developed countries have contributed more emissions over the last 150 years; therefore, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities."

In 2001, President George W. Bush indicated that he would not submit the treaty to the U.S. Senate for ratification, which effectively ended American involvement in the Kyoto Protocol. In December 2009, international leaders met in Copenhagen to address the future of international climate change commitments post-Kyoto. No binding agreement was reached in Copenhagen; however, the Committee identified the long-term goal of limiting the maximum global average temperature increase to no more than 2 degrees Celsius (°C) above pre-industrial levels, subject to a review in 2015. The UN Climate Change Committee held additional meetings in Durban, South Africa in November 2011; Doha, Qatar in November 2012; and Warsaw, Poland in November 2013. The meetings are gradually gaining consensus among participants on individual climate change issues.

On September 23, 2014 more than 100 Heads of State and Government and leaders from the private sector and civil society met at the Climate Summit in New York hosted by the U.N. At the Summit, heads of government, business and civil society announced actions in areas that would have the greatest impact on reducing emissions, including climate finance, energy, transport, industry, agriculture, cities, forests, and building resilience.

Parties to the U.N. Framework Convention on Climate Change (UNFCCC) reached a landmark agreement on December 12, 2015 in Paris, charting a fundamentally new course in the two-decade-old global climate effort. Culminating a four-year negotiating round, the new treaty ends the strict differentiation between developed and developing countries that characterized earlier efforts, replacing it with a common framework that commits all countries to put forward their best efforts and to strengthen them in the years ahead. This includes, for the first time, requirements that all parties report regularly on their emissions and implementation efforts and undergo international review.

The agreement and a companion decision by parties were the key outcomes of the conference, known as the 21st session of the UNFCCC Conference of the Parties (COP) 21. Together, the Paris Agreement and the accompanying COP decision:

- Reaffirm the goal of limiting global temperature increase well below 2°C, while urging efforts to limit the increase to 1.5 degrees;
- Establish binding commitments by all parties to make “nationally determined contributions” (NDCs), and to pursue domestic measures aimed at achieving them;
- Commit all countries to report regularly on their emissions and “progress made in implementing and achieving” their NDCs, and to undergo international review;
- Commit all countries to submit new NDCs every five years, with the clear expectation that they will “represent a progression” beyond previous ones;
- Reaffirm the binding obligations of developed countries under the UNFCCC to support the efforts of developing countries, while for the first time encouraging voluntary contributions by developing countries too;
- Extend the current goal of mobilizing $100 billion a year in support by 2020 through 2025, with a new, higher goal to be set for the period after 2025;
- Extend a mechanism to address “loss and damage” resulting from climate change, which explicitly will not “involve or provide a basis for any liability or compensation;”
- Require parties engaging in international emissions trading to avoid “double counting;” and
- Call for a new mechanism, similar to the Clean Development Mechanism under the Kyoto Protocol, enabling emission reductions in one country to be counted toward another country’s NDC (C2ES 2015a) (30).

On November 4, 2019, the Trump administration formally notified the U.N. that the United States would withdraw from the Paris Agreement. It should be noted that withdrawal would be effective one year after notification in 2020.

2.7.2 NATIONAL

Prior to the last decade, there have been no concrete federal regulations of GHGs or major planning for climate change adaptation. The following are actions regarding the federal government, GHGs, and fuel efficiency.

GHG ENDANGERMENT

In *Massachusetts v. Environmental Protection Agency* 549 U.S. 497 (2007), decided on April 2, 2007, the United States Supreme Court (U.S. Court) found that four GHGs, including CO_2, are air pollutants subject to regulation under Section 202(a)(1) of the Clean Air Act (CAA). The Court held that the EPA Administrator must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. On December 7, 2009, the EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the CAA:

- Endangerment Finding: The Administrator finds 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 finds that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution, which threatens public health and welfare.

These findings do not impose requirements on industry or other entities. However, this was a prerequisite for implementing GHG emissions standards for vehicles, as discussed in the section "Clean Vehicles" below. After a lengthy legal challenge, the U.S. Court declined to review an Appeals Court ruling that upheld the EPA Administrator's findings (31).

CLEAN VEHICLES

Congress first passed the Corporate Average Fuel Economy law in 1975 to increase the fuel economy of cars and light duty trucks. The law has become more stringent over time. On May 19, 2009, President Obama put in motion a new national policy to increase fuel economy for all new cars and trucks sold in the U.S. On April 1, 2010, the EPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) announced a joint final rule establishing a national program that would reduce GHG emissions and improve fuel economy for new cars and trucks sold in the U.S.

The first phase of the national program applies to passenger cars, light-duty trucks, and medium-duty (MD) passenger vehicles, covering model years 2012 through 2016. They require these vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile, equivalent to 35.5 miles per gallon (mpg) if the automobile industry were to meet this CO_2 level solely through fuel economy improvements. Together, these standards would cut CO_2 emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012–2016). The EPA and the NHTSA issued final rules on a second-phase joint rulemaking establishing national standards for light-duty vehicles for model years 2017 through 2025 in August 2012. The new standards for model years 2017 through 2025 apply to passenger cars, light-duty trucks, and MD passenger vehicles. The final standards are projected to result in an average industry fleetwide level of 163 grams/mile of CO_2 in model year 2025, which is equivalent to 54.5 mpg if achieved exclusively through fuel economy improvements.

The EPA and the U.S. Department of Transportation issued final rules for the first national standards to reduce GHG emissions and improve fuel efficiency of heavy-duty trucks (HDT) and buses on September 15, 2011, effective November 14, 2011. For combination tractors, the agencies are proposing engine and vehicle standards that begin in the 2014 model year and achieve up to a 20% reduction in CO_2 emissions and fuel consumption by the 2018 model year. For HDT and vans, the agencies are proposing separate gasoline and diesel truck standards, which phase in starting in the 2014 model year and achieve up to a 10% reduction for gasoline vehicles and a 15% reduction for diesel vehicles by the 2018 model year (12 and 17% respectively if accounting for air conditioning leakage). Lastly, for vocational vehicles, the engine and vehicle standards would achieve up to a 10% reduction in fuel consumption and CO_2 emissions from the 2014 to 2018 model years.

On April 2, 2018, the EPA signed the Mid-term Evaluation Final Determination, which declared that the MY 2022-2025 GHG standards are not appropriate and should be revised (32). This Final Determination serves to initiate a notice to further consider appropriate standards for MY 2022-2025 light-duty vehicles. On August 2,2018, the NHTSA in conjunction with the EPA, released a notice of proposed rulemaking, the *Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks* (SAFE Vehicles Rule). The SAFE Vehicles Rule was proposed to amend exiting Corporate Average Fuel Economy (CAFE) and tailpipe CO_2 standards for passenger cars and light trucks and to establish new standards covering model years 2021 through 2026. As of March 31, 2020, the NHTSA and EPA finalized the SAFE Vehicle Rule which increased stringency of CAFE and CO_2 emissions standards by 1.5% each year through model year 2026 (33).

MANDATORY REPORTING OF GHGS

The Consolidated Appropriations Act of 2008, passed in December 2007, requires the establishment of mandatory GHG reporting requirements. On September 22, 2009, the EPA issued the Final Mandatory Reporting of GHGs Rule, which became effective January 1, 2010. The rule requires reporting of GHG emissions from large sources and suppliers in the U.S. and is intended to collect accurate and timely emissions data to inform future policy decisions. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons per year (MT/yr) or more of GHG emissions are required to submit annual reports to the EPA.

NEW SOURCE REVIEW

The EPA issued a final rule on May 13, 2010, that establishes thresholds for GHGs that define when permits under the New Source Review Prevention of Significant Deterioration and Title V Operating Permit programs are required for new and existing industrial facilities. This final rule "tailors" the requirements of these CAA permitting programs to limit which facilities will be required to obtain Prevention of Significant Deterioration and Title V permits. In the preamble to the revisions to the Federal Code of Regulations, the EPA states:

> *"This rulemaking is necessary because without it the Prevention of Significant Deterioration and Title V requirements would apply, as of January 2, 2011, at the 100 or 250 tons per year levels provided under the CAA, greatly increasing the number of required permits, imposing undue costs on small sources, overwhelming the resources of permitting authorities, and severely impairing the functioning of the programs. EPA is relieving these resource burdens by phasing in the applicability of these programs to GHG sources, starting with the largest GHG emitters. This rule establishes two initial steps of the phase-in. The rule also commits the agency to take certain actions on future steps addressing smaller sources but excludes certain smaller sources from Prevention of Significant Deterioration and Title V permitting for GHG emissions until at least April 30, 2016."*

The EPA estimates that facilities responsible for nearly 70% of the national GHG emissions from stationary sources will be subject to permitting requirements under this rule. This includes the nation's largest GHG emitters—power plants, refineries, and cement production facilities.

STANDARDS OF PERFORMANCE FOR GHG EMISSIONS FOR NEW STATIONARY SOURCES: ELECTRIC UTILITY GENERATING UNITS

As required by a settlement agreement, the EPA proposed new performance standards for emissions of CO_2 for new, affected, fossil fuel-fired electric utility generating units on March 27, 2012. New sources greater than 25 megawatts (MW) would be required to meet an output-based standard of 1,000 pounds (lbs) of CO_2 per MW-hour (MWh), based on the performance of widely used natural gas combined cycle technology. It should be noted that on February 9, 2016 the U.S. Court issued a stay of this regulation pending litigation. Additionally, the current EPA Administrator has also signed a measure to repeal the Clean Power Plan, including the CO_2 standards. The Clean Power Plan was officially repealed on June 19, 2019, when the EPA issued the final Affordable Clean Energy rule (ACE). Under ACE, new state emission guidelines were established that provided existing coal-fired electric utility generating units with achievable standards.

CAP-AND-TRADE

Cap-and-trade refers to a policy tool where emissions are limited to a certain amount and can be traded or provides flexibility on how the emitter can comply. Successful examples in the U.S. include the Acid Rain Program and the N_2O Budget Trading Program and Clean Air Interstate Rule in the northeast. There is no federal GHG cap-and-trade program currently; however, some states have joined to create initiatives to provide a mechanism for cap-and-trade.

The Regional GHG Initiative is an effort to reduce GHGs among the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont. Each state caps CO_2 emissions from power plants, auctions CO_2 emission allowances, and invests the proceeds in strategic energy programs that further reduce emissions, save consumers money, create jobs, and build a clean energy economy. The Initiative began in 2008 and in 2020 has retained all participating states.

The Western Climate Initiative (WCI) partner jurisdictions have developed a comprehensive initiative to reduce regional GHG emissions to 15% below 2005 levels by 2020. The partners were originally California, British Columbia, Manitoba, Ontario, and Quebec. However, Manitoba and Ontario are not currently participating. California linked with Quebec's cap-and-trade system January 1, 2014, and joint offset auctions took place in 2015. While the WCI has yet to publish whether it has successfully reached the 2020 emissions goal initiative set in 2007, SB 32, requires that California, a major partner in the WCI, adopt the goal of reducing statewide GHG emissions to 40% below the 1990 level by 2030.

SMARTWAY PROGRAM

The SmartWay Program is a public-private initiative between the EPA, large and small trucking companies, rail carriers, logistics companies, commercial manufacturers, retailers, and other federal and state agencies. Its purpose is to improve fuel efficiency and the environmental performance (reduction of both GHG emissions and air pollution) of the goods movement supply chains. SmartWay is comprised of four components (34):

1. SmartWay Transport Partnership: A partnership in which freight carriers and shippers commit to benchmark operations, track fuel consumption, and improve performance annually.
2. SmartWay Technology Program: A testing, verification, and designation program to help freight companies identify equipment, technologies, and strategies that save fuel and lower emissions.
3. SmartWay Vehicles: A program that ranks light-duty cars and small trucks and identifies superior environmental performers with the SmartWay logo.
4. SmartWay International Interests: Guidance and resources for countries seeking to develop freight sustainability programs modeled after SmartWay.

SmartWay effectively refers to requirements geared towards reducing fuel consumption. Most large trucking fleets driving newer vehicles are compliant with SmartWay design requirements. Moreover, over time, all HDTs will have to comply with the CARB GHG Regulation that is designed with the SmartWay Program in mind, to reduce GHG emissions by making them more fuel-efficient. For instance, in 2015, 53 foot or longer dry vans or refrigerated trailers equipped with a combination of SmartWay-verified low-rolling resistance tires and SmartWay-verified aerodynamic devices would obtain a total of 10% or more fuel savings over traditional trailers.

Through the SmartWay Technology Program, the EPA has evaluated the fuel saving benefits of various devices through grants, cooperative agreements, emissions and fuel economy testing, demonstration projects and technical literature review. As a result, the EPA has determined the following types of technologies provide fuel saving and/or emission reducing benefits when used properly in their designed applications, and has verified certain products:

- Idle reduction technologies – less idling of the engine when it is not needed would reduce fuel consumption.
- Aerodynamic technologies minimize drag and improve airflow over the entire tractor-trailer vehicle. Aerodynamic technologies include gap fairings that reduce turbulence between the tractor and trailer, side skirts that minimize wind under the trailer, and rear fairings that reduce turbulence and pressure drop at the rear of the trailer.
- Low rolling resistance tires can roll longer without slowing down, thereby reducing the amount of fuel used. Rolling resistance (or rolling friction or rolling drag) is the force resisting the motion when a tire rolls on a surface. The wheel will eventually slow down because of this resistance.
- Retrofit technologies include things such as diesel particulate filters, emissions upgrades (to a higher tier), etc., which would reduce emissions.
- Federal excise tax exemptions.

2.7.3 CALIFORNIA

2.7.3.1 LEGISLATIVE ACTIONS TO REDUCE GHGS

The State of California legislature has enacted a series of bills that constitute the most aggressive program to reduce GHGs of any state in the nation. Some legislation such as the landmark AB 32 was specifically enacted to address GHG emissions. Other legislation such as Title 24 and Title 20 energy standards were originally adopted for other purposes such as energy and water conservation, but also provide GHG reductions. This section describes the major provisions of the legislation.

AB 32

The California State Legislature enacted AB 32, which required that GHGs emitted in California be reduced to 1990 levels by the year 2020 (this goal has been met[3]). GHGs as defined under AB 32 include CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6. Since AB 32 was enacted, a seventh chemical, nitrogen trifluoride, has also been added to the list of GHGs. The CARB is the state agency charged with monitoring and regulating sources of GHGs. AB 32 states the following:

> *"Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems."*

SB 32

On September 8, 2016, Governor Jerry Brown signed the SB 32 and its companion bill, AB 197. SB 32 requires the state to reduce statewide GHG emissions to 40% below 1990 levels by 2030, a reduction target that was first introduced in Executive Order B-30-15. The new legislation builds upon the AB 32 goal and provides an intermediate goal to achieving S-3-05, which sets a statewide GHG reduction target of 80% below 1990 levels by 2050. AB 197 creates a legislative committee to oversee regulators to ensure that CARB not only responds to the Governor, but also the Legislature (35).

CARB Scoping Plan Update

In November 2017, CARB released the *Final 2017 Scoping Plan Update*, which identifies the State's post-2020 reduction strategy. The *Final 2017 Scoping Plan Update* reflects the 2030 target of a 40% reduction below 1990 levels, set by Executive Order B-30-15 and codified by SB 32. Key programs that the proposed Second Update builds upon include the Cap-and-Trade Regulation, the LCFS, and much cleaner cars, trucks and freight movement, utilizing cleaner, renewable energy, and strategies to reduce CH_4 emissions from agricultural and other wastes.

The *Final 2017 Scoping Plan Update* establishes a new emissions limit of 260 $MMTCO_2e$ for the year 2030, which corresponds to a 40% decrease in 1990 levels by 2030 (36).

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[3] Based upon the 2019 GHG inventory data (i.e., the latest year for which data are available) for the 2000-2017 GHG emissions period, California emitted an average 424.1 $MMTCO_2e$ (60). This is less than the 2020 emissions target of 431 $MMTCO_2e$.

California's climate strategy will require contributions from all sectors of the economy, including the land base, and will include enhanced focus on zero- and near-zero-emission (ZE/NZE) vehicle technologies; continued investment in renewables, including solar roofs, wind, and other distributed generation; greater use of low carbon fuels; integrated land conservation and development strategies; coordinated efforts to reduce emissions of short-lived climate pollutants (CH_4, black carbon, and fluorinated gases); and an increased focus on integrated land use planning to support livable, transit-connected communities and conservation of agricultural and other lands. Requirements for direct GHG reductions at refineries will further support air quality co-benefits in neighborhoods, including in disadvantaged communities historically located adjacent to these large stationary sources, as well as efforts with California's local air pollution control and air quality management districts (air districts) to tighten emission limits on a broad spectrum of industrial sources. Major elements of the *Final 2017 Scoping Plan Update* framework include:

- Implementing and/or increasing the standards of the Mobile Source Strategy, which include increasing ZEV buses and trucks.
- LCFS, with an increased stringency (18% by 2030).
- Implementing SB 350, which expands the RPS to 50% RPS and doubles energy efficiency savings by 2030.
- California Sustainable Freight Action Plan, which improves freight system efficiency, utilizes near-zero emissions technology, and deployment of zero-emission vehicles (ZEV) trucks.
- Implementing the proposed Short-Lived Climate Pollutant Strategy (SLPS), which focuses on reducing CH_4 and hydroflurocarbon emissions by 40% and anthropogenic black carbon emissions by 50% by year 2030.
- Continued implementation of SB 375.
- Post-2020 Cap-and-Trade Program that includes declining caps.
- 20% reduction in GHG emissions from refineries by 2030.
- Development of a Natural and Working Lands Action Plan to secure California's land base as a net carbon sink.

Note, however, that the *Final 2017 Scoping Plan Update* acknowledges that:

> *"[a]chieving net zero increases in GHG emissions, resulting in no contribution to GHG impacts, may not be feasible or appropriate for every project, however, and the inability of a project to mitigate its GHG emissions to net zero does not imply the project results in a substantial contribution to the cumulatively significant environmental impact of climate change under CEQA."*

In addition to the statewide strategies listed above, the *Final 2017 Scoping Plan Update* also identifies local governments as essential partners in achieving the State's long-term GHG reduction goals and identifies local actions to reduce GHG emissions. As part of the recommended actions, CARB recommends that local governments achieve a community-wide goal to achieve emissions of no more than 6 metric tons of CO_2e ($MTCO_2e$) or less per capita by 2030 and 2 $MTCO_2e$ or less per capita by 2050. For CEQA projects, CARB states that lead agencies may develop evidenced-based bright-line numeric thresholds—consistent with the Scoping Plan and the State's long-term GHG goals—and projects with emissions over that amount may be required to incorporate on-site design features and mitigation measures that avoid or minimize project emissions to the degree feasible; or, a performance-based metric using a CAP or other plan to reduce GHG emissions is appropriate.

According to research conducted by the Lawrence Berkeley National Laboratory (LBNL) and supported by CARB, California, under its existing and proposed GHG reduction policies, could achieve the 2030 goals under SB 32. The research utilized a new, validated model known as the California LBNL GHG Analysis of Policies Spreadsheet (CALGAPS), which simulates GHG and criteria pollutant emissions in California from 2010 to 2050 in accordance to existing and future GHG-reducing policies. The CALGAPS model showed that by 2030, emissions could range from 211 to 428 $MTCO_2e$ per year ($MTCO_2e$/yr), indicating that "even if all modeled policies are not implemented, reductions could be sufficient to reduce emissions 40% below the 1990 level [of SB 32]." CALGAPS analyzed emissions through 2050 even though it did not generally account for policies that might be put in place after 2030. Although the research indicated that the emissions would not meet the State's 80% reduction goal by 2050, various combinations of policies could allow California's cumulative emissions to remain very low through 2050 (37) (38).

CAP-AND-TRADE PROGRAM

The Scoping Plan identifies a Cap-and-Trade Program as one of the key strategies for California to reduce GHG emissions. According to CARB, a cap-and-trade program will help put California on the path to meet its goal of achieving a 40% reduction in GHG emissions from 1990 levels by 2030. Under cap-and-trade, an overall limit on GHG emissions from capped sectors is established, and facilities subject to the cap will be able to trade permits to emit GHGs within the overall limit.

CARB adopted a California Cap-and-Trade Program pursuant to its authority under AB 32. The Cap-and-Trade Program is designed to reduce GHG emissions from regulated entities by more than 16% between 2013 and 2020, and by an additional 40% by 2030. The statewide cap for GHG emissions from the capped sectors (e.g., electricity generation, petroleum refining, and cement production) commenced in 2013 and will decline over time, achieving GHG emission reductions throughout the program's duration.

Covered entities that emit more than 25.000 $MTCO_2e$/yr must comply with the Cap-and-Trade Program. Triggering of the 25.000 $MTCO_2e$/yr "inclusion threshold" is measured against a subset of emissions reported and verified under the California Regulation for the Mandatory Reporting of GHG Emissions (Mandatory Reporting Rule or "MRR").

