

Appendix D

Air Emissions Report

AIR EMISSIONS REPORT
for the
FRIANT RANCH COMMUNITY DEVELOPMENT
PROJECT

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GLOSSARY OF TERMS AND ACRONYMS

Acronym	Description
AE	Alternative Energy
BE	Building Energy
CalEEMod	California Emissions Estimator Model
Cal/EPA	California Environmental Protection Agency
CAMx	Comprehensive Air Quality Model with Extensions
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CEUS	California Commercial End Use Survey
CO	Carbon Monoxide
csv	Comma Separated Value
DEIR	Draft Environmental Impact Report
DPM	Diesel particulate matter
DU	Dwelling Unit
EMFAC	EMission FACtor Model
FEIR	Final Environmental Impact Report
HIA	Health Impact Analysis
ISR	Indirect Source Review
ITE	Institute of Transportation Engineers
kg	Kilograms
km	Kilometers
kWh	Kilowatt hour
lb/day	Pounds per Day
lb/yr	Pounds per Year
LE	Lighting Energy
LUT	Land Use Transportation
NO ₂	Nitrogen Dioxide
NO _x	Oxides of Nitrogen
O ₃	Ozone
PM	Particulate Matter
PM ₁₀	Particulate Matter 10 Micrometers or less in diameter
PM _{2.5}	Particulate Matter 2.5 Micrometers or less in diameter
ppm	Parts per million
RASS	Residential Appliance Saturation Survey
ROG	Reactive Organic Gases
SAFE	Safer Affordable Fuel-Efficient Vehicles Rule
SDT	Site Design Transportation
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO ₂	Sulfur Dioxide
SO _x	Oxides of Sulfur
sqft	Square Feet
SW	Solid Waste
TPY	Tons Per Year
TRT	Trip Reduction Transportation
USEPA	US Environmental Protection Agency
VOC	Volatile Organic Compounds

1.0 INTRODUCTION

At the request of Friant Ranch LP, BlueScape Environmental (BlueScape) prepared this Air Emissions Report for pollutant emissions from the Friant Ranch Development Project (Project), including criteria pollutants. The Project consists of the Friant Ranch Specific Plan, an update to the Friant Ranch Community Plan, a new wastewater treatment facility, and improvements at such locations as the Depot Parcel. The purpose of the report is to provide the Project air quality modeling emissions inputs for the regional Health Impact Analysis (HIA). A discussion on the baseline regional emissions inputs used in the HIA is provided in a separate report (BlueScape 2021).

The Air Emissions Report is organized into the following sections:

- **Section 2.0 – Project Description:** The Friant Ranch Development Project is described in this section, including details that were used to complete the emission calculations.
- **Section 3.0 – Air Emissions Calculation Methods:** The methods used to calculate criteria pollutant emissions are described in this section, for the Specific Plan and Community Plan, for each phase of Project construction and for operations. Emissions from a proposed new wastewater treatment plant were evaluated and determined to be negligible for regional impact analysis modeling, but were included in the HRA. This section also provides a discussion on non-mitigated and mitigated emission scenarios.
- **Section 4.0 – Air Emissions Estimates:** The emission calculations are summarized in this section.
- **Section 5.0 – Evaluation of Mitigation Measures:** A brief discussion of construction and operational mitigation measures used in emissions modeling are described in this section.
- **Section 6.0 – Peak Daily Emissions for Health Impact Modeling:** This section presents the peak daily criteria pollutant estimates that were used in HIA modeling.
- **Section 7.0 – References:** includes a list of references cited in this report.

2.0 PROJECT DESCRIPTION

The Project is located in Friant, California, in Fresno County, approximately five miles north of the Fresno city limits and 21 miles east of the city of Madera, within the Friant Community Plan Area and the Friant Specific Plan Area. In February 2011, the County of Fresno approved the Friant Ranch Project, a master planned community incorporating age-restricted (ages 55+) and non-age restricted family and multi-family residential units, a commercial village center, a recreation center, trails, open spaces, parks and parkways. The county's approvals included a new Specific Plan called the Friant Ranch Specific Plan and an update to the pre-existing Friant Community Plan.

The proposed Project is a mixed-use development proposed by Friant Ranch LP (Project sponsor). The Project would develop retail, residential, and open space uses on a 942-acre site in Friant, California. The Project will be primarily residential, with up to 2,270 dwelling units age restricted to over 55, and up to 230 dwelling units without age restriction.

The site is in a mostly rural area, with scattered neighborhoods and houses surrounding it to the northwest, northeast, and southwest. Off-site roads near the Project site include North Friant Road, which runs in a northwest/southwest direction directly along the eastern property line of the Project. North Friant Road becomes Millerton Road at the northern tip of the Project site where the direction changes to mostly an east/west direction. North Fork Road / Road 206 branches off at the N. Friant Rd. / Millerton Rd. transition, and runs in an east/west direction.