Under the Cap-and-Trade Program, CARB issues allowances equal to the total amount of allowable emissions over a given compliance period and distributes these to regulated entities. Covered entities are allocated free allowances in whole or part (if eligible), and may buy allowances at auction, purchase allowances from others, or purchase offset credits. Each covered entity with a compliance obligation is required to surrender "compliance instruments" for each $MTCO_2e$ of GHG they emit. There also are requirements to surrender compliance instruments covering 30% of the prior year's compliance obligation by November of each year (39).

The Cap-and-Trade Program provides a firm cap, which provides the highest certainty of achieving the 2030 target. An inherent feature of the Cap-and-Trade program is that it does not guarantee GHG emissions reductions in any discrete location or by any particular source. Rather, GHG emissions reductions are only guaranteed on an accumulative basis. As summarized by CARB in the *First Update to the Climate Change Scoping Plan*:

> *"The Cap-and-Trade Regulation gives companies the flexibility to trade allowances with others or take steps to cost-effectively reduce emissions at their own facilities. Companies that emit more have to turn in more allowances or other compliance instruments. Companies that can cut their GHG emissions have to turn in fewer allowances. But as the cap declines, aggregate emissions must be reduced. In other words, a covered entity theoretically could increase its GHG emissions every year and still comply with the Cap-and-Trade Program if there is a reduction in GHG emissions from other covered entities. Such a focus on aggregate GHG emissions is considered appropriate because climate change is a global phenomenon, and the effects of GHG emissions are considered cumulative."* (40)

The Cap-and-Trade Program covered approximately 80% of California's GHG emissions (36). The Cap-and-Trade Program covers the GHG emissions associated with electricity consumed in California, whether generated in-state or imported. Accordingly, GHG emissions associated with CEQA projects' electricity usage are covered by the Cap-and-Trade Program. The Cap-and-Trade Program also covers fuel suppliers (natural gas and propane fuel providers and transportation fuel providers) to address emissions from such fuels and from combustion of other fossil fuels not directly covered at large sources in the Program's first compliance period. The Cap-and-Trade Program covers the GHG emissions associated with the combustion of transportation fuels in California, whether refined in-state or imported.

THE SUSTAINABLE COMMUNITIES AND CLIMATE PROTECTION ACT OF 2008 (SB 375)

Passing the Senate on August 30, 2008, SB 375 was signed by the Governor on September 30, 2008. According to SB 375, the transportation sector is the largest contributor of GHG emissions, which emits over 40% of the total GHG emissions in California. SB 375 states, "Without improved land use and transportation policy, California will not be able to achieve the goals of AB 32." SB 375 does the following: it (1) requires metropolitan planning organizations to include sustainable community strategies in their regional transportation plans for reducing GHG emissions, (2) aligns planning for transportation and housing, and (3) creates specified incentives for the implementation of the strategies.

Concerning CEQA, SB 375, as codified in Public Resources Code Section 21159.28, states that CEQA findings for certain projects are not required to reference, describe, or discuss (1) growth inducing impacts, or (2) any project-specific or cumulative impacts from cars and light-duty truck trips generated by the project on global warming or the regional transportation network, if the project:

1. Is in an area with an approved sustainable communities strategy or an alternative planning strategy that the CARB accepts as achieving the GHG emission reduction targets.

2. Is consistent with that strategy (in designation, density, building intensity, and applicable policies).
3. Incorporates the mitigation measures required by an applicable prior environmental document.

AB 1493

California AB 1493, enacted on July 22, 2002, required CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. Implementation of the regulation was delayed by lawsuits filed by automakers and by the EPA's denial of an implementation waiver. The EPA subsequently granted the requested waiver in 2009, which was upheld by the U.S. District Court for the District of Columbia in 2011.

The standards phase in during the 2009 through 2016 model years. When fully phased in, the near-term (2009–2012) standards will result in about a 22% reduction compared with the 2002 fleet, and the mid-term (2013–2016) standards will result in about a 30% reduction. Several technologies stand out as providing significant reductions in emissions at favorable costs. These include discrete variable valve lift or camless valve actuation to optimize valve operation rather than relying on fixed valve timing and lift as has historically been done; turbocharging to boost power and allow for engine downsizing; improved multi-speed transmissions; and improved air conditioning systems that operate optimally, leak less, and/or use an alternative refrigerant.

The second phase of the implementation for the Pavley bill was incorporated into Amendments to the Low-Emission Vehicle Program (LEV III) or the Advanced Clean Cars program. The Advanced Clean Car program combines the control of smog-causing pollutants and GHG emissions into a single coordinated package of requirements for model years 2017 through 2025. The regulation will reduce GHGs from new cars by 34% from 2016 levels by 2025. The new rules will clean up gasoline and diesel-powered cars, and deliver increasing numbers of zero-emission technologies, such as full battery electric cars, newly emerging plug-in hybrid EVs (EV) and hydrogen fuel cell cars. The package will also ensure adequate fueling infrastructure is available for the increasing numbers of hydrogen fuel cell vehicles planned for deployment in California.

CLEAN ENERGY AND POLLUTION REDUCTION ACT OF 2015 (SB 350)

In October 2015, the legislature approved, and the Governor signed SB 350, which reaffirms California's commitment to reducing its GHG emissions and addressing climate change. Key provisions include an increase in the RPS, higher energy efficiency requirements for buildings, initial strategies towards a regional electricity grid, and improved infrastructure for EV charging stations. Provisions for a 50% reduction in the use of petroleum statewide were removed from the Bill because of opposition and concern that it would prevent the Bill's passage. Specifically, SB 350 requires the following to reduce statewide GHG emissions:

- Increase the amount of electricity procured from renewable energy sources from 33% to 50% by 2030, with interim targets of 40% by 2024, and 25% by 2027.
- Double the energy efficiency in existing buildings by 2030. This target will be achieved through the California Public Utilities Commission (CPUC), the California Energy Commission (CEC), and local publicly owned utilities.

- Reorganize the Independent System Operator to develop more regional electrify transmission markets and to improve accessibility in these markets, which will facilitate the growth of renewable energy markets in the western United States.

2.7.3.1 EXECUTIVE ORDERS RELATED TO GHG EMISSIONS

California's Executive Branch has taken several actions to reduce GHGs through the use of Executive Orders. Although not regulatory, they set the tone for the state and guide the actions of state agencies.

EXECUTIVE ORDER B-55-18

Executive Order B-55-18 was signed by Governor Brown on September 10, 2018. The order establishes an additional Statewide policy to achieve carbon neutrality by 2045 and maintain net negative emissions thereafter. As per Executive Order B-55-18, CARB is directed to work with relevant State agencies to develop a framework for implementation and accounting that tracks progress toward this goal and to ensure future Climate Change Scoping Plans identify and recommend measures to achieve the carbon neutrality goal.

EXECUTIVE ORDER S-3-05

Former California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, the following reduction targets for GHG emissions:

- By 2010, reduce GHG emissions to 2000 levels.
- By 2020, reduce GHG emissions to 1990 levels.
- By 2050, reduce GHG emissions to 80% below 1990 levels.

The 2050 reduction goal represents what some scientists believe is necessary to reach levels that will stabilize the climate. The 2020 goal was established to be a mid-term target. Because this is an executive order, the goals are not legally enforceable for local governments or the private sector.

EXECUTIVE ORDER S-01-07 (LCFS)

The Governor signed Executive Order S-01-07 on January 18, 2007. The order mandates that a statewide goal shall be established to reduce the carbon intensity of California's transportation fuels by at least 10% by 2020. The CARB adopted the LCFS on April 23, 2009.

The LCFS was challenged in the U.S. District Court in Fresno in 2011. The court's ruling issued on December 29, 2011, included a preliminary injunction against CARB's implementation of the rule. The Ninth Circuit Court of Appeals stayed the injunction on April 23, 2012, pending final ruling on appeal, allowing CARB to continue to implement and enforce the regulation. The Ninth Circuit Court's decision, filed September 18, 2013, vacated the preliminary injunction. In essence, the court held that LCFS adopted by CARB were not in conflict with federal law. On August 8, 2013, the Fifth District Court of Appeal (California) ruled CARB failed to comply with CEQA and the Administrative Procedure Act (APA) when adopting regulations for LCFS. In a partially published opinion, the Court of Appeal reversed the trial court's judgment and directed issuance of a writ of mandate setting aside Resolution 09-31 and two executive orders of CARB approving LCFS regulations promulgated to reduce GHG emissions. However, the court tailored its remedy to protect the public interest by allowing the LCFS regulations to remain operative while CARB complies with the procedural requirements it failed to satisfy.

To address the Court ruling, CARB was required to bring a new LCFS regulation to the Board for consideration in February 2015. The proposed LCFS regulation was required to contain revisions to the 2010 LCFS as well as new provisions designed to foster investments in the production of the low-carbon intensity fuels, offer additional flexibility to regulated parties, update critical technical information, simplify and streamline program operations, and enhance enforcement. On November 16, 2015 the Office of Administrative Law (OAL) approved the Final Rulemaking Package. The new LCFS regulation became effective on January 1, 2016.

In 2018, the CARB approved amendments to the regulation, which included strengthening the carbon intensity benchmarks through 2030 in compliance with the SB 32 GHG emissions reduction target for 2030. The amendments included crediting opportunities to promote zero emission vehicle adoption, alternative jet fuel, carbon capture and sequestration, and advanced technologies to achieve deep decarbonization in the transportation sector (41).

EXECUTIVE ORDER S-13-08

Executive Order S-13-08 states that "climate change in California during the next century is expected to shift precipitation patterns, accelerate sea level rise and increase temperatures, thereby posing a serious threat to California's economy, to the health and welfare of its population and to its natural resources." Pursuant to the requirements in the Order, the 2009 California Climate Adaptation Strategy (CNRA 2009) was adopted, which is the "…first statewide, multi-sector, region-specific, and information-based climate change adaptation strategy in the United States." Objectives include analyzing risks of climate change in California, identifying and exploring strategies to adapt to climate change, and specifying a direction for future research.

EXECUTIVE ORDER B-30-15

On April 29, 2015, Governor Edmund G. Brown Jr. issued an executive order to establish a California GHG reduction target of 40% below 1990 levels by 2030. The Governor's executive order aligns California's GHG reduction targets with those of leading international governments ahead of the U.N. Climate Change Conference in Paris late 2015. The Order sets a new interim statewide GHG emission reduction target to reduce GHG emissions to 40% below 1990 levels by 2030 in order to ensure California meets its target of reducing GHG emissions to 80% below 1990 levels by 2050 and directs CARB to update the Climate Change Scoping Plan to express the 2030 target in terms of $MMTCO_2e$. The Order also requires the state's climate adaptation plan to be updated every three years, and for the State to continue its climate change research program, among other provisions. As with Executive Order S-3-05, this Order is not legally enforceable for local governments and the private sector. Legislation that would update AB 32 to make post 2020 targets and requirements a mandate is in process in the State Legislature.

2.7.3.2 CALIFORNIA REGULATIONS AND BUILDING CODES

California has a long history of adopting regulations to improve energy efficiency in new and remodeled buildings. These regulations have kept California's energy consumption relatively flat even with rapid population growth.

TITLE 20 CCR

CCR, Title 20: Division 2, Chapter 4, Article 4, Sections 1601-1608: Appliance Efficiency Regulations regulates the sale of appliances in California. The Appliance Efficiency Regulations include standards for both federally regulated appliances and non-federally regulated appliances. 23 categories of appliances are included in the scope of these regulations. The standards within these regulations apply to appliances that are sold or offered for sale in California, except those sold wholesale in California for final retail sale outside the state and those designed and sold exclusively for use in recreational vehicles or other mobile equipment (CEC 2012).

TITLE 24 CCR

CCR Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings, was first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficient technologies and methods. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases GHG emissions. The 2019 version of Title 24 was adopted by the CEC and became effective on January 1, 2020.

The CEC indicates that the 2019 Title 24 standards will require solar photovoltaic systems for new homes, establish requirements for newly constructed healthcare facilities, encourage demand responsive technologies for residential buildings, update indoor and outdoor lighting for nonresidential buildings. The CEC anticipates that single-family homes built with the 2019 standards will use approximately 7% less energy compared to the residential homes built under the 2016 standards. Additionally, after implementation of solar photovoltaic systems, homes built under the 2019 standards will about 53% less energy than homes built under the 2016 standards. Nonresidential buildings will use approximately 30% less energy due to lighting upgrades (42).

CCR, Title 24, Part 11: California Green Building Standards Code (CALGreen) is a comprehensive and uniform regulatory code for all residential, commercial, and school buildings that went in effect on January 1, 2011, and is administered by the California Building Standards Commission (BSC). CALGreen is updated on a regular basis, with the most recent approved update consisting of the 2019 California Green Building Code Standards that have become effective on January 1, 2020. Local jurisdictions are permitted to adopt more stringent requirements, as state law provides methods for local enhancements. CALGreen recognizes that many jurisdictions have developed existing construction and demolition ordinances and defers to them as the ruling guidance provided, they establish a minimum 65% diversion requirement. The code also provides exemptions for areas not served by construction and demolition recycling infrastructure. The State Building Code provides the minimum standard that buildings must meet in order to be certified for occupancy, which is generally enforced by the local building official. 2019 CALGreen standards are applicable to the Project and require (43):

- Short-term bicycle parking. If the new project or an additional alteration is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5% of new visitor motorized vehicle parking spaces being added, with a minimum of one two-bike capacity rack (5.106.4.1.1).
- Long-term bicycle parking. For new buildings with tenant spaces that have 10 or more tenant-occupants, provide secure bicycle parking for 5% of the tenant-occupant vehicular parking spaces with a minimum of one bicycle parking facility (5.106.4.1.2).
- Designated parking. In new projects or additions to alterations that add 10 or more vehicular parking spaces, provide designated parking for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as shown in Table 5.106.5.2 (5.106.5.2).
- Construction waste management. Recycle and/or salvage for reuse a minimum of 65% of the nonhazardous construction and demolition waste in accordance with Section 5.408.1.1. 5.405.1.2, or 5.408.1.3; or meet a local construction and demolition waste management ordinance, whichever is more stringent (5.408.1).
- Excavated soil and land clearing debris. 100% of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled. For a phase project, such material may be stockpiled on site until the storage site is developed (5.408.3).
- Recycling by Occupants. Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of non-hazardous materials for recycling, including (at a minimum) paper, corrugated cardboard, glass, plastics, organic waste, and metals or meet a lawfully enacted local recycling ordinance, if more restrictive (5.410.1).
- Water conserving plumbing fixtures and fittings. Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall comply with the following:
    - Water Closets. The effective flush volume of all water closets shall not exceed 1.28 gallons per flush (5.303.3.1)
    - Urinals. The effective flush volume of wall-mounted urinals shall not exceed 0.125 gallons per flush (5.303.3.2.1). The effective flush volume of floor-mounted or other urinals shall not exceed 0.5 gallons per flush (5.303.3.2.2).
    - Showerheads. Single showerheads shall have a minimum flow rate of not more than 1.8 gallons per minute and 80 psi (5.303.3.3.1). When a shower is served by more than one showerhead, the combine flow rate of all showerheads and/or other shower outlets controlled by a single valve shall not exceed 1.8 gallons per minute at 80 psi (5.303.3.3.2).
    - Faucets and fountains. Nonresidential lavatory faucets shall have a maximum flow rate of note more than 0.5 gallons per minute at 60 psi (5.303.3.4.1). Kitchen faucets shall have a maximum flow rate of not more than 1.8 gallons per minute of 60 psi (5.303.3.4.2). Wash fountains shall have a maximum flow rate of not more than 1.8 gallons per minute (5.303.3.4.3). Metering faucets shall not deliver more than 0.20 gallons per cycle (5.303.3.4.4). Metering faucets for wash fountains shall have a maximum flow rate not more than 0.20 gallons per cycle (5.303.3.4.5).

- Outdoor portable water use in landscaped areas. Nonresidential developments shall comply with a local water efficient landscape ordinance or the current California Department of Water Resources' Model Water Efficient (MWELO), whichever is more stringent (5.304.1).
- Water meters. Separate submeters or metering devices shall be installed for new buildings or additions in excess of 50,000 sf or for excess consumption where any tenant within a new building or within an addition that is project to consume more than 1,000 gal/day (5.303.1.1 and 5.303.1.2).
- Outdoor water use in rehabilitated landscape projects equal or greater than 2,500 sf. Rehabilitated landscape projects with an aggregate landscape area equal to or greater than 2,500 sf requiring a building or landscape permit (5.304.3).
- Commissioning. For new buildings 10,000 sf and over, building commissioning shall be included in the design and construction processes of the building project to verify that the building systems and components meet the owner's or owner representative's project requirements (5.410.2).

MWELO

The MWELO was required by AB 1881, the Water Conservation Act. The bill required local agencies to adopt a local landscape ordinance at least as effective in conserving water as the Model Ordinance by January 1, 2010. Governor Brown's Drought Executive Order of April 1, 2015 (Executive Order B-29-15) directed DWR to update the Ordinance through expedited regulation. The California Water Commission approved the revised Ordinance on July 15, 2015 effective December 15, 2015. New development projects that include landscape areas of 500 sf or more are subject to the Ordinance. The update requires:

- More efficient irrigation systems;
- Incentives for graywater usage;
- Improvements in on-site stormwater capture;
- Limiting the portion of landscapes that can be planted with high water use plants; and
- Reporting requirements for local agencies.

CARB REFRIGERANT MANAGEMENT PROGRAM

CARB adopted a regulation in 2009 to reduce refrigerant GHG emissions from stationary sources through refrigerant leak detection and monitoring, leak repair, system retirement and retrofitting, reporting and recordkeeping, and proper refrigerant cylinder use, sale, and disposal. The regulation is set forth in sections 95380 to 95398 of Title 17, CCR. The rules implementing the regulation establish a limit on statewide GHG emissions from stationary facilities with refrigeration systems with more than 50 lbs of a high GWP refrigerant. The refrigerant management program is designed to (1) reduce emissions of high-GWP GHG refrigerants from leaky stationary, non-residential refrigeration equipment; (2) reduce emissions from the installation and servicing of refrigeration and air-conditioning appliances using high-GWP refrigerants; and (3) verify GHG emission reductions.

TRACTOR-TRAILER GHG REGULATION

The tractors and trailers subject to this regulation must either use EPA SmartWay certified tractors and trailers or retrofit their existing fleet with SmartWay verified technologies. The regulation applies primarily to owners of 53-foot or longer box-type trailers, including both dry-van and refrigerated-van trailers, and owners of the HD tractors that pull them on California highways. These owners are responsible for replacing or retrofitting their affected vehicles with compliant aerodynamic technologies and low rolling resistance tires. Sleeper cab tractors model year 2011 and later must be SmartWay certified. All other tractors must use SmartWay verified low rolling resistance tires. There are also requirements for trailers to have low rolling resistance tires and aerodynamic devices.

PHASE I AND 2 HEAVY-DUTY VEHICLE GHG STANDARDS

CARB has adopted a new regulation for GHG emissions from HDTs and engines sold in California. It establishes GHG emission limits on truck and engine manufacturers and harmonizes with the EPA rule for new trucks and engines nationally. Existing HD vehicle regulations in California include engine criteria emission standards, tractor-trailer GHG requirements to implement SmartWay strategies (i.e., the Heavy-Duty Tractor-Trailer Greenhouse Gas Regulation), and in-use fleet retrofit requirements such as the Truck and Bus Regulation. In September 2011, the EPA adopted their new rule for HDTs and engines. The EPA rule has compliance requirements for new compression and spark ignition engines, as well as trucks from Class 2b through Class 8. Compliance requirements begin with model year (MY) 2014 with stringency levels increasing through MY 2018. The rule organizes truck compliance into three groupings, which include a) HD pickups and vans; b) vocational vehicles; and c) combination tractors. The EPA rule does not regulate trailers.

CARB staff has worked jointly with the EPA and the NHTSA on the next phase of federal GHG emission standards for medium-duty trucks (MDT) and HDT vehicles, called federal Phase 2. The federal Phase 2 standards were built on the improvements in engine and vehicle efficiency required by the Phase 1 emission standards and represent a significant opportunity to achieve further GHG reductions for 2018 and later model year HDT vehicles, including trailers. But as discussed above, the EPA and NHTSA have proposed to roll back GHG and fuel economy standards for cars and light-duty trucks, which suggests a similar rollback of Phase 2 standards for MDT and HDT vehicles may be pursued.

In February 2019, the OAL approved the Phase 2 Heavy-Duty Vehicle GHG Standards and became effective April 1, 2019. The Phase 2 GHG standards are needed to offset projected vehicle miles traveled (VMT) growth and keep heavy-duty truck CO_2 emissions declining. The federal Phase 2 standards establish for the first time, federal emissions requirements for trailers hauled by heavy-duty tractors. The federal Phase 2 standards are more technology-forcing than the federal Phase 1 standards, requiring manufacturers to improve existing technologies or develop new technologies to meet the standards. The federal Phase 2 standards for tractors, vocational vehicles, and heavy-duty pick-up trucks and vans (PUVs) will be phased-in from 2021-2027, additionally for trailers, the standards are phased-in from 2018 (2020 in California) through 2027 (44).

SB 97 AND THE CEQA GUIDELINES UPDATE

Passed in August 2007, SB 97 added Section 21083.05 to the Public Resources Code. The code states "(a) On or before July 1, 2009, the Office of Planning and Research (OPR) shall prepare, develop, and transmit to the Resources Agency guidelines for the mitigation of GHG emissions or the effects of GHG emissions as required by this division, including, but not limited to, effects associated with transportation or energy consumption. (b) On or before January 1, 2010, the Resources Agency shall certify and adopt guidelines prepared and developed by the OPR pursuant to subdivision (a)." Section 21097 was also added to the Public Resources Code. It provided CEQA protection until January 1, 2010 for transportation projects funded by the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 or projects funded by the Disaster Preparedness and Flood Prevention Bond Act of 2006, in stating that the failure to analyze adequately the effects of GHGs would not violate CEQA.

On December 28, 2018, the Natural Resources Agency announced the OAL approved the amendments to the CEQA Guidelines for implementing the CEQA. The CEQA Amendments provide guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in CEQA documents. The CEQA Amendments fit within the existing CEQA framework by amending existing CEQA Guidelines to reference climate change.

Section 15064.3 was added the CEQA Guidelines and states that in determining the significance of a project's GHG 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. Additionally, a lead agency may use a model or methodology to estimate GHG 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 (45).

CALIFORNIA RPS PROGRAM (SB 100)

Under the existing RPS, 25% of retail sales are required to be from renewable sources by December 31, 2016, 33% by December 31, 2020, 40% by December 31, 2024, 45% by December 31, 2027, and 50% by December 31, 2030. SB 100 raises California's RPS requirement to 50% renewable resources target by December 31, 2026, and to achieve a 60% target by December 31, 2030. SB 100 also requires that retail sellers and local publicly owned electric utilities procure a minimum quantity of electricity products from eligible renewable energy resources so that the total kilowatt hours (kWh) of those products sold to their retail end-use customers achieve 44% of retail sales by December 31, 2024, 52% by December 31, 2027, and 60% by December 31, 2030. In addition to targets under AB 32 and SB 32, Executive Order B-55-18 establishes a carbon neutrality goal for the state of California by 2045; and sets a goal to maintain net negative emissions thereafter. The Executive Order directs the California Natural Resources Agency (CNRA), California Environmental Protection Agency (CalEPA), the Department of Food and Agriculture (CDFA), and CARB to include sequestration targets in the Natural and Working Lands Climate Change Implementation Plan consistent with the carbon neutrality goal.

2.7.4 REGIONAL

The project is within the South Coast Air Basin (SCAB), which is under the jurisdiction of the SCAQMD.

SCAQMD

SCAQMD is the agency responsible for air quality planning and regulation in the SCAB. The SCAQMD addresses the impacts to climate change of projects subject to SCAQMD permit as a lead agency if they are the only agency having discretionary approval for the project and acts as a responsible agency when a land use agency must also approve discretionary permits for the project. The SCAQMD acts as an expert commenting agency for impacts to air quality. This expertise carries over to GHG emissions, so the agency helps local land use agencies through the development of models and emission thresholds that can be used to address GHG emissions.

In 2008, SCAQMD formed a Working Group to identify GHG emissions thresholds for land use projects that could be used by local lead agencies in the SCAB. The Working Group developed several different options that are contained in the SCAQMD Draft Guidance Document – Interim CEQA GHG Significance Threshold, that could be applied by lead agencies (46). The working group has not provided additional guidance since release of the interim guidance in 2008. The SCAQMD Board has not approved the thresholds; however, the Guidance Document provides substantial evidence supporting the approaches to significance of GHG emissions that can be considered by the lead agency in adopting its own threshold. The current interim thresholds consist of the following tiered approach:

- Tier 1 consists of evaluating whether or not the project qualifies for any applicable exemption under CEQA.
- Tier 2 consists of determining whether the project is consistent with a GHG reduction plan. If a project is consistent with a qualifying local GHG reduction plan, it does not have significant GHG emissions.
- Tier 3 consists of screening values, which the lead agency can choose, but must be consistent with all projects within its jurisdiction. A project's construction emissions are averaged over 30 years and are added to the project's operational emissions. If a project's emissions are below one of the following screening thresholds, then the project is less than significant:
    - Residential and Commercial land use: 3,000 $MTCO_2e$/yr
    - Industrial land use: 10,000 $MTCO_2e$/yr
    - Based on land use type: residential: 3,500 $MTCO_2e$/yr; commercial: 1,400 $MTCO_2e$/yr; or mixed use: 3,000 $MTCO_2e$/yr
- Tier 4 has the following options:

- Option 1: Reduce Business-as-Usual (BAU) emissions by a certain percentage; this percentage is currently undefined.
- Option 2: Early implementation of applicable AB 32 Scoping Plan measures
- Option 3: 2020 target for service populations, which includes residents and employees: 4.8 $MTCO_2e$ per service population per year for projects and 6.6 $MTCO_2e$ per service population per year for plans;
- Option 3, 2035 target: 3.0 $MTCO_2e$ per service population per year for projects and 4.1 $MTCO_2e$ per service population per year for plans

- Tier 5 involves mitigation offsets to achieve target significance threshold.

The SCAQMD's interim thresholds used the Executive Order S-3-05-year 2050 goal as the basis for the Tier 3 screening level. Achieving the Executive Order's objective would contribute to worldwide efforts to cap CO_2 concentrations at 450 ppm, thus stabilizing global climate.

SCAQMD only has authority over GHG emissions from development projects that include air quality permits. At this time, it is unknown if the project would include stationary sources of emissions subject to SCAQMD permits. Notwithstanding, if the Project requires a stationary permit, it would be subject to the applicable SCAQMD regulations.

SCAQMD Regulation XXVII, adopted in 2009 includes the following rules:

- Rule 2700 defines terms and post global warming potentials.
- Rule 2701, SoCal Climate Solutions Exchange, establishes a voluntary program to encourage, quantify, and certify voluntary, high quality certified GHG emission reductions in the SCAQMD.
- Rule 2702, GHG Reduction Program created a program to produce GHG emission reductions within the SCAQMD. The SCAQMD will fund projects through contracts in response to requests for proposals or purchase reductions from other parties.

CITY OF RANCHO CUCAMONGA SUSTAINABLE COMMUNITY ACTION PLAN

The City of Rancho Cucamonga released the Sustainable Community Action Plan (Plan) on April 5, 2017. In order to align with the State's long-term GHG reduction goals, the Plan identifies steps that the City can take to contribute towards a GHG reduction target that reduce emissions to 15% below 2008 levels by 2020. Policies and actions to achieve long term GHG reduction targets beyond 2020 that are further out in the future will be considered as the City identifies updates or revisions to the Rancho Cucamonga General Plan. It should be noted that the Plan does not authorize or mandate any given activity or initiative on the environment in the City of Rancho Cucamonga and is therefore not a project under CEQA. As such, consistency with the Plan will not be used to make any CEQA findings (47).

2.8 DISCUSSION ON ESTABLISHMENT OF SIGNIFICANCE THRESHOLDS

The City of Rancho Cucamonga has not adopted its own numeric threshold of significance for determining impacts with respect to GHG emissions. A screening threshold of 3,000 $MTCO_2e$/yr to determine if additional analysis is required is an acceptable approach for small projects. This approach is a widely accepted screening threshold used by the City of Menifee and numerous cities in the South Coast Air Basin and is based on the SCAQMD staff's proposed GHG screening threshold for stationary source emissions for non-industrial projects, as described in the SCAQMD's *Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans* ("SCAQMD Interim GHG Threshold"). The SCAQMD Interim GHG Threshold identifies a screening threshold to determine whether additional analysis is required (48). As noted by the SCAQMD:

> *"…the…screening level for stationary sources is based on an emission capture rate of 90% for all new or modified projects...the policy objective of [SCAQMD's] recommended interim GHG significance threshold proposal is to achieve an emission capture rate of 90% of all new or modified stationary source projects. A GHG significance threshold based on a 90% emission capture rate may be more appropriate to address the long-term adverse impacts associated with global climate change because most projects will be required to implement GHG reduction measures. Further, a 90% emission capture rate sets the emission threshold low enough to capture a substantial fraction of future stationary source projects that will be constructed to accommodate future statewide population and economic growth, while setting the emission threshold high enough to exclude small projects that will in aggregate contribute a relatively small fraction of the cumulative statewide GHG emissions. This assertion is based on the fact that [SCAQMD] staff estimates that these GHG emissions would account for slightly less than 1% of future 2050 statewide GHG emissions target (85 [MMTCO$_2$e/yr]). In addition, these small projects may be subject to future applicable GHG control regulations that would further reduce their overall future contribution to the statewide GHG inventory. Finally, these small sources are already subject to [Best Available Control Technology] (BACT) for criteria pollutants and are more likely to be single-permit facilities, so they are more likely to have few opportunities readily available to reduce GHG emissions from other parts of their facility."* (49)

Thus, and based on guidance from the SCAQMD, if a non-industrial project would emit GHGs less than 3,000 MTCO$_2$e/yr, the project is not considered a substantial GHG emitter and the GHG impact is less than significant, requiring no additional analysis and no mitigation. On the other hand, if a non-industrial project would emit GHGs in excess of 3,000 MTCO$_2$e/yr, then the project could be considered a substantial GHG emitter, requiring additional analysis and potential mitigation.

As previously discussed, a screening threshold of 3,000 MTCO$_2$e/yr is an acceptable approach for small projects to determine if additional analysis is required and is therefore applied for this Project.

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3 PROJECT GHG IMPACT

3.1 INTRODUCTION

The Project has been evaluated to determine if it will result in a significant GHG impact. The significance of these potential impacts is described in the following section.

3.2 STANDARDS OF SIGNIFICANCE

The criteria used to determine the significance of potential Project-related GHG impacts are taken from the Initial Study Checklist in Appendix G of the State *CEQA Guidelines* (14 CCR of Regulations §§15000, et seq.). Based on these thresholds, a project would result in a significant impact related to GHG if it would (1):

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?

3.3 MODELS EMPLOYED TO ANALYZE GHGS

3.3.1 CALIFORNIA EMISSIONS ESTIMATOR MODEL (CALEEMOD)

On October 17, 2017, the SCAQMD, in conjunction with the California Air Pollution Control Officers Association (CAPCOA) and other California air districts, released the latest version of the CalEEMod Version 2016.3.2. The purpose of this model is to calculate construction-source and operational-source criteria pollutants and GHG emissions from direct and indirect sources; and quantify applicable air quality and GHG reductions achieved from mitigation measures (50). Accordingly, the latest version of CalEEMod has been used for this Project to determine GHG emissions. Output from the model runs for construction and operational activity are provided in Appendix 3.1. CalEEMod includes GHG emissions from the following source categories: construction, area, energy, mobile, waste, water.

3.3.2 EMFAC2017 EMISSION RATES

On August 19, 2019, the EPA approved the 2017 version of the EMissions FACtor model (EMFAC) web database for use in State Implementation Plan and transportation conformity analyses. EMFAC2017 is a mathematical model that was developed to calculate emission rates, fuel consumption, VMT from motor vehicles that operate on highways, freeways, and local roads in California and is commonly used by CARB to project changes in future emissions from on-road mobile sources (51). This GHGA utilizes annual EMFAC2017 emission factors in order to derive vehicle emissions associated with Project operational activities.

Because the EMFAC2017 emission rates are associated with vehicle fuel types while CalEEMod vehicle emission factors are aggregated to include all fuel types for each individual vehicle class, the EMFAC2017 emission rates for different fuel types of a vehicle class are averaged by activity or by population and activity to derive CalEEMod emission factors. The equations applied to obtain CalEEMod vehicle emission factors for each emission type are detailed in CalEEMod User's Guide *Appendix A: Calculation Details for CalEEMod* (52).

3.4 LIFE-CYCLE ANALYSIS NOT REQUIRED

A full life-cycle analysis (LCA) for construction and operational activity is not included in this analysis due to the lack of consensus guidance on LCA methodology at this time (53). Life-cycle analysis (i.e., assessing economy-wide GHG emissions from the processes in manufacturing and transporting all raw materials used in the Project development, infrastructure and on-going operations) depends on emission factors or econometric factors that are not well established for all processes. At this time, an LCA would be extremely speculative and thus has not been prepared.

Additionally, the SCAQMD recommends analyzing direct and indirect project GHG emissions generated within California and not life-cycle emissions because the life-cycle effects from a project could occur outside of California, might not be very well understood or documented, and would be challenging to mitigate (54). Additionally, the science to calculate life cycle emissions is not yet established or well defined; therefore, SCAQMD has not recommended, and is not requiring, life-cycle emissions analysis.

3.5 CONSTRUCTION EMISSIONS

Project construction actvities would generate CO_2 and CH_4 emissions The report *Banyan Avenue Residential Air Quality Impact Analysis Report* (AQIA) (Urban Crossroads, Inc.) contains detailed information regarding Project construction activities (55) As discussed in the AQIA, Construction related emissions are expected from the following construction activities:

- Site Preparation
- Grading
- Building Construction
- Paving
- Architectural Coating

3.5.1 CONSTRUCTION DURATION

Construction is expected to commence in May 2021 and will last through June 2022. The construction schedule utilized in the analysis, shown in Table 3-1, represents a "worst-case" analysis scenario should construction occur any time after the respective dates since emission factors for construction decrease as time passes and the analysis year increases due to emission regulations becoming more stringent.[4] The duration of construction activity and associated

[4] As shown in the CalEEMod User's Guide Version 2016.3.2, Section 4.3 "OFFROAD Equipment" as the analysis year increases, emission factors for the same equipment pieces decrease due to the natural turnover of older equipment being replaced by newer less polluting equipment and new regulatory requirements.

equipment represents a reasonable approximation of the expected construction fleet as required per *CEQA Guidelines* (56).

TABLE 3-1: CONSTRUCTION DURATION

Phase Name	Start Date	End Date	Days
Site Preparation	05/03/2021	05/14/2021	10
Grading	05/15/2021	06/11/2021	20
Building Construction	06/12/2021	04/29/2022	230
Paving	04/30/2022	05/27/2022	20
Architectural Coating	05/28/2022	06/24/2022	20

3.5.2 CONSTRUCTION EQUIPMENT

Site specific construction fleet may vary due to specific project needs at the time of construction. The associated construction equipment was generally based on CalEEMod defaults. A detailed summary of construction equipment assumptions by phase is provided at Table 3-2. Please refer to specific detailed modeling inputs/outputs contained in Appendix 3.1 of this GHGA.

TABLE 3-2: CONSTRUCTION EQUIPMENT ASSUMPTIONS

Phase Name	Equipment	Amount	Hours Per Day
Site Preparation	Rubber Tired Dozers	3	8
	Tractors/Loaders/Backhoes	4	8
Grading	Graders	2	8
	Rubber Tired Dozers	1	8
	Tractors/Loaders/Backhoes	3	8
Building Construction	Cranes	1	8
	Forklifts	3	8
	Generator Sets	1	8
	Tractors/Loaders/Backhoes	3	8
	Welders	1	8
Paving	Pavers	2	8
	Paving Equipment	2	8
	Rollers	2	8
Architectural Coating	Air Compressors	1	8

3.5.3 CONSTRUCTION EMISSIONS SUMMARY

For construction phase Project emissions, GHGs are quantified and amortized over the life of the Project. To amortize the emissions over the life of the Project, the SCAQMD recommends calculating the total GHG emissions for the construction activities, dividing it by a 30-year Project life then adding that number to the annual operational phase GHG emissions (57). As such, construction emissions were amortized over a 30-year period and added to the annual operational phase GHG emissions. The amortized construction emissions are presented in Table 3-3.

TABLE 3-3: AMORTIZED ANNUAL CONSTRUCTION EMISSIONS

Year	Emissions (metric tons per year)			
	CO_2	CH_4	N_2O	Total CO_2e[5]
2021	230.01	0.06	0.00	231.48
2022	132.56	0.03	0.00	133.37
Total	362.57	0.09	0.00	364.86
Amortized Construction Emissions ($MTCO_2e$)	**12.09**	**0.00**	**0.00**	**12.16**

3.6 OPERATIONAL EMISSIONS

Operational activities associated with the Project will result in emissions of CO_2, CH_4, and N_2O from the following primary sources:

- Area Source Emissions
- Energy Source Emissions
- Mobile Source Emissions
- Water Supply, Treatment, and Distribution
- Solid Waste

3.6.1 AREA SOURCE EMISSIONS

LANDSCAPE MAINTENANCE EQUIPMENT

Landscape maintenance equipment would generate emissions from fuel combustion and evaporation of unburned fuel. Equipment in this category would include lawnmowers, shedders/grinders, blowers, trimmers, chain saws, and hedge trimmers used to maintain the landscaping of the Project. The emissions associated with landscape maintenance equipment were calculated based on assumptions provided in CalEEMod.

3.6.2 ENERGY SOURCE EMISSIONS

COMBUSTION EMISSIONS ASSOCIATED WITH NATURAL GAS AND ELECTRICITY

GHGs are emitted from buildings as a result of activities for which electricity and natural gas are typically used as energy sources. Combustion of any type of fuel emits CO_2 and other GHGs directly into the atmosphere; these emissions are considered direct emissions associated with a

[5] CalEEMod reports the most common GHGs emitted which include CO_2, CH_4, and N_2O. These GHGs are then converted into the CO_2e by multiplying the individual GHG by the GWP.

building; the building energy use emissions do not include street lighting[6]. GHGs are also emitted during the generation of electricity from fossil fuels; these emissions are considered to be indirect emissions. For purposes of analysis, the CalEEMod default parameters were used.

TITLE 24 ENERGY EFFICIENCY STANDARDS

California's Energy Efficiency Standards for Residential and Nonresidential Buildings was first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficient technologies and methods. Energy efficient buildings require less electricity. The 2019 version of Title 24 was adopted by the CEC and became effective on January 1, 2020. The CEC anticipates that nonresidential buildings will use approximately 30% less energy (42). The CalEEMod defaults for Title 24 – Electricity and Lighting Energy were reduced by 30% in order to reflect consistency with the 2019 Title 24 standard.

3.6.3 MOBILE SOURCE EMISSIONS

The Project related operational GHG emissions derive primarily from the weekday vehicle trips generated by the Project. This study utilizes the Institute of Transportation Engineers (ITE) 10th Edition Trip Generation Standards for Single-Family Detached Housing (ITE Code 210) to determine project-related mobile-source emissions. Based on ITE Code 210, the Project is expected to generate a total of approximately 86 two-way vehicular trips per day (43 inbound and 43 outbound).

3.6.4 WATER SUPPLY, TREATMENT AND DISTRIBUTION

Indirect GHG emissions result from the production of electricity used to convey, treat and distribute water and wastewater. The amount of electricity required to convey, treat and distribute water depends on the volume of water as well as the sources of the water. CalEEMod default parameters were used to estimate GHG emissions associated with water supply, treatment and distribution for the Project scenario.

3.6.5 SOLID WASTE

The proposed land uses will result in the generation and disposal of solid waste. A percentage of this waste will be diverted from landfills by a variety of means, such as reducing the amount of waste generated, recycling, and/or composting. The remainder of the waste not diverted will be disposed of at a landfill. GHG emissions from landfills are associated with the anaerobic breakdown of material. GHG emissions associated with the disposal of solid waste associated with the proposed Project were calculated by CalEEMod using default parameters.

[6] The CalEEMod emissions inventory model does not include indirect emission related to street lighting. Indirect emissions related to street lighting are expected to be negligible and cannot be accurately quantified at this time as there is insufficient information as to the number and type of street lighting that would occur.

3.7 EMISSIONS SUMMARY

The annual GHG emissions associated with the operation of the proposed Project are summarized in Table 3-4. As shown, the Project would generate approximately 166.27 $MTCO_2e$/yr.

TABLE 3-4: PROJECT GHG EMISSIONS

Emission Source	Emissions (MT/yr)			
	CO_2	CH_4	N_2O	Total CO_2e
Annual construction-related emissions amortized over 30 years	12.09	0.00	0.00	12.16
Area Source	2.31	1.90E-04	4.00E-05	2.33
Energy Source	23.76	1.03E-03	3.40E-04	23.88
Mobile Source	118.82	7.76E-03	0.00	119.01
Waste	2.16	0.13	0.00	5.36
Water Usage	2.90	0.02	4.80E-04	3.53
Total CO_2e (All Sources)	**166.27**			

Source: CalEEMod output, See Appendix 3.1 for detailed model outputs.