The Project also includes a land use designation and zone change for the Depot Parcel, which is outside of the Friant Ranch Specific Plan area, but within the boundaries of the 1983 Friant Community Plan area.

Table 2-1 defines the land use types and total square footage for the proposed development at full-build-out, including both the Specific Plan and the Community Plan land use types.

**TABLE 2-1
FRIANT RANCH LAND USE TYPES: SPECIFIC PLAN AND COMMUNITY PLAN**

Land Use		Specific Plan			Community Plan		
Type	Subtype	Amount	Size Metric	Population	Amount	Size Metric	Population
Commercial	Medical Office Building	10	1000sqft	--	--	--	--
Commercial	Office Park	100	1000sqft	--	--	--	--
Recreational	Fast Food Restaurant w/Drive Thru	5.0	1000sqft	--	10	1000sqft	--
Recreational	Health Club	42	1000sqft	--	--	--	--
Recreational	High Turnover (Sit Down Restaurant)	10	1000sqft	--	80	1000sqft	--
Residential	Apartments Low Rise	230	Dwelling Unit	658	146	Dwelling Unit	418
Residential	Condo/Townhouse	166	Dwelling Unit	475	--	--	--
Residential	Retirement Community/Single Family Housing	2,104	Dwelling Unit	4,158	419	Dwelling Unit	1,198
Retail	Regional Shopping Center	125	1000sqft	--	74	1000sqft	--
Commercial	Pharmacy/Drugstore with Drive Thru	--	--	--	50	1000sqft	--
Recreational	City Park	--	--	--	6.1	Acre	--
Recreational	Hotel	--	--	--	200	Room	--
Recreational	Motel	--	--	--	25	Room	--
Recreational	Quality Restaurant	--	--	--	40	1000sqft	--
Retail	Convenience Market (24-hr)	--	--	--	10	1000sqft	--
Retail	Gasoline/Service Station	--	--	--	10	Pump	--
Retail	Strip Mall	--	--	--	100	1000sqft	--

3.0 EMISSION CALCULATION METHODS

Emissions of criteria pollutants were estimated for the Friant Ranch Specific Plan, as well as the Community Plan and new wastewater treatment plant discussed in the DEIR. Emissions are revised relative to the Draft Environmental Impact Report (DEIR, County of Fresno, 2009) for two reasons:

- 1) The DEIR used URBEMIS, an emissions model that is currently outdated, to estimate operational emissions for the Project. Currently, most air districts in California recommend the use of CalEEMod (CAPCOA, 2017), a more recently developed land use emissions model.
- 2) The DEIR estimated emissions for the Community Plan and the full Specific Plan at build-out, which was projected to be in year 2020. Based on an updated construction start date of 2022, operational Project emissions are estimated for full-build out in 2031.

This section describes the calculation of the Friant Ranch Project estimated emissions using CalEEMod and preparation of the model-ready Project emissions for regional Health Impact Analysis (HIA) modeling. Emissions of reactive organic gases (ROG), oxides of nitrogen (NO_x), carbon monoxide (CO), sulfur dioxide (SO₂), particulate matter 10 micrometers or less in diameter (PM₁₀), and particulate matter 2.5 micrometers or less in diameter (PM_{2.5}) were estimated. There are minor differences between volatile organic compounds (VOC) and ROG that define each term, however for purposes of this study we will assume they are equivalent due to the fact that air quality models directly calculate ROG in place of VOC. The development of Friant Ranch Project emissions is provided in Section 3.1. The annual unmitigated Friant Ranch Project emissions are summarized in Section 4.0.

The highest peak daily Project emission rate for each pollutant was applied to the 2020 and 2031 background regional emissions data that is discussed further in the HIA report (BlueScape 2021). The 2020 scenario year represents the CEQA baseline for existing conditions prior to Project development. The 2031 scenario year represents the “no project” conditions that account for reasonably foreseeable development that will have occurred by that year, and is adequate as a cumulative CEQA baseline. The 2031 year full-buildout Project impacts were then added to these two CEQA baseline years, to understand the potential specific health impacts above baseline.

There are conservative assumptions and methodologies that were used during the development of Friant Ranch Project emissions, which result in conservatively high estimates of Project emissions and associated health effects. This includes a conservatively high estimate of land use areas and an overlap of all emissions that may happen in any given year. The operational emissions associated with the Specific Plan and the Community Plan were combined with the construction emissions to determine the highest emission rates for modeling.

First, the emissions were determined using the land use described in Section 2 of this report, for operational year 2031. Some of the land use types proposed for the Community Plan in the DEIR have been adjusted based on more recent and accurate information. The land use was revised to remove the light industrial building type and more realistic estimates of the sizes of hotels, motels, and park areas were applied.