3.8 GHG EMISSIONS FINDINGS AND RECOMMENDATIONS

3.8.1 GHG IMPACT 1

The Project could generate direct or indirect GHG emissions that would result in a significant impact on the environment.

As shown on Table 3-4, the Project will result in a net total of approximately 166.27 $MTCO_2$/yr; the proposed Project would not exceed the SCAQMD/City's screening threshold of 3,000 $MTCO_2e$/yr. Thus, the Project would not have the potential to result in a cumulatively considerable impact with respect to GHG emissions. As such, a less than significant impact is expected.

The Project would not generate GHG emissions either directly or indirectly that would result in a significant impact on the environment.

3.8.2 GHG IMPACT 2

The Project could not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.

As previously stated, pursuant to 15604.4 of the CEQA Guidelines, a lead agency may rely on qualitative analysis or performance-based standards to determine the significance of impacts from GHG emissions (45). As such, the Project's consistency with SB 32 (2017 Scoping Plan), is discussed below. It should be noted that the Project's consistency with the 2017 Scoping Plan also satisfies consistency with AB 32 since the 2017 Scoping Plan is based on the overall targets established by AB 32. Consistency with the 2008 Scoping Plan is not necessary, since the target year for the 2008 Scoping Plan was 2020, and the Project's buildout year is anticipated to be after 2020, the 2008 Scoping Plan does not apply and consistency with the 2017 Scoping Plan is relevant.

SB 32/2017 Scoping Plan Consistency

The 2017 Scoping Plan Update reflects the 2030 target of a 40% reduction below 1990 levels, set by Executive Order B-30-15 and codified by SB 32. Table 3-5 summarizes the Project's consistency with the 2017 Scoping Plan. As summarized, the Project will not conflict with any of the provisions of the Scoping Plan and in fact supports seven of the action categories.

TABLE 3-5: 2017 SCOPING PLAN CONSISTENCY SUMMARY[7]

Action	Responsible Parties	Consistency
Implement SB 350 by 2030		
Increase the Renewables Portfolio Standard to 50% of retail sales by 2030 and ensure grid reliability.	CPUC, CEC, CARB	Consistent. The Project would use energy from Southern California Edison (SCE). SCE has committed to diversify its portfolio of energy sources by increasing energy from wind and solar sources. The Project would not interfere with or obstruct SCE energy source diversification efforts.
Establish annual targets for statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas end uses by 2030.		Consistent. The Project would be constructed in compliance with current California Building Code requirements. Specifically, new buildings must achieve compliance with 2019 Building and Energy Efficiency Standards and the 2019 California Green Building Standards requirements. The proposed Project includes energy efficient field lighting and fixtures that meet the current Title 24 Standards throughout the Project Site and would be a modern development with energy efficient boilers, heaters, and air conditioning systems.

[7] Measures can be found at the following link: https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf

Action	Responsible Parties	Consistency
Reduce GHG emissions in the electricity sector through the implementation of the above measures and other actions as modeled in Integrated Resource Planning (IRP) to meet GHG emissions reductions planning targets in the IRP process. Load-serving entities and publicly- owned utilities meet GHG emissions reductions planning targets through a combination of measures as described in IRPs.		Consistent. The Project would be constructed in compliance with current California Building Code requirements. Specifically, new buildings must achieve compliance with 2019 Building and Energy Efficiency Standards and the 2019 California Green Building Standards requirements. The proposed Project includes energy efficient field lighting and fixtures that meet the current Title 24 Standards throughout the Project Site and would be a modern development with energy efficient boilers, heaters, and air conditioning systems.
Implement Mobile Source Strategy (Cleaner Technology and Fuels)		
At least 1.5 million zero emission and plug-in hybrid light-duty EV by 2025.	CARB, California State Transportation Agency (CalSTA), Strategic Growth Council (SGC), California Department of Transportation (Caltrans), CEC, OPR, Local Agencies	Consistent. This is a CARB Mobile Source Strategy. The Project would not obstruct or interfere with CARB zero emission and plug-in hybrid light-duty EV 2025 targets. As this is a CARB enforced standard, vehicles that access the Project are required to comply with the standards and will therefore comply with the strategy.
At least 4.2 million zero emission and plug-in hybrid light-duty EV by 2030.		Consistent. This is a CARB Mobile Source Strategy. The Project would not obstruct or interfere with CARB zero emission and plug-in hybrid light-duty EV 2030 targets. As this is a CARB enforced standard, vehicles that access the Project are required to comply with the standards and will therefore comply with the strategy.
Further increase GHG stringency on all light-duty vehicles beyond existing Advanced Clean cars regulations.		Consistent. This is a CARB Mobile Source Strategy. The Project would not obstruct or interfere with CARB efforts to further increase GHG stringency on all light-duty vehicles beyond existing Advanced Clean cars regulations. As this is a CARB enforced standard, vehicles that access the Project are required to comply with the standards and will therefore comply with the strategy.

Action	Responsible Parties	Consistency
Medium- and Heavy-Duty GHG Phase 2.		Consistent. This is a CARB Mobile Source Strategy. The Project would not obstruct or interfere with CARB efforts to implement Medium- and Heavy-Duty GHG Phase 2. As this is a CARB enforced standard, vehicles that access the Project are required to comply with the standards and will therefore comply with the strategy.
Innovative Clean Transit: Transition to a suite of to-be-determined innovative clean transit options. Assumed 20% of new urban buses purchased beginning in 2018 will be zero emission buses with the penetration of zero-emission technology ramped up to 100% 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-NO_X standard.		Consistent. This is a CARB Mobile Source Strategy. The Project would not obstruct or interfere with CARB efforts improve transit-source emissions.
Last Mile Delivery: New regulation that would result in the use of low NO_X 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% of new Class 3–7 truck sales in local fleets starting in 2020, increasing to 10% in 2025 and remaining flat through 2030.		Consistent. This is a CARB Mobile Source Strategy. The Project would not obstruct or interfere with CARB efforts to improve last mile delivery emissions.
Further reduce vehicle miles traveled (VMT) through continued implementation of SB 375 and regional Sustainable Communities Strategies; forthcoming statewide implementation of SB 743; and potential additional VMT reduction strategies not specified in the Mobile Source Strategy but included in the document "Potential VMT Reduction Strategies for Discussion."		Consistent. This Project would not obstruct or interfere with implementation of SB 375 and would therefore not conflict with this measure.
Increase stringency of SB 375 Sustainable Communities Strategy (2035 targets).	CARB	Consistent. This is a CARB Mobile Source Strategy. The Project would not obstruct or interfere with CARB efforts to Increase stringency of SB 375 Sustainable Communities Strategy (2035 targets).

Action	Responsible Parties	Consistency
Harmonize project performance with emissions reductions and increase competitiveness of transit and active transportation modes (e.g. via guideline documents, funding programs, project selection, etc.).	CalSTA, SGC, OPR, CARB, Governor's Office of Business and Economic Development (GO-Biz), California Infrastructure and Economic Development Bank (IBank), Department of Finance (DOF), California Transportation Commission (CTC), Caltrans	Consistent. Although this is directed towards CARB and Caltrans, the proposed Project would be designed to promote and support pedestrian activity on-site and in the Project Site area.
By 2019, develop pricing policies to support low-GHG transportation (e.g. low-emission vehicle zones for heavy duty, road user, parking pricing, transit discounts).	CalSTA, Caltrans, CTC, OPR, SGC, CARB	Consistent. The Project would not obstruct or interfere with agency efforts to develop pricing policies to support low-GHG transportation.
Implement California Sustainable Freight Action Plan		
Improve freight system efficiency.	CalSTA, CalEPA, CNRA, CARB, Caltrans, CEC, GO-Biz	Consistent. This measure would apply to all trucks accessing the Project site, this may include existing trucks or new trucks that are part of the statewide goods movement sector.
Deploy over 100,000 freight vehicles and equipment capable of zero emission operation and maximize both zero and near-zero emission freight vehicles and equipment powered by renewable energy by 2030.		Consistent. The Project would not obstruct or interfere with agency efforts to deploy over 100,000 freight vehicles and equipment capable of zero emission operation and maximize both zero and near-zero emission freight vehicles and equipment powered by renewable energy by 2030.
Adopt a Low Carbon Fuel Standard with a Carbon Intensity reduction of 18%.	CARB	Consistent. When adopted, this measure would apply to all fuel purchased and

Action	Responsible Parties	Consistency
		used by the Project in the state. The Project would not obstruct or interfere with agency efforts to adopt a Low Carbon Fuel Standard with a Carbon Intensity reduction of 18%.
Implement the Short-Lived Climate Pollutant Strategy (SLPS) by 2030		
40% reduction in methane and hydrofluorocarbon emissions below 2013 levels.	CARB, CalRecycle, CDFA, SWRCB, Local Air Districts	Consistent. The Project would be required to comply with this measure and reduce any Project-source SLPS emissions accordingly. The Project would not obstruct or interfere agency efforts to reduce SLPS emissions.
50% reduction in black carbon emissions below 2013 levels.		
By 2019, develop regulations and programs to support organic waste landfill reduction goals in the SLCP and SB 1383.	CARB, CalRecycle, CDFA SWRCB, Local Air Districts	Consistent. The Project would implement waste reduction and recycling measures consistent with State and County requirements. The Project would not obstruct or interfere agency efforts to support organic waste landfill reduction goals in the SLCP and SB 1383.
Implement the post-2020 Cap-and-Trade Program with declining annual caps.	CARB	Consistent. The Project would be required to comply with any applicable Cap-and-Trade Program provisions. The Project would not obstruct or interfere agency efforts to implement the post-2020 Cap-and-Trade Program.
By 2018, develop Integrated Natural and Working Lands Implementation Plan to secure California's land base as a net carbon sink		
Protect land from conversion through conservation easements and other incentives.	CNRA, Departments Within CDFA, CalEPA, CARB	Consistent. The Project would not obstruct or interfere agency efforts to protect land from conversion through conservation easements and other incentives.
Increase the long-term resilience of carbon storage in the land base and enhance sequestration capacity		Consistent. The Project site is vacant disturbed property and does not comprise an area that would effectively provide for carbon sequestration. The Project would not obstruct or interfere agency efforts to increase the long-term resilience of

Action	Responsible Parties	Consistency
		carbon storage in the land base and enhance sequestration capacity.
Utilize wood and agricultural products to increase the amount of carbon stored in the natural and built environments		Consistent. Where appropriate, Project designs will incorporate wood or wood products. The Project would not obstruct or interfere agency efforts to encourage use of wood and agricultural products to increase the amount of carbon stored in the natural and built environments.
Establish scenario projections to serve as the foundation for the Implementation Plan		Consistent. The Project would not obstruct or interfere agency efforts to establish scenario projections to serve as the foundation for the Implementation Plan.
Establish a carbon accounting framework for natural and working lands as described in SB 859 by 2018	CARB	Consistent. The Project would not obstruct or interfere agency efforts to establish a carbon accounting framework for natural and working lands as described in SB 859 by 2018.
Implement Forest Carbon Plan	CNRA, California Department of Forestry and Fire Protection (CAL FIRE), CalEPA and Departments Within	Consistent. The Project would not obstruct or interfere agency efforts to implement the Forest Carbon Plan.
Identify and expand funding and financing mechanisms to support GHG reductions across all sectors.	State Agencies & Local Agencies	Consistent. The Project would not obstruct or interfere agency efforts to identify and expand funding and financing mechanisms to support GHG reductions across all sectors.

As shown above, the Project would not conflict with any of the 2017 Scoping Plan elements as any regulations adopted would apply directly or indirectly to the Project. Further, recent studies show that the State's existing and proposed regulatory framework will allow the State to reduce its GHG emissions level to 40% below 1990 levels by 2030 (58).

CITY OF RANCHO CUCAMONGA SUSTAINABLE COMMUNITY ACTION PLAN CONSISTENCY

The Project is required to comply with the City of Rancho Cucamonga's Sustainable Community Action Plan and will incorporate the following measures from the Plan in order to meet the City's GHG reduction goals. It should be noted that the Plan does not authorize or mandate any specific activity or initiative on the environment in the City of Rancho Cucamonga and is therefore not a qualified plan pursuant to CEQA. As such, the Plan will not be used to make any CEQA findings with respect to the Project GHG emissions (47).

TABLE 3-6: PROJECT CONSISTENCY WITH THE SUSTAINABLE COMMUNITY ACTION PLAN

Policy	Consistency
Transportation + Mobility (TM)	
TM Policy 1: Promote active transportation choices.	Consistent. The proposed Project includes the construction of sidewalks and incorporates bicycle facilities that would facilitate pedestrian and bicycle travel.
TM Policy 2: Utilize Transportation Demand Management strategies citywide.	Consistent. In an effort to promote alternative modes of transportation, the City of Rancho Cucamonga General Plan also includes a bike plan.
Energy Efficiency + Renewables (EE)	
EE Policy 1: Reduce energy demand by improved efficiency and building design.	Consistent. The Project would be constructed in compliance with current California Building Code requirements. Specifically, new buildings must achieve compliance with 2019 Building and Energy Efficiency Standards and the 2019 California Green Building Standards requirements. The proposed Project includes energy efficient field lighting and fixtures that meet the current Title 24 Standards throughout the Project Site and would be a modern development with energy efficient boilers, heaters, and air conditioning systems.
Green Building Performance (GB)	
GB Policy 1: Facilitate the use of green building practices.	Consistent. The Project would be constructed in compliance with current California Building Code requirements. Specifically, new buildings must achieve compliance with 2019 Building and Energy Efficiency Standards and the 2019 California Green Building Standards requirements. The proposed Project includes energy efficient field lighting and fixtures that meet the current Title 24 Standards throughout the Project Site and would be a modern development with energy efficient boilers, heaters, and air conditioning systems.

The Project would not conflict with any applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs.

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5 CERTIFICATIONS

The contents of this GHG study report represent an accurate depiction of the GHG impacts associated with the proposed Banyan Avenue Residential Project. The information contained in this GHG report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at hqureshi@urbanxroads.com.

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California State University, Fullerton • May 2010

Bachelor of Arts in Environmental Analysis and Design
University of California, Irvine • June 2006

PROFESSIONAL AFFILIATIONS

AEP – Association of Environmental Planners
AWMA – Air and Waste Management Association
ASTM – American Society for Testing and Materials

PROFESSIONAL CERTIFICATIONS

Planned Communities and Urban Infill – Urban Land Institute • June 2011
Indoor Air Quality and Industrial Hygiene – EMSL Analytical • April 2008
Principles of Ambient Air Monitoring – CARB • August 2007
AB2588 Regulatory Standards – Trinity Consultants • November 2006
Air Dispersion Modeling – Lakes Environmental • June 2006

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APPENDIX 3.1:

CALEEMOD PROJECT ANNUAL EMISSIONS MODEL OUTPUTS

Banyan Avenue Residential

San Bernardino-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	9.00	Dwelling Unit	4.62	201,564.00	26

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	509.79	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 Intensity Factor adjusted for the 2022 Opening Year

Land Use - Based on the Site Plan, the Net Land Area is 201,564 SF (4.62 Acres)

Construction Phase - Construction Schedule adjusted to reflect the number of days identified in the 2016 Study.

Off-road Equipment - Hours are based on an 8-hour workday.

Off-road Equipment - Hours are based on an 8-hour workday.

Off-road Equipment - Construction Equipment consistent with the equipment identified in the 2016 Study.

Off-road Equipment - Hours are based on an 8-hour workday.

Grading - For purposes of analysis, it assumed that 4 acres will be disturbed per day.

Vehicle Trips - Trip Rates based on 10th Edition ITE

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Vehicle Emission Factors - EMFAC2017

Woodstoves - Rule 445

Energy Use - The Project will design building shells and building components to meet 2019 Title 24 Standards which expects 53% less energy for residential use.

Construction Off-road Equipment Mitigation - Rule 403

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	5.00	10.00
tblConstructionPhase	NumDays	8.00	20.00
tblConstructionPhase	NumDays	18.00	20.00
tblConstructionPhase	NumDays	18.00	20.00
tblEnergyUse	LightingElect	1,608.84	756.15
tblEnergyUse	T24E	951.67	447.28
tblEnergyUse	T24NG	24,566.15	11,546.09
tblFireplaces	NumberGas	7.65	9.00
tblFireplaces	NumberNoFireplace	0.90	0.00
tblFireplaces	NumberWood	0.45	0.00

tblGrading	AcresOfGrading	20.00	80.00
tblGrading	AcresOfGrading	0.00	40.00
tblLandUse	LandUseSquareFeet	16,200.00	201,564.00
tblLandUse	LotAcreage	2.92	4.62
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	509.79
tblVehicleEF	HHD	1.21	0.03
tblVehicleEF	HHD	0.04	0.14
tblVehicleEF	HHD	0.10	0.00
tblVehicleEF	HHD	3.29	5.95
tblVehicleEF	HHD	0.57	0.67
tblVehicleEF	HHD	1.82	3.7880e-003
tblVehicleEF	HHD	6,933.41	1,124.17
tblVehicleEF	HHD	1,475.79	1,484.27
tblVehicleEF	HHD	5.54	0.03
tblVehicleEF	HHD	26.50	6.08
tblVehicleEF	HHD	2.50	3.42

tblVehicleEF	HHD	20.21	2.10
tblVehicleEF	HHD	9.7780e-003	3.6280e-003
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.01	0.03
tblVehicleEF	HHD	5.1000e-005	1.0000e-006
tblVehicleEF	HHD	9.3550e-003	3.4710e-003
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tblVehicleEF	HHD	8.8810e-003	8.8310e-003
tblVehicleEF	HHD	0.01	0.03
tblVehicleEF	HHD	4.7000e-005	1.0000e-006
tblVehicleEF	HHD	8.5000e-005	5.0000e-006
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tblVehicleEF	HHD	5.2000e-005	3.0000e-006
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tblVehicleEF	HHD	0.05	1.0000e-006
tblVehicleEF	HHD	0.07	0.01
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	8.6000e-005	0.00
tblVehicleEF	HHD	8.5000e-005	5.0000e-006
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tblVehicleEF	HHD	5.2000e-005	3.0000e-006
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tblVehicleEF	HHD	2.1700e-004	7.9100e-004

tblVehicleEF	HHD	0.06	1.0000e-006
tblVehicleEF	HHD	1.14	0.03
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tblVehicleEF	HHD	0.09	0.00
tblVehicleEF	HHD	2.39	5.82
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tblVehicleEF	HHD	0.01	0.03
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tblVehicleEF	HHD	3.5970e-003	1.8200e-004
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tblVehicleEF	HHD	0.01	0.03
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tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.8810e-003	8.6000e-003
tblVehicleEF	HHD	0.01	0.03
tblVehicleEF	HHD	4.7000e-005	1.0000e-006
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tblVehicleEF	HHD	0.06	0.01
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	8.5000e-005	0.00
tblVehicleEF	HHD	8.5000e-005	5.0000e-006
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tblVehicleEF	LDA	0.10	0.10
tblVehicleEF	LDA	0.03	0.05
tblVehicleEF	LDA	0.02	0.01
tblVehicleEF	LDA	0.03	0.21
tblVehicleEF	LDA	0.08	0.24
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tblVehicleEF	LDA	2.0960e-003	1.7080e-003
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tblVehicleEF	LDA	0.12	0.11
tblVehicleEF	LDA	0.07	0.09
tblVehicleEF	LDA	0.01	0.01
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tblVehicleEF	LDA	0.12	0.11
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tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.03	0.21
tblVehicleEF	LDA	0.07	0.21
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tblVehicleEF	LDA	1.5460e-003	1.4000e-003
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tblVehicleEF	LDA	0.11	0.11
tblVehicleEF	LDA	0.03	0.05
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tblVehicleEF	LDA	0.11	0.11
tblVehicleEF	LDA	0.03	0.05
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tblVehicleEF	LDA	0.04	0.24
tblVehicleEF	LDA	0.08	0.24
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tblVehicleEF	LDT1	0.33	0.26
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tblVehicleEF	LDT1	0.12	0.13
tblVehicleEF	LDT1	0.05	0.05
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tblVehicleEF	LDT2	0.13	0.14
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.02	0.02
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tblVehicleEF	LDT2	0.11	0.33
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tblVehicleEF	LDT2	8.2200e-004	6.9100e-004
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tblVehicleEF	LDT2	0.13	0.14
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.02	0.03
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tblVehicleEF	LDT2	0.13	0.28
tblVehicleEF	LDT2	1.7270e-003	1.6020e-003

tblVehicleEF	LDT2	2.4170e-003	1.9240e-003
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tblVehicleEF	LDT2	0.11	0.15
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.07	0.45
tblVehicleEF	LDT2	0.09	0.29
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tblVehicleEF	LDT2	0.03	0.03
tblVehicleEF	LDT2	0.07	0.45
tblVehicleEF	LDT2	0.10	0.31
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tblVehicleEF	LDT2	0.14	0.30
tblVehicleEF	LDT2	1.7270e-003	1.6020e-003
tblVehicleEF	LDT2	2.4170e-003	1.9240e-003

tblVehicleEF	LDT2	1.5880e-003	1.4740e-003
tblVehicleEF	LDT2	2.2220e-003	1.7690e-003
tblVehicleEF	LDT2	0.06	0.09
tblVehicleEF	LDT2	0.14	0.16
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.08	0.52
tblVehicleEF	LDT2	0.11	0.33
tblVehicleEF	LDT2	3.4410e-003	3.2580e-003
tblVehicleEF	LDT2	8.2200e-004	6.9100e-004
tblVehicleEF	LDT2	0.06	0.09
tblVehicleEF	LDT2	0.14	0.16
tblVehicleEF	LDT2	0.05	0.08
tblVehicleEF	LDT2	0.02	0.03
tblVehicleEF	LDT2	0.08	0.52
tblVehicleEF	LDT2	0.12	0.37
tblVehicleEF	LHD1	5.2170e-003	5.0850e-003
tblVehicleEF	LHD1	0.01	6.1020e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.14	0.18
tblVehicleEF	LHD1	1.07	0.75
tblVehicleEF	LHD1	2.60	1.03
tblVehicleEF	LHD1	9.23	9.25
tblVehicleEF	LHD1	609.20	652.45
tblVehicleEF	LHD1	30.40	11.21
tblVehicleEF	LHD1	0.09	0.07
tblVehicleEF	LHD1	2.12	1.25

tblVehicleEF	LHD1	0.99	0.32
tblVehicleEF	LHD1	9.6500e-004	8.9000e-004
tblVehicleEF	LHD1	0.01	9.8770e-003
tblVehicleEF	LHD1	0.01	9.8260e-003
tblVehicleEF	LHD1	9.5800e-004	2.6000e-004
tblVehicleEF	LHD1	9.2400e-004	8.5100e-004
tblVehicleEF	LHD1	2.5390e-003	2.4690e-003
tblVehicleEF	LHD1	0.01	9.3760e-003
tblVehicleEF	LHD1	8.8100e-004	2.3900e-004
tblVehicleEF	LHD1	3.7070e-003	3.0390e-003
tblVehicleEF	LHD1	0.11	0.08
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.8240e-003	1.5810e-003
tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	0.35	0.55
tblVehicleEF	LHD1	0.27	0.08
tblVehicleEF	LHD1	9.2000e-005	9.0000e-005
tblVehicleEF	LHD1	5.9760e-003	6.3570e-003
tblVehicleEF	LHD1	3.5300e-004	1.1100e-004
tblVehicleEF	LHD1	3.7070e-003	3.0390e-003
tblVehicleEF	LHD1	0.11	0.08
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	1.8240e-003	1.5810e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.35	0.55
tblVehicleEF	LHD1	0.29	0.09
tblVehicleEF	LHD1	5.2170e-003	5.0990e-003

tblVehicleEF	LHD1	0.01	6.2280e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.14	0.18
tblVehicleEF	LHD1	1.09	0.76
tblVehicleEF	LHD1	2.43	0.98
tblVehicleEF	LHD1	9.23	9.25
tblVehicleEF	LHD1	609.20	652.47
tblVehicleEF	LHD1	30.40	11.12
tblVehicleEF	LHD1	0.09	0.07
tblVehicleEF	LHD1	1.98	1.17
tblVehicleEF	LHD1	0.94	0.31
tblVehicleEF	LHD1	9.6500e-004	8.9000e-004
tblVehicleEF	LHD1	0.01	9.8770e-003
tblVehicleEF	LHD1	0.01	9.8260e-003
tblVehicleEF	LHD1	9.5800e-004	2.6000e-004
tblVehicleEF	LHD1	9.2400e-004	8.5100e-004
tblVehicleEF	LHD1	2.5390e-003	2.4690e-003
tblVehicleEF	LHD1	0.01	9.3760e-003
tblVehicleEF	LHD1	8.8100e-004	2.3900e-004
tblVehicleEF	LHD1	7.3080e-003	5.4780e-003
tblVehicleEF	LHD1	0.13	0.10
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	4.1220e-003	3.0450e-003
tblVehicleEF	LHD1	0.09	0.06
tblVehicleEF	LHD1	0.36	0.56
tblVehicleEF	LHD1	0.25	0.08
tblVehicleEF	LHD1	9.2000e-005	9.0000e-005

tblVehicleEF	LHD1	5.9770e-003	6.3570e-003
tblVehicleEF	LHD1	3.5000e-004	1.1000e-004
tblVehicleEF	LHD1	7.3080e-003	5.4780e-003
tblVehicleEF	LHD1	0.13	0.10
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	4.1220e-003	3.0450e-003
tblVehicleEF	LHD1	0.11	0.08
tblVehicleEF	LHD1	0.36	0.56
tblVehicleEF	LHD1	0.28	0.08
tblVehicleEF	LHD1	5.2170e-003	5.0870e-003
tblVehicleEF	LHD1	0.01	6.1100e-003
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.14	0.18
tblVehicleEF	LHD1	1.07	0.75
tblVehicleEF	LHD1	2.55	1.02
tblVehicleEF	LHD1	9.23	9.25
tblVehicleEF	LHD1	609.20	652.45
tblVehicleEF	LHD1	30.40	11.20
tblVehicleEF	LHD1	0.09	0.07
tblVehicleEF	LHD1	2.08	1.23
tblVehicleEF	LHD1	0.97	0.31
tblVehicleEF	LHD1	9.6500e-004	8.9000e-004
tblVehicleEF	LHD1	0.01	9.8770e-003
tblVehicleEF	LHD1	0.01	9.8260e-003
tblVehicleEF	LHD1	9.5800e-004	2.6000e-004
tblVehicleEF	LHD1	9.2400e-004	8.5100e-004
tblVehicleEF	LHD1	2.5390e-003	2.4690e-003

tblVehicleEF	LHD1	0.01	9.3760e-003
tblVehicleEF	LHD1	8.8100e-004	2.3900e-004
tblVehicleEF	LHD1	4.0430e-003	3.1520e-003
tblVehicleEF	LHD1	0.13	0.10
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.7940e-003	1.6100e-003
tblVehicleEF	LHD1	0.08	0.06
tblVehicleEF	LHD1	0.38	0.60
tblVehicleEF	LHD1	0.26	0.08
tblVehicleEF	LHD1	9.2000e-005	9.0000e-005
tblVehicleEF	LHD1	5.9760e-003	6.3570e-003
tblVehicleEF	LHD1	3.5200e-004	1.1100e-004
tblVehicleEF	LHD1	4.0430e-003	3.1520e-003
tblVehicleEF	LHD1	0.13	0.10
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	1.7940e-003	1.6100e-003
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.38	0.60
tblVehicleEF	LHD1	0.29	0.09
tblVehicleEF	LHD2	3.5950e-003	3.6950e-003
tblVehicleEF	LHD2	4.6110e-003	4.1040e-003
tblVehicleEF	LHD2	8.1370e-003	0.01
tblVehicleEF	LHD2	0.12	0.15
tblVehicleEF	LHD2	0.50	0.50
tblVehicleEF	LHD2	1.20	0.67
tblVehicleEF	LHD2	14.27	14.14
tblVehicleEF	LHD2	608.52	665.25

tblVehicleEF	LHD2	24.46	8.76
tblVehicleEF	LHD2	0.11	0.10
tblVehicleEF	LHD2	1.49	1.36
tblVehicleEF	LHD2	0.53	0.22
tblVehicleEF	LHD2	1.2830e-003	1.3100e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	4.0000e-004	1.3700e-004
tblVehicleEF	LHD2	1.2280e-003	1.2540e-003
tblVehicleEF	LHD2	2.6860e-003	2.6560e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	3.6800e-004	1.2600e-004
tblVehicleEF	LHD2	1.3070e-003	1.7040e-003
tblVehicleEF	LHD2	0.04	0.05
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	7.0300e-004	9.2000e-004
tblVehicleEF	LHD2	0.06	0.06
tblVehicleEF	LHD2	0.09	0.32
tblVehicleEF	LHD2	0.11	0.05
tblVehicleEF	LHD2	1.3900e-004	1.3500e-004
tblVehicleEF	LHD2	5.9200e-003	6.4300e-003
tblVehicleEF	LHD2	2.6700e-004	8.7000e-005
tblVehicleEF	LHD2	1.3070e-003	1.7040e-003
tblVehicleEF	LHD2	0.04	0.05
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	7.0300e-004	9.2000e-004
tblVehicleEF	LHD2	0.07	0.07

tblVehicleEF	LHD2	0.09	0.32
tblVehicleEF	LHD2	0.12	0.06
tblVehicleEF	LHD2	3.5950e-003	3.7050e-003
tblVehicleEF	LHD2	4.6760e-003	4.1460e-003
tblVehicleEF	LHD2	7.7630e-003	0.01
tblVehicleEF	LHD2	0.12	0.15
tblVehicleEF	LHD2	0.50	0.50
tblVehicleEF	LHD2	1.13	0.64
tblVehicleEF	LHD2	14.27	14.14
tblVehicleEF	LHD2	608.52	665.25
tblVehicleEF	LHD2	24.46	8.70
tblVehicleEF	LHD2	0.11	0.10
tblVehicleEF	LHD2	1.40	1.28
tblVehicleEF	LHD2	0.50	0.21
tblVehicleEF	LHD2	1.2830e-003	1.3100e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	4.0000e-004	1.3700e-004
tblVehicleEF	LHD2	1.2280e-003	1.2540e-003
tblVehicleEF	LHD2	2.6860e-003	2.6560e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	3.6800e-004	1.2600e-004
tblVehicleEF	LHD2	2.5220e-003	3.0730e-003
tblVehicleEF	LHD2	0.04	0.06
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	1.5220e-003	1.7630e-003
tblVehicleEF	LHD2	0.06	0.06

tblVehicleEF	LHD2	0.09	0.32
tblVehicleEF	LHD2	0.10	0.05
tblVehicleEF	LHD2	1.3900e-004	1.3500e-004
tblVehicleEF	LHD2	5.9200e-003	6.4300e-003
tblVehicleEF	LHD2	2.6500e-004	8.6000e-005
tblVehicleEF	LHD2	2.5220e-003	3.0730e-003
tblVehicleEF	LHD2	0.04	0.06
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	1.5220e-003	1.7630e-003
tblVehicleEF	LHD2	0.07	0.07
tblVehicleEF	LHD2	0.09	0.32
tblVehicleEF	LHD2	0.11	0.05
tblVehicleEF	LHD2	3.5950e-003	3.6960e-003
tblVehicleEF	LHD2	4.6180e-003	4.1080e-003
tblVehicleEF	LHD2	8.0640e-003	0.01
tblVehicleEF	LHD2	0.12	0.15
tblVehicleEF	LHD2	0.50	0.50
tblVehicleEF	LHD2	1.19	0.67
tblVehicleEF	LHD2	14.27	14.14
tblVehicleEF	LHD2	608.52	665.25
tblVehicleEF	LHD2	24.46	8.75
tblVehicleEF	LHD2	0.11	0.10
tblVehicleEF	LHD2	1.46	1.33
tblVehicleEF	LHD2	0.52	0.22
tblVehicleEF	LHD2	1.2830e-003	1.3100e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.01	0.01

tblVehicleEF	LHD2	4.0000e-004	1.3700e-004
tblVehicleEF	LHD2	1.2280e-003	1.2540e-003
tblVehicleEF	LHD2	2.6860e-003	2.6560e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	3.6800e-004	1.2600e-004
tblVehicleEF	LHD2	1.3460e-003	1.7140e-003
tblVehicleEF	LHD2	0.04	0.06
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	6.8700e-004	9.2200e-004
tblVehicleEF	LHD2	0.06	0.06
tblVehicleEF	LHD2	0.10	0.34
tblVehicleEF	LHD2	0.11	0.05
tblVehicleEF	LHD2	1.3900e-004	1.3500e-004
tblVehicleEF	LHD2	5.9200e-003	6.4300e-003
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tblVehicleEF	LHD2	1.3460e-003	1.7140e-003
tblVehicleEF	LHD2	0.04	0.06
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	6.8700e-004	9.2200e-004
tblVehicleEF	LHD2	0.07	0.07
tblVehicleEF	LHD2	0.10	0.34
tblVehicleEF	LHD2	0.12	0.06
tblVehicleEF	MCY	0.43	0.34
tblVehicleEF	MCY	0.16	0.24
tblVehicleEF	MCY	20.55	19.26
tblVehicleEF	MCY	9.93	8.60
tblVehicleEF	MCY	167.73	212.03

tblVehicleEF	MCY	46.45	60.73
tblVehicleEF	MCY	1.16	1.13
tblVehicleEF	MCY	0.31	0.26
tblVehicleEF	MCY	1.8610e-003	1.9650e-003
tblVehicleEF	MCY	3.6730e-003	2.9600e-003
tblVehicleEF	MCY	1.7420e-003	1.8380e-003
tblVehicleEF	MCY	3.4650e-003	2.7870e-003
tblVehicleEF	MCY	1.45	1.42
tblVehicleEF	MCY	0.84	0.80
tblVehicleEF	MCY	0.80	0.78
tblVehicleEF	MCY	2.23	2.33
tblVehicleEF	MCY	0.49	1.91
tblVehicleEF	MCY	2.16	1.84
tblVehicleEF	MCY	2.0770e-003	2.0980e-003
tblVehicleEF	MCY	6.9000e-004	6.0100e-004
tblVehicleEF	MCY	1.45	1.42
tblVehicleEF	MCY	0.84	0.80
tblVehicleEF	MCY	0.80	0.78
tblVehicleEF	MCY	2.74	2.87
tblVehicleEF	MCY	0.49	1.91
tblVehicleEF	MCY	2.35	2.01
tblVehicleEF	MCY	0.42	0.34
tblVehicleEF	MCY	0.14	0.21
tblVehicleEF	MCY	20.68	19.28
tblVehicleEF	MCY	9.05	7.90
tblVehicleEF	MCY	167.73	211.90
tblVehicleEF	MCY	46.45	58.88

tblVehicleEF	MCY	0.99	0.97
tblVehicleEF	MCY	0.29	0.25
tblVehicleEF	MCY	1.8610e-003	1.9650e-003
tblVehicleEF	MCY	3.6730e-003	2.9600e-003
tblVehicleEF	MCY	1.7420e-003	1.8380e-003
tblVehicleEF	MCY	3.4650e-003	2.7870e-003
tblVehicleEF	MCY	3.14	2.77
tblVehicleEF	MCY	1.27	1.11
tblVehicleEF	MCY	2.13	1.77
tblVehicleEF	MCY	2.17	2.28
tblVehicleEF	MCY	0.49	1.88
tblVehicleEF	MCY	1.86	1.62
tblVehicleEF	MCY	2.0770e-003	2.0970e-003
tblVehicleEF	MCY	6.6700e-004	5.8300e-004
tblVehicleEF	MCY	3.14	2.77
tblVehicleEF	MCY	1.27	1.11
tblVehicleEF	MCY	2.13	1.77
tblVehicleEF	MCY	2.67	2.81
tblVehicleEF	MCY	0.49	1.88
tblVehicleEF	MCY	2.02	1.76
tblVehicleEF	MCY	0.42	0.34
tblVehicleEF	MCY	0.15	0.24
tblVehicleEF	MCY	19.63	18.76
tblVehicleEF	MCY	9.55	8.44
tblVehicleEF	MCY	167.73	211.17
tblVehicleEF	MCY	46.45	60.38
tblVehicleEF	MCY	1.12	1.09

tblVehicleEF	MCY	0.31	0.26
tblVehicleEF	MCY	1.8610e-003	1.9650e-003
tblVehicleEF	MCY	3.6730e-003	2.9600e-003
tblVehicleEF	MCY	1.7420e-003	1.8380e-003
tblVehicleEF	MCY	3.4650e-003	2.7870e-003
tblVehicleEF	MCY	1.71	1.57
tblVehicleEF	MCY	1.13	1.06
tblVehicleEF	MCY	0.72	0.74
tblVehicleEF	MCY	2.19	2.31
tblVehicleEF	MCY	0.56	2.18
tblVehicleEF	MCY	2.08	1.81
tblVehicleEF	MCY	2.0610e-003	2.0900e-003
tblVehicleEF	MCY	6.8200e-004	5.9800e-004
tblVehicleEF	MCY	1.71	1.57
tblVehicleEF	MCY	1.13	1.06
tblVehicleEF	MCY	0.72	0.74
tblVehicleEF	MCY	2.69	2.84
tblVehicleEF	MCY	0.56	2.18
tblVehicleEF	MCY	2.27	1.98
tblVehicleEF	MDV	0.01	5.5200e-003
tblVehicleEF	MDV	0.02	0.09
tblVehicleEF	MDV	1.35	1.14
tblVehicleEF	MDV	3.25	3.25
tblVehicleEF	MDV	483.94	415.10
tblVehicleEF	MDV	107.92	87.32
tblVehicleEF	MDV	0.17	0.11
tblVehicleEF	MDV	0.32	0.38

tblVehicleEF	MDV	1.8260e-003	1.6850e-003
tblVehicleEF	MDV	2.5170e-003	2.0310e-003
tblVehicleEF	MDV	1.6830e-003	1.5540e-003
tblVehicleEF	MDV	2.3150e-003	1.8680e-003
tblVehicleEF	MDV	0.10	0.11
tblVehicleEF	MDV	0.20	0.17
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.03	0.02
tblVehicleEF	MDV	0.11	0.50
tblVehicleEF	MDV	0.25	0.44
tblVehicleEF	MDV	4.8500e-003	4.0780e-003
tblVehicleEF	MDV	1.1370e-003	8.5900e-004
tblVehicleEF	MDV	0.10	0.11
tblVehicleEF	MDV	0.20	0.17
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.05	0.03
tblVehicleEF	MDV	0.11	0.50
tblVehicleEF	MDV	0.28	0.48
tblVehicleEF	MDV	0.01	6.2110e-003
tblVehicleEF	MDV	0.02	0.08
tblVehicleEF	MDV	1.64	1.35
tblVehicleEF	MDV	2.69	2.72
tblVehicleEF	MDV	526.85	438.45
tblVehicleEF	MDV	107.92	86.27
tblVehicleEF	MDV	0.16	0.10
tblVehicleEF	MDV	0.30	0.35
tblVehicleEF	MDV	1.8260e-003	1.6850e-003

tblVehicleEF	MDV	2.5170e-003	2.0310e-003
tblVehicleEF	MDV	1.6830e-003	1.5540e-003
tblVehicleEF	MDV	2.3150e-003	1.8680e-003
tblVehicleEF	MDV	0.20	0.21
tblVehicleEF	MDV	0.23	0.19
tblVehicleEF	MDV	0.17	0.19
tblVehicleEF	MDV	0.04	0.03
tblVehicleEF	MDV	0.11	0.49
tblVehicleEF	MDV	0.21	0.38
tblVehicleEF	MDV	5.2830e-003	4.3080e-003
tblVehicleEF	MDV	1.1260e-003	8.4800e-004
tblVehicleEF	MDV	0.20	0.21
tblVehicleEF	MDV	0.23	0.19
tblVehicleEF	MDV	0.17	0.19
tblVehicleEF	MDV	0.05	0.04
tblVehicleEF	MDV	0.11	0.49
tblVehicleEF	MDV	0.23	0.41
tblVehicleEF	MDV	0.01	5.4050e-003
tblVehicleEF	MDV	0.02	0.09
tblVehicleEF	MDV	1.28	1.09
tblVehicleEF	MDV	3.20	3.26
tblVehicleEF	MDV	473.93	410.75
tblVehicleEF	MDV	107.92	87.35
tblVehicleEF	MDV	0.16	0.10
tblVehicleEF	MDV	0.32	0.38
tblVehicleEF	MDV	1.8260e-003	1.6850e-003
tblVehicleEF	MDV	2.5170e-003	2.0310e-003

tblVehicleEF	MDV	1.6830e-003	1.5540e-003
tblVehicleEF	MDV	2.3150e-003	1.8680e-003
tblVehicleEF	MDV	0.10	0.11
tblVehicleEF	MDV	0.22	0.18
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.03	0.02
tblVehicleEF	MDV	0.13	0.57
tblVehicleEF	MDV	0.25	0.44
tblVehicleEF	MDV	4.7490e-003	4.0360e-003
tblVehicleEF	MDV	1.1360e-003	8.5900e-004
tblVehicleEF	MDV	0.10	0.11
tblVehicleEF	MDV	0.22	0.18
tblVehicleEF	MDV	0.08	0.10
tblVehicleEF	MDV	0.04	0.03
tblVehicleEF	MDV	0.13	0.57
tblVehicleEF	MDV	0.27	0.48
tblVehicleEF	MH	0.04	3.6580e-003
tblVehicleEF	MH	0.03	0.00
tblVehicleEF	MH	3.07	0.35
tblVehicleEF	MH	6.43	0.00
tblVehicleEF	MH	1,045.05	970.21
tblVehicleEF	MH	59.49	0.00
tblVehicleEF	MH	1.54	4.24
tblVehicleEF	MH	0.91	0.00
tblVehicleEF	MH	0.01	0.02
tblVehicleEF	MH	0.04	0.11
tblVehicleEF	MH	1.1740e-003	0.00