Second, Friant Ranch Project emissions are estimated for each year of the development, from 2022 through 2031. Although 2031 is shown to be the full build-out year, with the highest Specific Plan and Community Plan operational emissions, the emissions from construction of the development were applied to each individual year to predict the worst-case year for health effects.

Third, both annual and peak daily emissions are estimated for all Friant Ranch Project sources; however, in order to be conservative, peak daily emissions for each emission source are selected for modeling and are modeled throughout the full annual air quality model simulation. Thus, the modeled annual impacts and the health effects that are dependent on annual concentrations have incorporated layers of conservatism:

1. Peak daily emissions for all activities occur concurrently;
2. Peak daily emissions would occur over a full year;
3. The highest unmitigated peak daily emissions for NO_x occur in 2023, but the highest peak daily emissions for ROG, PM₁₀, and PM_{2.5} occur in 2029. Highest emissions are combined and overlaid onto the 2020 existing conditions baseline and the 2031 Project full build-out baseline to predict conservative health effects; and
4. Similarly, the highest mitigated peak daily emissions for NO_x occur in 2022, but the highest peak daily emissions for ROG, PM₁₀, and PM_{2.5} occur in 2029. Highest emissions are combined and overlaid onto the 2020 existing conditions baseline and the 2031 Project full build-out baseline to demonstrate more likely, but still conservative, health effects after mitigation strategies are implemented.

Therefore, the estimated emissions utilized for health impacts modeling should be considered as worst-case scenarios.

3.1 Calculation Methodology for Friant Ranch Emissions

Emissions associated with construction and operation of the proposed Project and existing development were estimated using the California Emissions Estimator Model (CalEEMod) version 2016.3.2. Emission estimates are based on CalEEMod land use types and total square feet (as shown in Table 2-1), as well as population.

Default values used in CalEEMod version 2016.3.2 are based on the California Energy Commission (CEC), sponsored California Commercial End Use Survey (CEUS), and Residential Appliance Saturation Survey (RASS) studies. CalEEMod provides both construction-related and operational emissions of air pollutants. This methodology has been subjected to peer review by numerous public and private stakeholders, and in particular by the CEC; and therefore, is considered reasonable and reliable for use in estimating air emissions for development projects in California. CalEEMod is considered a conservative tool because many of the default parameters used to calculate emissions are based on conservative assumptions for land use developments throughout the State of California to be protective of the environment and air quality standards.

3.1.1 Construction Emissions Methodology

Construction of the proposed Project would generate temporary air emissions, primarily associated with the operation of construction equipment and truck trips. These impacts are associated with fugitive dust (PM₁₀ and PM_{2.5}) from soil disturbance, and exhaust emissions, such as ROG, NO_x, CO, SO₂, and DPM from heavy diesel-fueled construction vehicles.

Site preparation and grading typically generate the highest emission quantities because the use of heavy equipment is greatest during this phase of construction. Emissions associated with the construction phases were estimated based on the projected maximum amount of equipment that would be used onsite at one time, in each given year.

The development schedule for the Specific Plan and Depot Parcel is based on the annual phased schedule in Table 2-2 of the DEIR and the duration and sequence of construction activities presented in the DEIR. Construction emissions are developed for the Specific Plan, phases 1 through 5 and the Depot Parcel. Each year of active construction in a development phase is run separately in CalEEMod and results for overlapping phases in the same year are added together to yield worst-case annual and daily emissions.

The duration and timing of construction activities are phased in 3-year increments, as presented in the FEIR. The following example shows the construction duration for phase 1 through phase 5.

- The first year of each phase includes grading that will occur from January 1 through May 2 and building construction from April 16 through December 31.
- The second year of each phase includes building construction from January 1 through December 31.
- The third year of each phase includes building construction from January 1 through December 31, architectural coating from June 28 through October 7, and paving from October 21 through December 3.
- In addition, the next phase of construction will begin in the second year of the previous phase, so construction activities occur in different locations, but emissions will overlap.

The construction equipment and activities are in accordance with CalEEMod defaults, with slight adjustments in equipment load factors, based on those discussed in the FEIR. Worker, vendor, and haul trips are also based on CalEEMod defaults. The silt loading factor is from the California Air Resources Board (CARB) 2018 Miscellaneous Process Methodology 7.9 for Entrained Road Travel, Paved Road Dust using Fresno County data. Construction mitigation strategies will be discussed in a subsequent section of this report.

After construction is complete, three types of sources will generate emissions at the proposed Project site. These are area sources, energy use, and Project-generated traffic, which are defined as operational emissions. The emission calculation methodologies of these sources are discussed below.

3.1.2 Operational Emissions Methodology

Operational emissions include emissions from electricity consumption (energy sources), vehicle trips (mobile sources), and area sources (landscape equipment and consumer products use or reapplication of paint). The majority of operational emissions are associated with vehicle trips to and from the Project site.