tblVehicleEF	MH	3.2230e-003	4.0000e-003
tblVehicleEF	MH	0.04	0.11
tblVehicleEF	MH	1.0790e-003	0.00
tblVehicleEF	MH	1.47	0.00
tblVehicleEF	MH	0.09	0.00
tblVehicleEF	MH	0.51	0.00
tblVehicleEF	MH	0.10	0.08
tblVehicleEF	MH	0.03	0.00
tblVehicleEF	MH	0.37	0.00
tblVehicleEF	MH	0.01	9.1720e-003
tblVehicleEF	MH	7.0700e-004	0.00
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tblVehicleEF	MH	0.14	0.09
tblVehicleEF	MH	0.03	0.00
tblVehicleEF	MH	0.40	0.00
tblVehicleEF	MH	0.04	3.6580e-003
tblVehicleEF	MH	0.03	0.00
tblVehicleEF	MH	3.19	0.35
tblVehicleEF	MH	5.84	0.00
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tblVehicleEF	MH	59.49	0.00
tblVehicleEF	MH	1.41	4.00
tblVehicleEF	MH	0.86	0.00
tblVehicleEF	MH	0.01	0.02
tblVehicleEF	MH	0.04	0.11

tblVehicleEF	MH	1.1740e-003	0.00
tblVehicleEF	MH	3.2230e-003	4.0000e-003
tblVehicleEF	MH	0.04	0.11
tblVehicleEF	MH	1.0790e-003	0.00
tblVehicleEF	MH	2.91	0.00
tblVehicleEF	MH	0.11	0.00
tblVehicleEF	MH	1.21	0.00
tblVehicleEF	MH	0.11	0.08
tblVehicleEF	MH	0.03	0.00
tblVehicleEF	MH	0.34	0.00
tblVehicleEF	MH	0.01	9.1720e-003
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tblVehicleEF	MH	2.91	0.00
tblVehicleEF	MH	0.11	0.00
tblVehicleEF	MH	1.21	0.00
tblVehicleEF	MH	0.15	0.09
tblVehicleEF	MH	0.03	0.00
tblVehicleEF	MH	0.38	0.00
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tblVehicleEF	MH	3.08	0.35
tblVehicleEF	MH	6.36	0.00
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tblVehicleEF	MH	0.89	0.00
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tblVehicleEF	MH	3.2230e-003	4.0000e-003
tblVehicleEF	MH	0.04	0.11
tblVehicleEF	MH	1.0790e-003	0.00
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tblVehicleEF	MH	0.11	0.00
tblVehicleEF	MH	0.53	0.00
tblVehicleEF	MH	0.10	0.08
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tblVehicleEF	MH	0.37	0.00
tblVehicleEF	MH	0.01	9.1720e-003
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tblVehicleEF	MH	1.75	0.00
tblVehicleEF	MH	0.11	0.00
tblVehicleEF	MH	0.53	0.00
tblVehicleEF	MH	0.15	0.09
tblVehicleEF	MH	0.03	0.00
tblVehicleEF	MH	0.40	0.00
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tblVehicleEF	MHD	3.5160e-003	3.3210e-003
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tblVehicleEF	MHD	0.04	0.06
tblVehicleEF	MHD	0.02	0.08
tblVehicleEF	MHD	0.32	0.03
tblVehicleEF	MHD	1.5080e-003	6.5300e-004
tblVehicleEF	MHD	0.01	9.2620e-003
tblVehicleEF	MHD	6.1700e-004	6.3000e-005
tblVehicleEF	MHD	1.2800e-003	4.5300e-004
tblVehicleEF	MHD	0.04	0.01
tblVehicleEF	MHD	0.03	0.02
tblVehicleEF	MHD	6.5100e-004	2.4000e-004
tblVehicleEF	MHD	0.04	0.07
tblVehicleEF	MHD	0.02	0.08
tblVehicleEF	MHD	0.35	0.04

tblVehicleEF	MHD	0.02	2.3860e-003
tblVehicleEF	MHD	3.5800e-003	3.3450e-003
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tblVehicleEF	MHD	0.28	0.33
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tblVehicleEF	MHD	1,101.52	974.58
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tblVehicleEF	MHD	0.92	1.52
tblVehicleEF	MHD	11.85	1.49
tblVehicleEF	MHD	3.2500e-004	1.0410e-003
tblVehicleEF	MHD	5.0030e-003	0.04
tblVehicleEF	MHD	7.6400e-004	7.5000e-005
tblVehicleEF	MHD	3.1100e-004	9.9600e-004
tblVehicleEF	MHD	4.7830e-003	0.03
tblVehicleEF	MHD	7.0300e-004	6.9000e-005
tblVehicleEF	MHD	2.5300e-003	8.2800e-004
tblVehicleEF	MHD	0.05	0.02
tblVehicleEF	MHD	0.02	0.02
tblVehicleEF	MHD	1.5010e-003	4.7800e-004
tblVehicleEF	MHD	0.04	0.06
tblVehicleEF	MHD	0.02	0.08
tblVehicleEF	MHD	0.30	0.03
tblVehicleEF	MHD	1.5950e-003	6.5900e-004
tblVehicleEF	MHD	0.01	9.2620e-003

tblVehicleEF	MHD	6.1100e-004	6.2000e-005
tblVehicleEF	MHD	2.5300e-003	8.2800e-004
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tblVehicleEF	MHD	0.03	0.02
tblVehicleEF	MHD	1.5010e-003	4.7800e-004
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tblVehicleEF	MHD	0.02	2.6830e-003
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tblVehicleEF	MHD	4.7000e-004	1.4940e-003
tblVehicleEF	MHD	5.0030e-003	0.04
tblVehicleEF	MHD	7.6400e-004	7.5000e-005
tblVehicleEF	MHD	4.4900e-004	1.4300e-003
tblVehicleEF	MHD	4.7830e-003	0.03
tblVehicleEF	MHD	7.0300e-004	6.9000e-005
tblVehicleEF	MHD	1.3890e-003	4.7100e-004

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tblVehicleEF	MHD	6.4000e-004	2.4400e-004
tblVehicleEF	MHD	0.04	0.06
tblVehicleEF	MHD	0.02	0.09
tblVehicleEF	MHD	0.32	0.03
tblVehicleEF	MHD	1.3860e-003	6.4400e-004
tblVehicleEF	MHD	0.01	9.2620e-003
tblVehicleEF	MHD	6.1600e-004	6.3000e-005
tblVehicleEF	MHD	1.3890e-003	4.7100e-004
tblVehicleEF	MHD	0.05	0.02
tblVehicleEF	MHD	0.04	0.02
tblVehicleEF	MHD	6.4000e-004	2.4400e-004
tblVehicleEF	MHD	0.04	0.07
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tblVehicleEF	OBUS	0.26	0.52
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tblVehicleEF	OBUS	0.97	1.24

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tblVehicleEF	OBUS	9.2900e-004	2.1800e-004
tblVehicleEF	OBUS	6.1000e-005	5.6400e-004
tblVehicleEF	OBUS	4.4220e-003	0.01
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tblVehicleEF	OBUS	2.1800e-003	2.6020e-003
tblVehicleEF	OBUS	0.02	0.02
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tblVehicleEF	OBUS	2.1800e-003	2.6020e-003
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tblVehicleEF	OBUS	0.05	0.07
tblVehicleEF	OBUS	9.3100e-004	1.1160e-003
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tblVehicleEF	OBUS	4.6440e-003	0.01
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tblVehicleEF	OBUS	4.2350e-003	4.6860e-003
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tblVehicleEF	OBUS	2.1330e-003	2.2090e-003
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tblVehicleEF	SBUS	0.03	0.03
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tblVehicleEF	SBUS	0.68	0.28
tblVehicleEF	SBUS	1.2820e-003	6.0100e-004
tblVehicleEF	SBUS	0.11	0.11
tblVehicleEF	SBUS	0.01	0.08
tblVehicleEF	SBUS	0.28	0.04
tblVehicleEF	SBUS	0.01	3.1850e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	4.6400e-004	4.8000e-005
tblVehicleEF	SBUS	2.9580e-003	1.2070e-003
tblVehicleEF	SBUS	0.02	0.01
tblVehicleEF	SBUS	0.98	0.40
tblVehicleEF	SBUS	1.2820e-003	6.0100e-004
tblVehicleEF	SBUS	0.13	0.13
tblVehicleEF	SBUS	0.01	0.08
tblVehicleEF	SBUS	0.31	0.04
tblVehicleEF	UBUS	1.83	4.45
tblVehicleEF	UBUS	0.08	0.01
tblVehicleEF	UBUS	9.26	34.75
tblVehicleEF	UBUS	14.34	0.89
tblVehicleEF	UBUS	1,846.39	1,692.13
tblVehicleEF	UBUS	136.37	11.77
tblVehicleEF	UBUS	5.87	0.38
tblVehicleEF	UBUS	13.57	0.14
tblVehicleEF	UBUS	0.52	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.07	2.6550e-003

tblVehicleEF	UBUS	1.4030e-003	1.4100e-004
tblVehicleEF	UBUS	0.22	0.03
tblVehicleEF	UBUS	3.0000e-003	6.6220e-003
tblVehicleEF	UBUS	0.06	2.5280e-003
tblVehicleEF	UBUS	1.2900e-003	1.3000e-004
tblVehicleEF	UBUS	8.0860e-003	1.6780e-003
tblVehicleEF	UBUS	0.11	9.5390e-003
tblVehicleEF	UBUS	3.9450e-003	7.3700e-004
tblVehicleEF	UBUS	0.61	0.07
tblVehicleEF	UBUS	0.02	0.04
tblVehicleEF	UBUS	1.15	0.04
tblVehicleEF	UBUS	0.01	3.0250e-003
tblVehicleEF	UBUS	1.6240e-003	1.1700e-004
tblVehicleEF	UBUS	8.0860e-003	1.6780e-003
tblVehicleEF	UBUS	0.11	9.5390e-003
tblVehicleEF	UBUS	3.9450e-003	7.3700e-004
tblVehicleEF	UBUS	2.50	4.54
tblVehicleEF	UBUS	0.02	0.04
tblVehicleEF	UBUS	1.25	0.04
tblVehicleEF	UBUS	1.83	4.45
tblVehicleEF	UBUS	0.08	9.2350e-003
tblVehicleEF	UBUS	9.36	34.75
tblVehicleEF	UBUS	11.74	0.76
tblVehicleEF	UBUS	1,846.39	1,692.13
tblVehicleEF	UBUS	136.37	11.55
tblVehicleEF	UBUS	5.45	0.38
tblVehicleEF	UBUS	13.45	0.13

tblVehicleEF	UBUS	0.52	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.07	2.6550e-003
tblVehicleEF	UBUS	1.4030e-003	1.4100e-004
tblVehicleEF	UBUS	0.22	0.03
tblVehicleEF	UBUS	3.0000e-003	6.6220e-003
tblVehicleEF	UBUS	0.06	2.5280e-003
tblVehicleEF	UBUS	1.2900e-003	1.3000e-004
tblVehicleEF	UBUS	0.02	3.0610e-003
tblVehicleEF	UBUS	0.14	0.01
tblVehicleEF	UBUS	9.3320e-003	1.4840e-003
tblVehicleEF	UBUS	0.62	0.07
tblVehicleEF	UBUS	0.02	0.04
tblVehicleEF	UBUS	1.02	0.03
tblVehicleEF	UBUS	0.01	3.0250e-003
tblVehicleEF	UBUS	1.5790e-003	1.1400e-004
tblVehicleEF	UBUS	0.02	3.0610e-003
tblVehicleEF	UBUS	0.14	0.01
tblVehicleEF	UBUS	9.3320e-003	1.4840e-003
tblVehicleEF	UBUS	2.52	4.54
tblVehicleEF	UBUS	0.02	0.04
tblVehicleEF	UBUS	1.12	0.04
tblVehicleEF	UBUS	1.83	4.45
tblVehicleEF	UBUS	0.08	0.01
tblVehicleEF	UBUS	9.27	34.75
tblVehicleEF	UBUS	13.86	0.90
tblVehicleEF	UBUS	1,846.39	1,692.13

tblVehicleEF	UBUS	136.37	11.80
tblVehicleEF	UBUS	5.76	0.38
tblVehicleEF	UBUS	13.55	0.14
tblVehicleEF	UBUS	0.52	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.07	2.6550e-003
tblVehicleEF	UBUS	1.4030e-003	1.4100e-004
tblVehicleEF	UBUS	0.22	0.03
tblVehicleEF	UBUS	3.0000e-003	6.6220e-003
tblVehicleEF	UBUS	0.06	2.5280e-003
tblVehicleEF	UBUS	1.2900e-003	1.3000e-004
tblVehicleEF	UBUS	9.2250e-003	1.6870e-003
tblVehicleEF	UBUS	0.14	0.01
tblVehicleEF	UBUS	4.1190e-003	7.4500e-004
tblVehicleEF	UBUS	0.61	0.07
tblVehicleEF	UBUS	0.03	0.05
tblVehicleEF	UBUS	1.13	0.04
tblVehicleEF	UBUS	0.01	3.0250e-003
tblVehicleEF	UBUS	1.6160e-003	1.1700e-004
tblVehicleEF	UBUS	9.2250e-003	1.6870e-003
tblVehicleEF	UBUS	0.14	0.01
tblVehicleEF	UBUS	4.1190e-003	7.4500e-004
tblVehicleEF	UBUS	2.50	4.54
tblVehicleEF	UBUS	0.03	0.05
tblVehicleEF	UBUS	1.24	0.04
tblVehicleTrips	ST_TR	9.91	9.54
tblVehicleTrips	SU_TR	8.62	8.55

tblVehicleTrips	WD_TR	9.52	9.44
tblWoodstoves	NumberCatalytic	0.45	0.00
tblWoodstoves	NumberNoncatalytic	0.45	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.1935	1.8555	1.5482	2.6500e-003	0.2197	0.0970	0.3167	0.0911	0.0907	0.1818	0.0000	230.0112	230.0112	0.0589	0.0000	231.4835
2022	0.7228	0.8474	0.9213	1.5300e-003	3.4200e-003	0.0435	0.0470	9.1000e-004	0.0409	0.0418	0.0000	132.5560	132.5560	0.0327	0.0000	133.3737
Maximum	**0.7228**	**1.8555**	**1.5482**	**2.6500e-003**	**0.2197**	**0.0970**	**0.3167**	**0.0911**	**0.0907**	**0.1818**	**0.0000**	**230.0112**	**230.0112**	**0.0589**	**0.0000**	**231.4835**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.1935	1.8555	1.5482	2.6500e-003	0.0890	0.0970	0.1860	0.0364	0.0907	0.1271	0.0000	230.0110	230.0110	0.0589	0.0000	231.4832
2022	0.7228	0.8474	0.9213	1.5300e-003	3.4200e-003	0.0435	0.0470	9.1000e-004	0.0409	0.0418	0.0000	132.5559	132.5559	0.0327	0.0000	133.3736
Maximum	**0.7228**	**1.8555**	**1.5482**	**2.6500e-003**	**0.0890**	**0.0970**	**0.1860**	**0.0364**	**0.0907**	**0.1271**	**0.0000**	**230.0110**	**230.0110**	**0.0589**	**0.0000**	**231.4832**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**58.57**	**0.00**	**35.93**	**59.42**	**0.00**	**24.46**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	5-3-2021	8-2-2021	0.8904	0.8904
2	8-3-2021	11-2-2021	0.6866	0.6866
3	11-3-2021	2-2-2022	0.6607	0.6607
4	2-3-2022	5-2-2022	0.5875	0.5875
5	5-3-2022	8-2-2022	0.7624	0.7624
		Highest	0.8904	0.8904

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.7944	2.9400e-003	0.0937	2.0000e-005		6.6000e-004	6.6000e-004		6.6000e-004	6.6000e-004	0.0000	2.3128	2.3128	1.9000e-004	4.0000e-005	2.3293
Energy	8.5000e-004	7.2900e-003	3.1000e-003	5.0000e-005		5.9000e-004	5.9000e-004		5.9000e-004	5.9000e-004	0.0000	23.7572	23.7572	1.0300e-003	3.4000e-004	23.8829
Mobile	0.0398	0.1353	0.3947	1.2500e-003	0.1090	1.4100e-003	0.1104	0.0292	1.3300e-003	0.0305	0.0000	118.8169	118.8169	7.7600e-003	0.0000	119.0110
Waste						0.0000	0.0000		0.0000	0.0000	2.1639	0.0000	2.1639	0.1279	0.0000	5.3609
Water						0.0000	0.0000		0.0000	0.0000	0.1860	2.7153	2.9013	0.0193	4.8000e-004	3.5268
Total	**0.8351**	**0.1455**	**0.4915**	**1.3200e-003**	**0.1090**	**2.6600e-003**	**0.1117**	**0.0292**	**2.5800e-003**	**0.0318**	**2.3499**	**147.6023**	**149.9522**	**0.1561**	**8.6000e-004**	**154.1110**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.7944	2.9400e-003	0.0937	2.0000e-005		6.6000e-004	6.6000e-004		6.6000e-004	6.6000e-004	0.0000	2.3128	2.3128	1.9000e-004	4.0000e-005	2.3293
Energy	8.5000e-004	7.2900e-003	3.1000e-003	5.0000e-005		5.9000e-004	5.9000e-004		5.9000e-004	5.9000e-004	0.0000	23.7572	23.7572	1.0300e-003	3.4000e-004	23.8829
Mobile	0.0398	0.1353	0.3947	1.2500e-003	0.1090	1.4100e-003	0.1104	0.0292	1.3300e-003	0.0305	0.0000	118.8169	118.8169	7.7600e-003	0.0000	119.0110
Waste						0.0000	0.0000		0.0000	0.0000	2.1639	0.0000	2.1639	0.1279	0.0000	5.3609
Water						0.0000	0.0000		0.0000	0.0000	0.1860	2.7153	2.9013	0.0193	4.8000e-004	3.5268
Total	**0.8351**	**0.1455**	**0.4915**	**1.3200e-003**	**0.1090**	**2.6600e-003**	**0.1117**	**0.0292**	**2.5800e-003**	**0.0318**	**2.3499**	**147.6023**	**149.9522**	**0.1561**	**8.6000e-004**	**154.1110**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**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**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/3/2021	5/14/2021	5	10	
2	Grading	Grading	5/15/2021	6/11/2021	5	20	
3	Building Construction	Building Construction	6/12/2021	4/29/2022	5	230	
4	Paving	Paving	4/30/2022	5/27/2022	5	20	
5	Architectural Coating	Architectural Coating	5/28/2022	6/24/2022	5	20	

Acres of Grading (Site Preparation Phase): 40

Acres of Grading (Grading Phase): 80

Acres of Paving: 0

Residential Indoor: 408,167; Residential Outdoor: 136,056; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	0	8.00	158	0.38
Grading	Graders	2	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Cement and Mortar Mixers	0	8.00	9	0.56
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Architectural Coating	Air Compressors	1	8.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	3.00	1.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1115	0.0000	0.1115	0.0519	0.0000	0.0519	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0194	0.2025	0.1058	1.9000e-004		0.0102	0.0102		9.4000e-003	9.4000e-003	0.0000	16.7179	16.7179	5.4100e-003	0.0000	16.8530
Total	**0.0194**	**0.2025**	**0.1058**	**1.9000e-004**	**0.1115**	**0.0102**	**0.1218**	**0.0519**	**9.4000e-003**	**0.0613**	**0.0000**	**16.7179**	**16.7179**	**5.4100e-003**	**0.0000**	**16.8530**

3.2 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.1000e-004	3.1000e-004	3.2100e-003	1.0000e-005	9.9000e-004	1.0000e-005	9.9000e-004	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.8189	0.8189	2.0000e-005	0.0000	0.8195
Total	**4.1000e-004**	**3.1000e-004**	**3.2100e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**9.9000e-004**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.8189**	**0.8189**	**2.0000e-005**	**0.0000**	**0.8195**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0435	0.0000	0.0435	0.0203	0.0000	0.0203	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0194	0.2025	0.1058	1.9000e-004		0.0102	0.0102		9.4000e-003	9.4000e-003	0.0000	16.7178	16.7178	5.4100e-003	0.0000	16.8530
Total	**0.0194**	**0.2025**	**0.1058**	**1.9000e-004**	**0.0435**	**0.0102**	**0.0537**	**0.0203**	**9.4000e-003**	**0.0297**	**0.0000**	**16.7178**	**16.7178**	**5.4100e-003**	**0.0000**	**16.8530**

3.2 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.1000e-004	3.1000e-004	3.2100e-003	1.0000e-005	9.9000e-004	1.0000e-005	9.9000e-004	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.8189	0.8189	2.0000e-005	0.0000	0.8195
Total	**4.1000e-004**	**3.1000e-004**	**3.2100e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**9.9000e-004**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.8189**	**0.8189**	**2.0000e-005**	**0.0000**	**0.8195**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1026	0.0000	0.1026	0.0377	0.0000	0.0377	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0251	0.2851	0.1435	3.1000e-004		0.0124	0.0124		0.0114	0.0114	0.0000	27.3373	27.3373	8.8400e-003	0.0000	27.5583
Total	**0.0251**	**0.2851**	**0.1435**	**3.1000e-004**	**0.1026**	**0.0124**	**0.1151**	**0.0377**	**0.0114**	**0.0491**	**0.0000**	**27.3373**	**27.3373**	**8.8400e-003**	**0.0000**	**27.5583**

3.3 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.9000e-004	5.2000e-004	5.3400e-003	2.0000e-005	1.6400e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.3649	1.3649	4.0000e-005	0.0000	1.3658
Total	**6.9000e-004**	**5.2000e-004**	**5.3400e-003**	**2.0000e-005**	**1.6400e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.3649**	**1.3649**	**4.0000e-005**	**0.0000**	**1.3658**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0400	0.0000	0.0400	0.0147	0.0000	0.0147	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0251	0.2851	0.1435	3.1000e-004		0.0124	0.0124		0.0114	0.0114	0.0000	27.3373	27.3373	8.8400e-003	0.0000	27.5583
Total	**0.0251**	**0.2851**	**0.1435**	**3.1000e-004**	**0.0400**	**0.0124**	**0.0525**	**0.0147**	**0.0114**	**0.0261**	**0.0000**	**27.3373**	**27.3373**	**8.8400e-003**	**0.0000**	**27.5583**

3.3 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.9000e-004	5.2000e-004	5.3400e-003	2.0000e-005	1.6400e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.3649	1.3649	4.0000e-005	0.0000	1.3658
Total	**6.9000e-004**	**5.2000e-004**	**5.3400e-003**	**2.0000e-005**	**1.6400e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.3649**	**1.3649**	**4.0000e-005**	**0.0000**	**1.3658**

3.4 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1467	1.3593	1.2811	2.0900e-003		0.0743	0.0743		0.0698	0.0698	0.0000	179.9520	179.9520	0.0444	0.0000	181.0621
Total	**0.1467**	**1.3593**	**1.2811**	**2.0900e-003**		**0.0743**	**0.0743**		**0.0698**	**0.0698**	**0.0000**	**179.9520**	**179.9520**	**0.0444**	**0.0000**	**181.0621**

3.4 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.9000e-004	7.0500e-003	1.4400e-003	2.0000e-005	4.6000e-004	1.0000e-005	4.7000e-004	1.3000e-004	1.0000e-005	1.4000e-004	0.0000	1.8412	1.8412	1.2000e-004	0.0000	1.8443
Worker	1.0000e-003	7.6000e-004	7.7500e-003	2.0000e-005	2.3800e-003	2.0000e-005	2.4000e-003	6.3000e-004	1.0000e-005	6.5000e-004	0.0000	1.9790	1.9790	6.0000e-005	0.0000	1.9804
Total	**1.1900e-003**	**7.8100e-003**	**9.1900e-003**	**4.0000e-005**	**2.8400e-003**	**3.0000e-005**	**2.8700e-003**	**7.6000e-004**	**2.0000e-005**	**7.9000e-004**	**0.0000**	**3.8203**	**3.8203**	**1.8000e-004**	**0.0000**	**3.8248**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1467	1.3593	1.2811	2.0900e-003		0.0743	0.0743		0.0698	0.0698	0.0000	179.9518	179.9518	0.0444	0.0000	181.0619
Total	**0.1467**	**1.3593**	**1.2811**	**2.0900e-003**		**0.0743**	**0.0743**		**0.0698**	**0.0698**	**0.0000**	**179.9518**	**179.9518**	**0.0444**	**0.0000**	**181.0619**

3.4 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.9000e-004	7.0500e-003	1.4400e-003	2.0000e-005	4.6000e-004	1.0000e-005	4.7000e-004	1.3000e-004	1.0000e-005	1.4000e-004	0.0000	1.8412	1.8412	1.2000e-004	0.0000	1.8443
Worker	1.0000e-003	7.6000e-004	7.7500e-003	2.0000e-005	2.3800e-003	2.0000e-005	2.4000e-003	6.3000e-004	1.0000e-005	6.5000e-004	0.0000	1.9790	1.9790	6.0000e-005	0.0000	1.9804
Total	**1.1900e-003**	**7.8100e-003**	**9.1900e-003**	**4.0000e-005**	**2.8400e-003**	**3.0000e-005**	**2.8700e-003**	**7.6000e-004**	**2.0000e-005**	**7.9000e-004**	**0.0000**	**3.8203**	**3.8203**	**1.8000e-004**	**0.0000**	**3.8248**

3.4 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0771	0.7126	0.7412	1.2200e-003		0.0367	0.0367		0.0345	0.0345	0.0000	105.5319	105.5319	0.0259	0.0000	106.1787
Total	**0.0771**	**0.7126**	**0.7412**	**1.2200e-003**		**0.0367**	**0.0367**		**0.0345**	**0.0345**	**0.0000**	**105.5319**	**105.5319**	**0.0259**	**0.0000**	**106.1787**

3.4 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1000e-004	3.9200e-003	7.8000e-004	1.0000e-005	2.7000e-004	1.0000e-005	2.7000e-004	8.0000e-005	1.0000e-005	8.0000e-005	0.0000	1.0706	1.0706	7.0000e-005	0.0000	1.0723
Worker	5.5000e-004	4.0000e-004	4.1700e-003	1.0000e-005	1.4000e-003	1.0000e-005	1.4100e-003	3.7000e-004	1.0000e-005	3.8000e-004	0.0000	1.1183	1.1183	3.0000e-005	0.0000	1.1191
Total	**6.6000e-004**	**4.3200e-003**	**4.9500e-003**	**2.0000e-005**	**1.6700e-003**	**2.0000e-005**	**1.6800e-003**	**4.5000e-004**	**2.0000e-005**	**4.6000e-004**	**0.0000**	**2.1889**	**2.1889**	**1.0000e-004**	**0.0000**	**2.1914**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0771	0.7126	0.7412	1.2200e-003		0.0367	0.0367		0.0345	0.0345	0.0000	105.5317	105.5317	0.0259	0.0000	106.1786
Total	**0.0771**	**0.7126**	**0.7412**	**1.2200e-003**		**0.0367**	**0.0367**		**0.0345**	**0.0345**	**0.0000**	**105.5317**	**105.5317**	**0.0259**	**0.0000**	**106.1786**

3.4 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1000e-004	3.9200e-003	7.8000e-004	1.0000e-005	2.7000e-004	1.0000e-005	2.7000e-004	8.0000e-005	1.0000e-005	8.0000e-005	0.0000	1.0706	1.0706	7.0000e-005	0.0000	1.0723
Worker	5.5000e-004	4.0000e-004	4.1700e-003	1.0000e-005	1.4000e-003	1.0000e-005	1.4100e-003	3.7000e-004	1.0000e-005	3.8000e-004	0.0000	1.1183	1.1183	3.0000e-005	0.0000	1.1191
Total	**6.6000e-004**	**4.3200e-003**	**4.9500e-003**	**2.0000e-005**	**1.6700e-003**	**2.0000e-005**	**1.6800e-003**	**4.5000e-004**	**2.0000e-005**	**4.6000e-004**	**0.0000**	**2.1889**	**2.1889**	**1.0000e-004**	**0.0000**	**2.1914**

3.5 Paving - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0110	0.1113	0.1458	2.3000e-004		5.6800e-003	5.6800e-003		5.2200e-003	5.2200e-003	0.0000	20.0276	20.0276	6.4800e-003	0.0000	20.1895
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0110**	**0.1113**	**0.1458**	**2.3000e-004**		**5.6800e-003**	**5.6800e-003**		**5.2200e-003**	**5.2200e-003**	**0.0000**	**20.0276**	**20.0276**	**6.4800e-003**	**0.0000**	**20.1895**

3.5 Paving - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.5000e-004	4.7000e-004	4.9000e-003	1.0000e-005	1.6400e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.3157	1.3157	3.0000e-005	0.0000	1.3165
Total	**6.5000e-004**	**4.7000e-004**	**4.9000e-003**	**1.0000e-005**	**1.6400e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.3157**	**1.3157**	**3.0000e-005**	**0.0000**	**1.3165**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0110	0.1113	0.1458	2.3000e-004		5.6800e-003	5.6800e-003		5.2200e-003	5.2200e-003	0.0000	20.0275	20.0275	6.4800e-003	0.0000	20.1895
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0110**	**0.1113**	**0.1458**	**2.3000e-004**		**5.6800e-003**	**5.6800e-003**		**5.2200e-003**	**5.2200e-003**	**0.0000**	**20.0275**	**20.0275**	**6.4800e-003**	**0.0000**	**20.1895**

3.5 Paving - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.5000e-004	4.7000e-004	4.9000e-003	1.0000e-005	1.6400e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.3157	1.3157	3.0000e-005	0.0000	1.3165
Total	**6.5000e-004**	**4.7000e-004**	**4.9000e-003**	**1.0000e-005**	**1.6400e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.3157**	**1.3157**	**3.0000e-005**	**0.0000**	**1.3165**

3.6 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.6306					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.7300e-003	0.0188	0.0242	4.0000e-005		1.0900e-003	1.0900e-003		1.0900e-003	1.0900e-003	0.0000	3.4043	3.4043	2.2000e-004	0.0000	3.4099
Total	**0.6334**	**0.0188**	**0.0242**	**4.0000e-005**		**1.0900e-003**	**1.0900e-003**		**1.0900e-003**	**1.0900e-003**	**0.0000**	**3.4043**	**3.4043**	**2.2000e-004**	**0.0000**	**3.4099**

3.6 Architectural Coating - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.0000e-005	3.0000e-005	3.3000e-004	0.0000	1.1000e-004	0.0000	1.1000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0877	0.0877	0.0000	0.0000	0.0878
Total	**4.0000e-005**	**3.0000e-005**	**3.3000e-004**	**0.0000**	**1.1000e-004**	**0.0000**	**1.1000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0877**	**0.0877**	**0.0000**	**0.0000**	**0.0878**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.6306					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.7300e-003	0.0188	0.0242	4.0000e-005		1.0900e-003	1.0900e-003		1.0900e-003	1.0900e-003	0.0000	3.4043	3.4043	2.2000e-004	0.0000	3.4099
Total	**0.6334**	**0.0188**	**0.0242**	**4.0000e-005**		**1.0900e-003**	**1.0900e-003**		**1.0900e-003**	**1.0900e-003**	**0.0000**	**3.4043**	**3.4043**	**2.2000e-004**	**0.0000**	**3.4099**

3.6 Architectural Coating - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.0000e-005	3.0000e-005	3.3000e-004	0.0000	1.1000e-004	0.0000	1.1000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0877	0.0877	0.0000	0.0000	0.0878
Total	**4.0000e-005**	**3.0000e-005**	**3.3000e-004**	**0.0000**	**1.1000e-004**	**0.0000**	**1.1000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0877**	**0.0877**	**0.0000**	**0.0000**	**0.0878**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0398	0.1353	0.3947	1.2500e-003	0.1090	1.4100e-003	0.1104	0.0292	1.3300e-003	0.0305	0.0000	118.8169	118.8169	7.7600e-003	0.0000	119.0110
Unmitigated	0.0398	0.1353	0.3947	1.2500e-003	0.1090	1.4100e-003	0.1104	0.0292	1.3300e-003	0.0305	0.0000	118.8169	118.8169	7.7600e-003	0.0000	119.0110

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	84.96	85.86	76.95	286,850	286,850
Total	84.96	85.86	76.95	286,850	286,850

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Single Family Housing	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	15.3159	15.3159	8.7000e-004	1.8000e-004	15.3914
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	15.3159	15.3159	8.7000e-004	1.8000e-004	15.3914
NaturalGas Mitigated	8.5000e-004	7.2900e-003	3.1000e-003	5.0000e-005		5.9000e-004	5.9000e-004		5.9000e-004	5.9000e-004	0.0000	8.4413	8.4413	1.6000e-004	1.5000e-004	8.4915
NaturalGas Unmitigated	8.5000e-004	7.2900e-003	3.1000e-003	5.0000e-005		5.9000e-004	5.9000e-004		5.9000e-004	5.9000e-004	0.0000	8.4413	8.4413	1.6000e-004	1.5000e-004	8.4915

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Single Family Housing	158185	8.5000e-004	7.2900e-003	3.1000e-003	5.0000e-005		5.9000e-004	5.9000e-004		5.9000e-004	5.9000e-004	0.0000	8.4413	8.4413	1.6000e-004	1.5000e-004	8.4915
Total		**8.5000e-004**	**7.2900e-003**	**3.1000e-003**	**5.0000e-005**		**5.9000e-004**	**5.9000e-004**		**5.9000e-004**	**5.9000e-004**	**0.0000**	**8.4413**	**8.4413**	**1.6000e-004**	**1.5000e-004**	**8.4915**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Single Family Housing	158185	8.5000e-004	7.2900e-003	3.1000e-003	5.0000e-005		5.9000e-004	5.9000e-004		5.9000e-004	5.9000e-004	0.0000	8.4413	8.4413	1.6000e-004	1.5000e-004	8.4915
Total		**8.5000e-004**	**7.2900e-003**	**3.1000e-003**	**5.0000e-005**		**5.9000e-004**	**5.9000e-004**		**5.9000e-004**	**5.9000e-004**	**0.0000**	**8.4413**	**8.4413**	**1.6000e-004**	**1.5000e-004**	**8.4915**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	66234.6	15.3159	8.7000e-004	1.8000e-004	15.3914
Total		**15.3159**	**8.7000e-004**	**1.8000e-004**	**15.3914**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	66234.6	15.3159	8.7000e-004	1.8000e-004	15.3914
Total		**15.3159**	**8.7000e-004**	**1.8000e-004**	**15.3914**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.7944	2.9400e-003	0.0937	2.0000e-005		6.6000e-004	6.6000e-004		6.6000e-004	6.6000e-004	0.0000	2.3128	2.3128	1.9000e-004	4.0000e-005	2.3293
Unmitigated	0.7944	2.9400e-003	0.0937	2.0000e-005		6.6000e-004	6.6000e-004		6.6000e-004	6.6000e-004	0.0000	2.3128	2.3128	1.9000e-004	4.0000e-005	2.3293

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0631					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7284					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	2.2000e-004	1.8700e-003	7.9000e-004	1.0000e-005		1.5000e-004	1.5000e-004		1.5000e-004	1.5000e-004	0.0000	2.1612	2.1612	4.0000e-005	4.0000e-005	2.1741
Landscaping	2.8100e-003	1.0700e-003	0.0929	0.0000		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004	0.0000	0.1516	0.1516	1.5000e-004	0.0000	0.1553
Total	**0.7944**	**2.9400e-003**	**0.0937**	**1.0000e-005**		**6.6000e-004**	**6.6000e-004**		**6.6000e-004**	**6.6000e-004**	**0.0000**	**2.3128**	**2.3128**	**1.9000e-004**	**4.0000e-005**	**2.3294**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0631					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7284					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	2.2000e-004	1.8700e-003	7.9000e-004	1.0000e-005		1.5000e-004	1.5000e-004		1.5000e-004	1.5000e-004	0.0000	2.1612	2.1612	4.0000e-005	4.0000e-005	2.1741
Landscaping	2.8100e-003	1.0700e-003	0.0929	0.0000		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004	0.0000	0.1516	0.1516	1.5000e-004	0.0000	0.1553
Total	**0.7944**	**2.9400e-003**	**0.0937**	**1.0000e-005**		**6.6000e-004**	**6.6000e-004**		**6.6000e-004**	**6.6000e-004**	**0.0000**	**2.3128**	**2.3128**	**1.9000e-004**	**4.0000e-005**	**2.3294**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	2.9013	0.0193	4.8000e-004	3.5268
Unmitigated	2.9013	0.0193	4.8000e-004	3.5268

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	0.586386 / 0.369678	2.9013	0.0193	4.8000e-004	3.5268
Total		**2.9013**	**0.0193**	**4.8000e-004**	**3.5268**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	0.586386 / 0.369678	2.9013	0.0193	4.8000e-004	3.5268
Total		**2.9013**	**0.0193**	**4.8000e-004**	**3.5268**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	2.1639	0.1279	0.0000	5.3609
Unmitigated	2.1639	0.1279	0.0000	5.3609

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	10.66	2.1639	0.1279	0.0000	5.3609
Total		**2.1639**	**0.1279**	**0.0000**	**5.3609**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	10.66	2.1639	0.1279	0.0000	5.3609
Total		**2.1639**	**0.1279**	**0.0000**	**5.3609**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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APPENDIX 3.2:

EMFAC 2017 OUTPUTS

EMFAC2017 Derived CalEEMod Annual Emission Rates: Year 2022[1,2]