Area Sources

All direct area source emissions were based on CalEEMod defaults for the designated land use category with the exception of consumer product emissions and fireplaces. For consumer products, a (VOC) emission factor was derived using methodology consistent with CalEEMod, but with updated statewide parameters. The CalEEMod default emission factor assumes 2008 statewide VOC inventory and building square footage. An updated VOC inventory for 2017 was taken from CARB (CARB, 2017), and 2017 population estimates based on the State of California's Department of Finance demographic projections (DOF, 2017) were used to estimate a statewide VOC EF of 1.62×10^{-5} lb/sf/day for consumer products use, for 2017 going forward. Residential dwellings within the Specific Plan do not include wood burning fireplaces. However, residential dwellings within the Community Plan may have already been built with existing wood burning fireplaces. So, it was estimated that 12.4% of multi-family dwellings and 10% of single-family dwellings would include wood burning fireplaces. In addition, 55% of all dwelling types in the Specific Plan and Community Plan are assumed to have a natural gas hearth, consistent with CalEEMod defaults, and the remaining units have no fireplace. Reapplication of architectural coatings assumes 10% of each building interior and exterior surface area, which incorporates low VOC paints.

Energy Use

Residences and other land uses will use natural gas and the associated emissions were estimated using CalEEMod. Electricity use would contribute indirectly to criteria air pollutant emissions; however, the emissions from electricity use are only quantified for GHGs in CalEEMod. Natural gas use was based on CalEEMod defaults.

Project Traffic

The Project would generate criteria pollutant and DPM emissions from mobile sources (vehicular traffic), as a result of the residents and workers associated with the Project. The daily vehicle miles traveled were estimated using the CalEEMod calculation methodology for each land use type. The daily trip rates are based on the Institute of Transportation Engineers (ITE) Trip Generation Manual, 8th edition, which are incorporated into CalEEMod as average trip rates for each respective land use category. However, trip lengths were adjusted to account for mixed-use development criteria. Under the mixed-use design criteria, the community is planned to create working and shopping opportunity within the residential development design. Therefore, trip lengths for residential land uses traveling for work, shopping, or other activities are assumed to be mainly originating from the community, with destinations within the community. Using a weighted average of default trip lengths and a general layout of the development roads, the trip lengths were adjusted. It was assumed that 80% of the vehicle trips would travel an average of 2 miles for on-community destinations and 20% of the vehicle trips would use default trip lengths in CalEEMod, for off-community destinations (likely to the Fresno area).

Project-related traffic was assumed to include a mixture of vehicles in accordance with the fleet mix distribution values defined by CARB's Emission FACTor Model (EMFAC) (CARB 2017). Emission factors representing the vehicle mix and emissions for each year were adjusted using EMFAC2017 emission factors for the Fresno/San Joaquin Valley region, with the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule emission factor adjustment. A comma-separated value (csv) file was generated for each year of the development Project duration, from 2022 through 2031 and imported into the CalEEMod model for the calculation of vehicle emissions.

4.0 AIR EMISSIONS ESTIMATES

Full Project build-out emissions are presented, consistent with the Friant Community Plan Update & Friant Ranch Specific Plan DEIR (County of Fresno 2009). Emissions were calculated assuming full Project build-out of residential and commercial areas in 2031 noting that, according to the Project sponsor, the Project will be developed in phases over multiple years. The Depot Parcel will be developed after the full build-out year in 2032 or 2033 in a much smaller area than previous Project phases, and construction-related emissions will be much less than in the 2031 full build-out year. Operational emissions will be slightly less in 2022 and 2023 and the Depot Parcel will add little to operational emissions. Therefore, the Depot Parcel was not included in the operational air emissions estimates. The unmitigated annual construction emissions for the Friant Ranch Specific Plan are presented in Table 4-1. Emissions are shown for each of the phases for Project build-out, from 2022 through 2031.