Season	Pollutant	LDA	LDT1	LDT2	MDV	LHDT1	LHDT2	MHDT	HHDT	OBUS	UBUS	MCY	SBUS	MH
Annual	CH4_IDLEX	0	0	0	0	0.0050851	0.003695113	0.002506877	0.029356376	0.0088195	0	0	0.0596216	0
Annual	CH4_RUNEX	0.002511	0.007576	0.0044093	0.0055203	0.0061022	0.004104298	0.003321213	0.13599332	0.0065956	4.4471247	0.3403666	0.0085844	0.0036581
Annual	CH4_STREX	0.0501486	0.0826572	0.0709165	0.0880071	0.0158535	0.010438222	0.006466798	1.99667E-07	0.0230531	0.0101717	0.2409502	0.0061574	0
Annual	CO_IDLEX	0	0	0	0	0.1781229	0.145213849	0.306081914	5.949976577	0.5193752	0	0	2.5047913	0
Annual	CO_RUNEX	0.6708625	1.5227713	1.0001954	1.1353959	0.7454201	0.496596346	0.32291321	0.670287286	0.770132	34.749389	19.259492	0.7810369	0.3456228
Annual	CO_STREX	2.1123197	2.3872575	2.7143849	3.2491728	1.0307795	0.672008973	0.742649102	0.003788439	2.4474186	0.8905121	8.5959988	0.8221453	0
Annual	CO2_NBIO_IDLEX	0	0	0	0	9.2507984	14.13711968	68.92121199	1124.174368	76.064645	0	0	345.06036	0
Annual	CO2_NBIO_RUNEX	265.14551	314.63378	335.587	415.0989	652.44765	665.2454714	974.5748282	1484.265464	1406.8974	1692.1273	212.03493	1112.1718	970.20504
Annual	CO2_NBIO_STREX	54.120585	65.695546	70.249733	87.324313	11.213673	8.759901098	6.352875619	0.034945266	20.488538	11.773881	60.730311	4.7905446	0
Annual	NOX_IDLEX	0	0	0	0	0.0732221	0.104688067	0.515800985	6.076375771	0.3431042	0	0	3.2862508	0
Annual	NOX_RUNEX	0.0373144	0.1275673	0.0857353	0.1078346	1.2509372	1.355503504	1.613798568	3.41682119	1.241885	0.3822291	1.129145	5.1952739	4.2439663
Annual	NOX_STREX[3]	0.1824467	0.2953594	0.2987658	0.3795807	0.3190663	0.222928046	1.496184373	2.104078617	0.6845205	0.137146	0.2629902	0.9057296	0
Annual	PM10_IDLEX	0	0	0	0	0.0008896	0.00131023	0.001231157	0.003628278	0.0005894	0	0	0.0043578	0
Annual	PM10_PMBW	0.03675	0.03675	0.03675	0.03675	0.07644	0.089180026	0.130340037	0.060589876	0.13034	0.0728339	0.01176	0.7448002	0.13034
Annual	PM10_PMTW	0.008	0.008	0.008	0.008	0.0098774	0.010622799	0.012000003	0.035325231	0.012	0.026486	0.004	0.0108041	0.016
Annual	PM10_RUNEX	0.0015205	0.0023434	0.0016015	0.001685	0.009826	0.012726783	0.035013591	0.028429484	0.0136136	0.0026547	0.0019647	0.0318947	0.1143325
Annual	PM10_STREX	0.0018572	0.0028386	0.0019239	0.0020314	0.0002596	0.000136886	7.52719E-05	9.44989E-07	0.0002182	0.0001414	0.0029599	3.955E-05	0
Annual	PM25_IDLEX	0	0	0	0	0.0008511	0.00125355	0.001177897	0.003471321	0.0005639	0	0	0.0041693	0
Annual	PM25_PMBW	0.01575	0.01575	0.01575	0.01575	0.03276	0.038220011	0.055860016	0.02596709	0.05586	0.0312145	0.00504	0.3192001	0.05586
Annual	PM25_PMTW	0.002	0.002	0.002	0.002	0.0024693	0.0026557	0.003000001	0.008831308	0.003	0.0066215	0.001	0.002701	0.004
Annual	PM25_RUNEX	0.0014	0.0021564	0.0014738	0.0015536	0.0093755	0.012162576	0.033495968	0.02719962	0.0130075	0.0025281	0.0018375	0.0305039	0.1093865
Annual	PM25_STREX	0.0017076	0.0026102	0.001769	0.0018682	0.0002387	0.000125862	6.92098E-05	8.68883E-07	0.0002006	0.00013	0.0027874	3.636E-05	0
Annual	ROG_DIURN	0.059871	0.1905013	0.0973609	0.1146443	0.0030394	0.001704043	0.00045316	5.01984E-06	0.0026021	0.0016779	1.422935	0.0012417	0
Annual	ROG_HTSK	0.100942	0.2621956	0.1415757	0.1685955	0.0845705	0.05067803	0.014922369	0.000160226	0.0242391	0.0095389	0.7987129	0.009512	0
Annual	ROG_IDLEX	0	0	0	0	0.0212921	0.017503442	0.015546555	0.429500781	0.0507962	0	0	0.2803478	0
Annual	ROG_RESTL	0.0483407	0.1353491	0.082393	0.102915	0.0015811	0.000919578	0.000239893	2.97166E-06	0.0011161	0.0007372	0.779223	0.0005903	0
Annual	ROG_RUNEX	0.0095373	0.0335905	0.0181307	0.0233402	0.0620099	0.059206164	0.056447565	0.081711517	0.0504943	0.0652964	2.3253718	0.1052018	0.0787567
Annual	ROG_RUNLS	0.2112005	0.85791	0.4533448	0.4975767	0.5542081	0.315849786	0.082321313	0.00079103	0.2852933	0.0404931	1.9080744	0.0641423	0
Annual	ROG_STREX	0.2201927	0.4247746	0.3325826	0.4378158	0.078984	0.051325408	0.034288939	1.04239E-06	0.1185417	0.0367858	1.8431582	0.0357779	0
Annual	SO2_IDLEX	0	0	0	0	8.959E-05	0.00013534	0.000653127	0.010324735	0.0007253	0	0	0.0032887	0
Annual	SO2_RUNEX	0.0026063	0.0030934	0.0032988	0.0040782	0.0063567	0.006429896	0.009262186	0.013164048	0.0136725	0.0030254	0.0020983	0.0106261	0.0091719
Annual	SO2_STREX	0.0005321	0.0006459	0.0006907	0.0008586	0.000111	8.66863E-05	6.28669E-05	3.45812E-07	0.0002028	0.0001165	0.000601	4.741E-05	0
Annual	TOG_DIURN	0.059889	0.1905585	0.0973901	0.1146786	0.0030394	0.001704043	0.00045316	5.01984E-06	0.0026021	0.0016779	1.422935	0.0012417	0
Annual	TOG_HTSK	0.1009723	0.2622742	0.1416181	0.168646	0.0845705	0.05067803	0.014922369	0.000160226	0.0242391	0.0095389	0.7987129	0.009512	0
Annual	TOG_IDLEX	0	0	0	0	0.0299225	0.023875182	0.02032501	0.49842643	0.0671426	0	0	0.4018426	0
Annual	TOG_RESTL	0.0483552	0.1353897	0.0824178	0.1029459	0.0015811	0.000919578	0.000239893	2.97166E-06	0.0011161	0.0007372	0.779223	0.0005903	0
Annual	TOG_RUNEX	0.0138798	0.0489955	0.0264217	0.0339072	0.0770615	0.069802209	0.065660178	0.226286692	0.0657861	4.5405286	2.8661964	0.1274631	0.0896592
Annual	TOG_RUNLS	0.2112639	0.8581674	0.4534808	0.4977259	0.5542081	0.315849786	0.082321313	0.00079103	0.2852933	0.0404931	1.9080744	0.0641423	0
Annual	TOG_STREX	0.2411787	0.4652589	0.3642807	0.4795383	0.0864776	0.056194861	0.037542072	1.14128E-06	0.1297883	0.0402758	2.0056647	0.0391723	0
Summer	CH4_IDLEX	0	0	0	0	0.0050986	0.003704863	0.002386309	0.03048662	0.0088754	0	0	0.0596891	0
Summer	CH4_RUNEX	0.0028347	0.0084645	0.0049544	0.0062114	0.0062279	0.004145781	0.003344779	0.135994271	0.006735	4.4471413	0.3356313	0.0087142	0.0036581
Summer	CH4_STREX	0.0434955	0.0711812	0.0614118	0.0761678	0.0152418	0.010036258	0.006209855	1.90483E-07	0.0219973	0.0092353	0.2129044	0.0051553	0
Summer	CO_IDLEX	0	0	0	0	0.1781229	0.145213849	0.26224218	5.816581695	0.5090583	0	0	2.4671258	0
Summer	CO_RUNEX	0.8083333	1.8056027	1.1962497	1.3542329	0.7589257	0.501023893	0.325643268	0.67056103	0.7860478	34.750309	19.27555	0.7960042	0.3456228
Summer	CO_STREX	1.7780547	2.0017572	2.2770876	2.7169552	0.9773456	0.637543509	0.701106403	0.0037666	2.2775773	0.7595399	7.9007261	0.5954702	0
Summer	CO2_NBIO_IDLEX	0	0	0	0	9.2507984	14.13711968	69.58563032	1121.036532	75.89573	0	0	352.97835	0
Summer	CO2_NBIO_RUNEX	287.10567	337.48233	357.70983	438.44709	652.47198	665.2532681	974.5796378	1484.265926	1406.9255	1692.129	211.89805	1112.1983	970.20504
Summer	CO2_NBIO_STREX	53.483259	64.873239	69.393407	86.265898	11.117954	8.698115905	6.282062728	0.034609429	20.20014	11.554669	58.878141	4.4116044	0
Summer	NOX_IDLEX	0	0	0	0	0.0732221	0.104688067	0.515942988	5.901205034	0.3350715	0	0	3.355634	0
Summer	NOX_RUNEX	0.0338242	0.1145163	0.0773451	0.0972591	1.1748123	1.277373817	1.519381496	3.226107767	1.1565432	0.379286	0.9747712	4.8782779	4.0016033
Summer	NOX_STREX[3]	0.1702192	0.2754067	0.2786917	0.3540257	0.3063664	0.214074275	1.493647722	2.104058715	0.6739387	0.1304061	0.24763	0.9021888	0
Summer	PM10_IDLEX	0	0	0	0	0.0008896	0.00131023	0.00104068	0.00317522	0.000501	0	0	0.0036811	0
Summer	PM10_PMBW	0.03675	0.03675	0.03675	0.03675	0.07644	0.089180026	0.130340037	0.060589876	0.13034	0.0728339	0.01176	0.7448002	0.13034
Summer	PM10_PMTW	0.008	0.008	0.008	0.008	0.0098774	0.010622799	0.012000003	0.035325231	0.012	0.026486	0.004	0.0108041	0.016
Summer	PM10_RUNEX	0.0015205	0.0023434	0.0016015	0.001685	0.009826	0.012726783	0.035013591	0.028429484	0.0136136	0.0026547	0.0019647	0.0318947	0.1143325
Summer	PM10_STREX	0.0018572	0.0028386	0.0019239	0.0020314	0.0002596	0.000136886	7.52719E-05	9.44989E-07	0.0002182	0.0001414	0.0029599	3.955E-05	0
Summer	PM25_IDLEX	0	0	0	0	0.0008511	0.00125355	0.000995661	0.003037861	0.0004793	0	0	0.0035218	0
Summer	PM25_PMBW	0.01575	0.01575	0.01575	0.01575	0.03276	0.038220011	0.055860016	0.02596709	0.05586	0.0312145	0.00504	0.3192001	0.05586
Summer	PM25_PMTW	0.002	0.002	0.002	0.002	0.0024693	0.0026557	0.003000001	0.008831308	0.003	0.0066215	0.001	0.002701	0.004
Summer	PM25_RUNEX	0.0014	0.0021564	0.0014738	0.0015536	0.0093755	0.012162576	0.033495968	0.02719962	0.0130075	0.0025281	0.0018375	0.0305039	0.1093865
Summer	PM25_STREX	0.0017076	0.0026102	0.001769	0.0018682	0.0002387	0.000125862	6.92098E-05	8.68883E-07	0.0002006	0.00013	0.0027874	3.636E-05	0
Summer	ROG_DIURN	0.1122918	0.3591141	0.1821484	0.2137828	0.0054783	0.003072949	0.000828267	9.86032E-06	0.0046858	0.0030607	2.7723384	0.0022078	0
Summer	ROG_HTSK	0.1140598	0.3100856	0.1609587	0.1877817	0.0967417	0.058157686	0.017228668	0.000182083	0.0268913	0.0112667	1.1143267	0.0099848	0
Summer	ROG_IDLEX	0	0	0	0	0.0212921	0.017503442	0.015061577	0.44923775	0.0514955	0	0	0.2801428	0
Summer	ROG_RESTL	0.0898943	0.2556617	0.1514602	0.1873187	0.0030454	0.001762514	0.000477905	6.58099E-06	0.0022091	0.0014842	1.767628	0.0011133	0
Summer	ROG_RUNEX	0.0106709	0.0373635	0.0202234	0.0260596	0.0626863	0.059386739	0.056559393	0.081717877	0.051161	0.0653378	2.2793623	0.1058624	0.0787567
Summer	ROG_RUNLS	0.2081493	0.8455275	0.4463895	0.4906893	0.5561259	0.317065942	0.082837087	0.000811643	0.285656	0.0393984	1.8797624	0.0589704	0
Summer	ROG_STREX	0.1891739	0.3631622	0.2853268	0.3755016	0.0757002	0.049193815	0.032809885	9.97423E-07	0.1128257	0.0333265	1.6174351	0.0299258	0
Summer	SO2_IDLEX	0	0	0	0	8.959E-05	0.00013534	0.000659489	0.010293096	0.0007237	0	0	0.0033635	0
Summer	SO2_RUNEX	0.0028222	0.003318	0.0035163	0.0043078	0.0063569	0.006429973	0.009262234	0.013164052	0.0136728	0.0030254	0.0020969	0.0106263	0.0091719
Summer	SO2_STREX	0.0005258	0.0006378	0.0006823	0.0008482	0.00011	8.60749E-05	6.21661E-05	3.42488E-07	0.0001999	0.0001143	0.0005826	4.366E-05	0
Summer	TOG_DIURN	0.1123254	0.3592218	0.182203	0.2138469	0.0054783	0.003072949	0.000828267	9.86032E-06	0.0046858	0.0030607	2.7723384	0.0022078	0
Summer	TOG_HTSK	0.114094	0.3101786	0.161007	0.187838	0.0967417	0.058157686	0.017228668	0.000182083	0.0268913	0.0112667	1.1143267	0.0099848	0
Summer	TOG_IDLEX	0	0	0	0	0.0299225	0.023875182	0.019615323	0.521108923	0.0679387	0	0	0.4016093	0
Summer	TOG_RESTL	0.0899213	0.2557384	0.1515056	0.1873748	0.0030454	0.001762514	0.000477905	6.58099E-06	0.0022091	0.0014842	1.767628	0.0011133	0
Summer	TOG_RUNEX	0.0155337	0.0545006	0.0294751	0.0378671	0.0780484	0.070065703	0.065823358	0.226295973	0.0667589	4.540589	2.811637	0.1284269	0.0896592
Summer	TOG_RUNLS	0.2082118	0.8457811	0.4465235	0.4908365	0.5561259	0.317065942	0.082837087	0.000811643	0.285656	0.0393984	1.8797624	0.0589704	0
Summer	TOG_STREX	0.2072035	0.3977744	0.3125211	0.4112861	0.0828822	0.053861035	0.035922694	1.09205E-06	0.1235299	0.0364883	1.7600981	0.032765	0

Winter	CH4_IDLEX	0	0	0	0	0.0050868	0.003696273	0.002683152	0.018657615	0.0087745	0	0	0.0596174	0
Winter	CH4_RUNEX	0.0024595	0.0074306	0.0043219	0.0054045	0.0061097	0.004107724	0.003321206	0.003368303	0.0065995	4.4471251	0.3380167	0.0085765	0.0036581
Winter	CH4_STREX	0.0504766	0.083203	0.0713869	0.0885931	0.0157744	0.010387561	0.006419771	1.98536E-07	0.0230509	0.0102547	0.2376692	0.0063442	0
Winter	CO_IDLEX	0	0	0	0	0.1781229	0.145213849	0.367232024	5.981575427	0.5336223	0	0	2.5568054	0
Winter	CO_RUNEX	0.6442281	1.4669951	0.9619362	1.0918503	0.7461444	0.496899006	0.323004081	0.331191983	0.7706524	34.749434	18.757183	0.7800615	0.3456228
Winter	CO_STREX	2.1157183	2.3918644	2.7219145	3.2585443	1.0243206	0.668014244	0.736815593	0.003758766	2.4531242	0.9034492	8.4367304	0.8592352	0
Winter	CO2_NBIO_IDLEX	0	0	0	0	9.2507984	14.13711968	68.0001011	1097.477971	76.297908	0	0	334.12598	0
Winter	CO2_NBIO_RUNEX	261.05996	310.37973	331.47008	410.75231	652.44895	665.2460099	974.5749866	1393.364139	1406.8983	1692.1274	211.16891	1112.1701	970.20504
Winter	CO2_NBIO_STREX	54.130665	65.711463	70.268838	87.348496	11.201968	8.752640942	6.342989048	0.034898214	20.497557	11.795351	60.384313	4.8530132	0
Winter	NOX_IDLEX	0	0	0	0	0.0732221	0.104688067	0.515604396	6.134648763	0.3541969	0	0	3.1904359	0
Winter	NOX_RUNEX	0.0357144	0.1222929	0.0821108	0.1032983	1.2305484	1.334381677	1.586931331	3.279278901	1.219445	0.3815239	1.0949706	5.118713	4.1746013
Winter	NOX_STREX[3]	0.1812511	0.2935605	0.2968511	0.3771769	0.3149779	0.220060449	1.495548849	2.104073738	0.6818154	0.1361885	0.2609966	0.9061097	0
Winter	PM10_IDLEX	0	0	0	0	0.0008896	0.00131023	0.001494195	0.003864686	0.0007116	0	0	0.0052923	0
Winter	PM10_PMBW	0.03675	0.03675	0.03675	0.03675	0.07644	0.089180026	0.130340037	0.059002456	0.13034	0.0728339	0.01176	0.7448002	0.13034
Winter	PM10_PMTW	0.008	0.008	0.008	0.008	0.0098774	0.010622799	0.012000003	0.034399622	0.012	0.026486	0.004	0.0108041	0.016
Winter	PM10_RUNEX	0.0015205	0.0023434	0.0016015	0.001685	0.009826	0.012726783	0.035013591	0.028273632	0.0136136	0.0026547	0.0019647	0.0318947	0.1143325
Winter	PM10_STREX	0.0018572	0.0028386	0.0019239	0.0020314	0.0002596	0.000136886	7.52719E-05	9.44989E-07	0.0002182	0.0001414	0.0029599	3.955E-05	0
Winter	PM25_IDLEX	0	0	0	0	0.0008511	0.00125355	0.001429557	0.003697502	0.0006808	0	0	0.0050633	0
Winter	PM25_PMBW	0.01575	0.01575	0.01575	0.01575	0.03276	0.038220011	0.055860016	0.025286767	0.05586	0.0312145	0.00504	0.3192001	0.05586
Winter	PM25_PMTW	0.002	0.002	0.002	0.002	0.0024693	0.0026557	0.003000001	0.008599905	0.003	0.0066215	0.001	0.002701	0.004
Winter	PM25_RUNEX	0.0014	0.0021564	0.0014738	0.0015536	0.0093755	0.012162576	0.033495968	0.02705051	0.0130075	0.0025281	0.0018375	0.0305039	0.1093865
Winter	PM25_STREX	0.0017076	0.0026102	0.001769	0.0018682	0.0002387	0.000125862	6.92098E-05	8.68883E-07	0.0002006	0.00013	0.0027874	3.636E-05	0
Winter	ROG_DIURN	0.0571558	0.1879088	0.0914014	0.1055327	0.003152	0.001714328	0.000470673	5.32641E-06	0.002739	0.0016874	1.5735307	0.0012073	0
Winter	ROG_HTSK	0.1105587	0.3005524	0.1558745	0.182272	0.0990207	0.058382004	0.016659725	0.000186681	0.0263554	0.01068	1.0568137	0.0100766	0
Winter	ROG_IDLEX	0	0	0	0	0.0212921	0.017503442	0.016225643	0.401693337	0.0498305	0	0	0.2806308	0
Winter	ROG_RESTL	0.0461666	0.1287548	0.0787752	0.0986676	0.00161	0.00092205	0.000244015	3.16348E-06	0.0011655	0.0007448	0.7426775	0.0006013	0
Winter	ROG_RUNEX	0.0093396	0.0329181	0.0177631	0.0228284	0.0620448	0.059219786	0.056450881	0.071960973	0.0505139	0.0652984	2.3059588	0.1051667	0.0787567
Winter	ROG_RUNLS	0.2380793	1.0011481	0.5242295	0.5708384	0.5956469	0.340844353	0.089738272	0.000829096	0.3039547	0.0468464	2.1751002	0.0770407	0
Winter	ROG_STREX	0.2215737	0.4273136	0.3346868	0.4405544	0.0785469	0.051048872	0.034098264	1.03659E-06	0.1185343	0.0370728	1.8149853	0.0368737	0
Winter	SO2_IDLEX	0	0	0	0	8.959E-05	0.00013534	0.000644307	0.010368428	0.0007275	0	0	0.0031854	0
Winter	SO2_RUNEX	0.0025661	0.0030516	0.0032583	0.0040355	0.0063567	0.006429901	0.009262188	0.013164048	0.0136725	0.0030254	0.0020897	0.0106261	0.0091719
Winter	SO2_STREX	0.0005322	0.0006461	0.0006909	0.0008588	0.0001109	8.66145E-05	6.2769E-05	3.45346E-07	0.0002028	0.0001167	0.0005976	4.802E-05	0
Winter	TOG_DIURN	0.057173	0.1879652	0.0914289	0.1055644	0.003152	0.001714328	0.000470673	5.32641E-06	0.002739	0.0016874	1.5735307	0.0012073	0
Winter	TOG_HTSK	0.1105918	0.3006426	0.1559212	0.1823266	0.0990207	0.058382004	0.016659725	0.000186681	0.0263554	0.01068	1.0568137	0.0100766	0
Winter	TOG_IDLEX	0	0	0	0	0.0299225	0.023875182	0.021318707	0.457297286	0.0660432	0	0	0.4021648	0
Winter	TOG_RESTL	0.0461805	0.1287935	0.0787988	0.0986972	0.00161	0.00092205	0.000244015	3.16348E-06	0.0011655	0.0007448	0.7426775	0.0006013	0
Winter	TOG_RUNEX	0.0135913	0.0480151	0.0258856	0.0331639	0.0771124	0.069822086	0.065665017	0.081982635	0.0658146	4.5405315	2.8427129	0.1274118	0.0896592
Winter	TOG_RUNLS	0.2381508	1.0014484	0.5243868	0.5710097	0.5956469	0.340844353	0.089738272	0.000829096	0.3039547	0.0468464	2.1751002	0.0770407	0
Winter	TOG_STREX	0.2426913	0.4680399	0.3665856	0.4825381	0.085999	0.055892089	0.037333308	1.13494E-06	0.1297801	0.0405901	1.9750313	0.0403721	0

1 Source: California Air Resources Board. EMFAC2017 Web Database. https://www.arb.ca.gov/emfac/2017/; California Air Pollution Control Officers Association (CAPCOA). 2017, November. California Emissions Estimator Model User's Guide, Version 2016.3.2, Appendix A.

2 Unless otherwise noted, per CalEEMod methodology, the calculated CalEEMod emission rates are derived from the emission rates obtained using the EMFAC2017 Web Database for the San Bernardino (SC) region .

3 Because EMFAC2017 provides vehicle trips data for MHDT and HHDT diesel trucks, the formula provided in Appendix A of the CalEEMod User's Guide in calculating the NO_X STREX emission rates are utilized.

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