**TABLE 4-1
ANNUAL UNMITIGATED CONSTRUCTION EMISSIONS**

Year	Friant Ranch - Annual Construction Emissions - Unmitigated (tons/year)										
	Phase	ROG	NO _x	CO	SO ₂	Fug PM ₁₀	Exh PM ₁₀	Total PM ₁₀	Fug PM _{2.5}	Exh PM _{2.5}	Total PM _{2.5}
Total 2022	P1	0.551	4.92	5.11	0.010	0.778	0.220	0.997	0.206	0.203	0.410
Total 2023	P1, P2	0.987	8.73	9.63	0.019	1.20	0.375	1.57	0.320	0.347	0.667
2023	P1	0.390	3.11	3.91	0.008	0.182	0.129	0.311	0.049	0.120	0.170
2023	P2	0.597	5.62	5.72	0.011	1.01	0.245	1.26	0.271	0.227	0.498
Total 2024	P1, P2	3.13	6.07	7.83	0.016	0.285	0.245	0.529	0.077	0.228	0.305
2024	P1	2.779	3.14	4.11	0.008	0.161	0.129	0.290	0.044	0.120	0.163
2024	P2	0.347	2.93	3.73	0.007	0.123	0.116	0.239	0.033	0.108	0.141
Total 2025	P2, P3	0.767	6.51	8.33	0.017	0.916	0.251	1.17	0.254	0.233	0.487
2025	P2	0.345	2.83	3.78	0.008	0.185	0.101	0.285	0.050	0.094	0.144
2025	P3	0.422	3.69	4.54	0.009	0.731	0.151	0.882	0.204	0.139	0.343
Total 2026	P2, P3	5.07	5.67	7.63	0.016	0.267	0.212	0.479	0.072	0.198	0.270
2026	P2	4.74	2.91	3.95	0.008	0.119	0.112	0.231	0.032	0.104	0.136
2026	P3	0.329	2.76	3.68	0.008	0.148	0.100	0.249	0.040	0.093	0.134
Total 2027	P3, P4	3.88	6.96	8.87	0.018	1.14	0.271	1.41	0.281	0.251	0.532
2027	P3	3.42	2.96	3.97	0.008	0.143	0.112	0.255	0.039	0.104	0.143
2027	P4	0.460	4.00	4.90	0.010	0.996	0.159	1.15	0.242	0.147	0.389
Total 2028	P4	0.354	2.95	3.82	0.009	0.251	0.101	0.351	0.068	0.094	0.161
Total 2029	P4, P5	4.63	7.64	9.70	0.020	0.960	0.295	1.26	0.265	0.274	0.539
2029	P4	4.08	2.85	3.83	0.007	0.073	0.112	0.185	0.020	0.104	0.124
2029	P5	0.553	4.78	5.88	0.013	0.887	0.183	1.07	0.245	0.170	0.415
Total 2030	P5	0.312	1.59	3.41	0.008	0.113	0.029	0.142	0.031	0.029	0.060
Total 2031	P5	3.49	1.66	3.64	0.008	0.057	0.037	0.093	0.015	0.037	0.052
Depot 2032	P6	0.191	0.955	1.804	0.004	0.230	0.024	0.254	0.116	0.024	0.140
Depot 2033	P6	0.247	0.430	0.822	0.002	0.022	0.010	0.032	0.006	0.010	0.016

Note: Fug PM₁₀/PM_{2.5} represents fugitive (dust) particulate matter and Exh PM₁₀/PM_{2.5} represents exhaust particulate matter.

The unmitigated annual operational emissions for the Friant Ranch Specific Plan and the Friant Community Plan are presented in Table 4-2.

**TABLE 4-2
ANNUAL UNMITIGATED OPERATIONAL CRITERIA POLLUTANT EMISSIONS**

Friant Ranch Specific Plan						
Category	2031					
	ROG	NO _x	CO	SO ₂	PM ₁₀	PM _{2.5}
	Tons/Year					
Area (Total)	10.7	1.15	18.9	0.007	0.179	0.179
Architectural Coatings	1.36	0	0	0	0	0
Consumer Products	8.65	0	0	0	0	0
Hearth	0.109	0.935	0.398	0.006	0.076	0.076
Landscaping	0.554	0.214	18.5	0.001	0.103	0.103
Energy (Natural Gas)	0.247	2.13	1.07	0.014	0.171	0.171
Mobile (Total)	4.90	4.00	27.0	0.062	7.86	2.13
Specific Plan Total	15.8	7.28	46.9	0.083	8.21	2.48
Friant Community Plan						
Category	2031					
	ROG	NO _x	CO	SO ₂	PM ₁₀	PM _{2.5}
	Tons/Year					
Area (Total)	6.36	0.350	9.83	0.020	0.946	0.946
Architectural Coatings	0.846	0	0	0	0	0
Consumer Products	4.75	0	0	0	0	0
Hearth	0.636	0.302	5.64	0.020	0.923	0.923
Landscaping	0.126	0.048	4.19	0.0002	0.023	0.023
Energy (Natural Gas)	0.277	2.48	1.84	0.015	0.192	0.192
Mobile (Total)	11.7	39.6	69.4	0.182	13.4	3.78
Community Plan Total	18.3	42.4	81.0	0.217	14.5	4.91
Friant Ranch Specific Plan and Community Plan						
Unmitigated Project Total	34.2	49.7	128	0.300	22.8	7.40

A summary of the total annual emissions for each year of the development Project are shown below in Table 4-3 for the Specific Plan, Community Plan, and Construction.

**TABLE 4-3
UNMITIGATED ANNUAL OPERATION AND CONSTRUCTION**

Year	Specific Plan - Total Operational Emissions - Unmitigated (tons/year)									
	ROG	NO _x	CO	SO ₂	Fug PM ₁₀	Exh PM ₁₀	Total PM ₁₀	Fug PM _{2.5}	Exh PM _{2.5}	Total PM _{2.5}
2022	1.91	0.99	5.97	0.010	0.784	0.043	0.827	0.210	0.043	0.253
2023	3.70	1.81	11.4	0.020	1.57	0.082	1.65	0.420	0.081	0.501
2024	5.41	2.60	16.5	0.029	2.35	0.121	2.47	0.630	0.120	0.750
2025	7.04	3.34	21.4	0.038	3.13	0.161	3.29	0.839	0.160	1.00
2026	8.62	4.05	26.0	0.046	3.92	0.201	4.12	1.05	0.199	1.25
2027	10.2	4.91	30.5	0.055	4.70	0.254	4.95	1.26	0.252	1.51
2028	11.8	5.37	34.7	0.061	5.48	0.277	5.76	1.47	0.275	1.74
2029	13.1	6.02	38.8	0.069	6.26	0.315	6.58	1.68	0.312	1.99
2030	14.5	6.65	42.9	0.076	7.04	0.352	7.40	1.89	0.350	2.24
2031	15.8	7.28	46.9	0.083	7.82	0.389	8.21	2.10	0.387	2.48
Year	Community Plan - Total Operational Emissions - Unmitigated (tons/year)									
	ROG	NO _x	CO	SO ₂	Fug PM ₁₀	Exh PM ₁₀	Total PM ₁₀	Fug PM _{2.5}	Exh PM _{2.5}	Total PM _{2.5}
2022	25.5	51.7	104	0.266	13.2	1.47	14.7	3.58	1.45	5.03
2023	24.0	46.9	100	0.258	13.2	1.38	14.6	3.58	1.37	4.95
2024	23.0	46.1	96.6	0.253	13.2	1.38	14.6	3.58	1.37	4.95
2025	22.1	45.3	93.2	0.246	13.2	1.38	14.6	3.58	1.36	4.94
2026	21.4	44.6	90.6	0.241	13.2	1.37	14.6	3.58	1.36	4.94
2027	20.7	44.0	88.1	0.235	13.2	1.37	14.6	3.58	1.36	4.93
2028	20.0	43.5	85.9	0.230	13.2	1.36	14.6	3.58	1.35	4.93
2029	19.4	43.0	84.0	0.225	13.2	1.36	14.6	3.58	1.35	4.92
2030	18.9	42.7	82.4	0.221	13.2	1.35	14.5	3.58	1.34	4.92
2031	18.3	42.4	81.0	0.217	13.2	1.35	14.5	3.58	1.34	4.91
Year	Friant Ranch - Total Annual Construction Emissions - Unmitigated (tons/year)									
	ROG	NO _x	CO	SO ₂	Fug PM ₁₀	Exh PM ₁₀	Total PM ₁₀	Fug PM _{2.5}	Exh PM _{2.5}	Total PM _{2.5}
2022	0.551	4.92	5.11	0.010	0.778	0.220	1.00	0.206	0.203	0.410
2023	0.987	8.73	9.63	0.019	1.20	0.375	1.57	0.320	0.347	0.667
2024	3.13	6.07	7.83	0.016	0.285	0.245	0.53	0.077	0.228	0.305
2025	0.767	6.51	8.33	0.017	0.92	0.251	1.17	0.254	0.233	0.487
2026	5.07	5.67	7.63	0.016	0.267	0.212	0.48	0.072	0.198	0.270
2027	3.88	6.96	8.87	0.018	1.14	0.271	1.41	0.281	0.251	0.532
2028	0.354	2.95	3.82	0.009	0.251	0.101	0.35	0.068	0.094	0.161
2029	4.63	7.64	9.70	0.020	0.960	0.295	1.26	0.265	0.274	0.539
2030	0.312	1.59	3.41	0.008	0.113	0.029	0.14	0.031	0.029	0.060
2031	3.49	1.66	3.64	0.008	0.057	0.037	0.09	0.015	0.037	0.052
Year	Friant Ranch - Total Annual Operational and Construction Emissions - Unmitigated (tons/year)									
	ROG	NO _x	CO	SO ₂	Fug PM ₁₀	Exh PM ₁₀	Total PM ₁₀	Fug PM _{2.5}	Exh PM _{2.5}	Total PM _{2.5}
2022	28.0	57.6	115	0.286	14.8	1.73	16.5	4.00	1.70	5.70
2023	28.7	57.4	121	0.297	16.0	1.84	17.8	4.32	1.80	6.12
2024	31.6	54.8	121	0.297	15.8	1.75	17.6	4.29	1.72	6.00
2025	30.0	55.1	123	0.301	17.2	1.79	19.0	4.67	1.76	6.43
2026	35.1	54.4	124	0.302	17.4	1.79	19.2	4.70	1.76	6.46
2027	34.7	55.9	127	0.308	19.0	1.89	20.9	5.12	1.86	6.98
2028	32.1	51.8	124	0.300	18.9	1.74	20.7	5.11	1.72	6.83
2029	37.1	56.7	133	0.314	20.4	1.97	22.4	5.52	1.93	7.45
2030	33.6	50.9	129	0.304	20.3	1.73	22.1	5.49	1.72	7.21
2031	37.6	51.3	132	0.308	21.1	1.77	22.8	5.69	1.76	7.45

5.0 EVALUATION OF MITIGATION STRATEGIES

Construction mitigation strategies would mainly rely on the use of construction equipment considered construction clean fleet, to comply with the emission reductions required by SJVAPCD District Rule 9510: Indirect Source Review (ISR). The rule requires construction equipment greater than fifty (50) horsepower to reduce construction equipment emissions by 20% of the total NO_x emissions and by 45% of the total PM₁₀ exhaust emissions. Although the construction fleet will vary based on the phase and subphase of construction activity, a combination of Tier 3 and Tier 4 engines were modeled to demonstrate the overall emission reductions. Lower emitting equipment or add-on control technology may become more readily available in future construction years.

Construction mitigation measures to comply with SJVAPCD District Rule 8021 were also included to demonstrate the reduction of fugitive dust emissions associated with the Project. At a minimum, watering of disturbed areas at least 3 times per day or as necessary; and limiting vehicle travel speeds on unpaved roads within the construction areas to a maximum of 15 miles per hour were incorporated.

Operational mitigation strategies were incorporated to quantify the reduction in emissions due to the SJVAPCD District Rule 9510: Indirect Source Review (ISR) strategies. The CAPCOA traffic mitigation measures have been incorporated into CalEEMod and correlate well with the ISR mitigation measures.

LUT-1 / Mitigation Measure 2a: Increase Density was applied as 2,000 dwelling units (du) within ½-mile radius (3.98 du/acre) and 1,500 jobs within ½-mile radius (2.9 jobs/acre).

LUT-3 / Mitigation Measure 2b: *Increase Diversity* can be included if the Project contains various land uses, such as office, commercial, institutional, and residential land uses present within ¼ mile.

LUT-9 / Mitigation Measure 2c: *Improve Walkability Design* included a calculation of 3-way and 4-way intersections compared to the distance from the center of the Project to its farthest boundary. This value was calculated to be 5.62 intersections per square mile.

LUT-4 / Mitigation Measure 2d: *Improve Destination Accessibility* was applied as the distance to downtown per job center is within ¼ mile.

LUT-5 / Mitigation Measure 2e: *Increase Transit Accessibility* was applied as the distance to a transit station is within ¼ mile.

SDT-1 / Mitigation Measure 3a: *Improve Pedestrian Network* was applied as providing a pedestrian access network within the Project site and connecting off-site.

SDT-2 / Mitigation Measure 3b: *Provide Traffic Calming Measures* was applied as 100% of streets containing improvements within ½ mile of the Project site and 25% of intersections improved within ½ mile of the Project site.

SDT-3 / Mitigation Measure 3c: *Implement Neighborhood Electric Vehicle (NEV) Network* was included for the Project.

TRT-6 / Mitigation Measure 5c: *Encourage Telecommuting and Alternative Work Schedules* included 25% of employees to participate in telecommuting 1.5 days per week.

A-1 / Mitigation Measure 7b: *Landscape Equipment* included 3% electric lawnmower, leaf blower, and chainsaws.

BE-1 / Mitigation Measure 7a: *Exceed Title 24* included as a minimum of 7% improvement over the 2016 building standards as applied by CalEEMod.

LE-1 / Mitigation Measure 7a: *Install High Efficiency Lighting* applied as a 20% reduction in energy use.

AE-1, AE-2, AE-3 / Mitigation Measure 8: *Solar Panels* are incorporated as 3 kW times the number of dwelling units, or a maximum of 7,500 kWh for 2031.

SW-1 would institute recycling and composting services to provide a reduction of 50% to 75% of the total waste disposed.

Use of low VOC paints will be included in the baseline scenario, but additional mitigation is considered for SJV Rule 4601, which requires a VOC limit of 50 g/L for flat and non-flat coatings, effective after 1/1/2022.

These mitigation strategies were quantified to demonstrate emission reductions, using the CalEEMod model. Mitigation strategies that were defined in the FEIR are now considered outdated, but are shown with the newer ISR reduction strategies, submitted in 2019. The comparison of FEIR mitigation strategies and those applied based on the ISR application is shown in Table A-1 in Appendix A.

The mitigated annual construction emissions for the Friant Ranch Specific Plan are presented in Table 5-1. Emissions are shown for each of the phases of Project build-out, from 2022 through 2031.

**TABLE 5-1
ANNUAL MITIGATED CONSTRUCTION EMISSIONS**

Year	Friant Ranch - Annual Construction Emissions - Mitigated (tons/year)										
	Phase	ROG	NO _x	CO	SO ₂	Fug PM ₁₀	Exh PM ₁₀	Total PM ₁₀	Fug PM _{2.5}	Exh PM _{2.5}	Total PM _{2.5}
Total 2022	P1	0.293	3.86	5.42	0.010	0.086	0.190	0.475	0.104	0.085	0.189
Total 2023	P1, P2	0.483	5.07	10.6	0.019	0.610	0.209	0.819	0.163	0.209	0.373
2023	P1	0.210	1.01	4.19	0.008	0.182	0.027	0.209	0.049	0.027	0.076
2023	P2	0.273	4.06	6.37	0.011	0.428	0.183	0.611	0.114	0.183	0.297
Total 2024	P1, P2	2.77	2.92	8.50	0.016	0.285	0.121	0.405	0.077	0.120	0.197
2024	P1	2.60	1.18	4.43	0.008	0.161	0.039	0.200	0.044	0.038	0.082
2024	P2	0.170	1.74	4.06	0.007	0.123	0.082	0.205	0.033	0.082	0.115
Total 2025	P2, P3	0.368	4.16	9.26	0.017	0.506	0.195	0.700	0.139	0.194	0.334
2025	P2	0.187	1.85	4.16	0.008	0.185	0.081	0.266	0.050	0.081	0.131
2025	P3	0.181	2.31	5.09	0.009	0.321	0.113	0.434	0.089	0.113	0.203
Total 2026	P2, P3	4.73	2.84	8.41	0.016	0.267	0.111	0.378	0.072	0.111	0.183
2026	P2	4.55	1.05	4.34	0.008	0.119	0.030	0.149	0.032	0.030	0.062
2026	P3	0.171	1.79	4.06	0.008	0.148	0.081	0.229	0.040	0.081	0.121
Total 2027	P3, P4	3.44	3.68	9.84	0.018	0.603	0.149	0.752	0.153	0.149	0.302
2027	P3	3.25	1.99	4.36	0.008	0.143	0.096	0.239	0.039	0.096	0.135
2027	P4	0.188	1.70	5.48	0.010	0.460	0.053	0.513	0.114	0.053	0.167
Total 2028	P4	0.197	1.98	4.20	0.009	0.251	0.081	0.332	0.068	0.081	0.149
Total 2029	P4, P5	4.17	4.98	10.8	0.020	0.551	0.236	0.788	0.151	0.236	0.388
2029	P4	3.91	1.88	4.22	0.007	0.073	0.097	0.170	0.020	0.097	0.116
2029	P5	0.261	3.10	6.55	0.013	0.478	0.140	0.618	0.132	0.140	0.271
Total 2030	P5	0.122	0.878	3.93	0.008	0.113	0.011	0.125	0.031	0.011	0.042
Total 2031	P5	3.28	0.985	4.16	0.008	0.057	0.026	0.082	0.015	0.026	0.041
Depot 2032	P6	0.063	0.671	2.22	0.004	0.111	0.018	0.129	0.051	0.018	0.069
Depot 2033	P6	0.202	0.318	0.943	0.002	0.022	0.009	0.031	0.006	0.009	0.015

Note: Fug PM₁₀/PM_{2.5} represents fugitive (dust) particulate matter and Exh PM₁₀/PM_{2.5} represents exhaust particulate matter.

Mitigated Specific Plan and Community Plan operational emissions for 2031 are shown in Table 5-2, which demonstrates the annual reduction in each pollutant by using the mitigation strategies defined above.

**TABLE 5-2
ANNUAL MITIGATED OPERATIONAL CRITERIA POLLUTANT EMISSIONS**

Friant Ranch Community: Operational Criteria Pollutant Emissions (tons/year)						
Friant Ranch Specific Plan						
Category	2031					
	ROG	NOx	CO	SO₂	PM₁₀	PM_{2.5}
	tons					
Area (Total)	10.2	1.15	18.8	0.007	0.178	0.178
Architectural Coatings	0.892	0	0	0	0	0
Consumer Products	8.65	0	0	0	0	0
Hearth	0.109	0.935	0.398	0.006	0.076	0.076
Landscaping	0.546	0.212	18.4	0.001	0.102	0.102
Energy (Natural Gas)	0.234	2.02	1.01	0.013	0.162	0.162
Mobile (Total)	4.84	3.60	24.7	0.052	6.45	1.75
Specific Plan Total	15.3	6.77	44.5	0.071	6.79	2.09
Mitigation Reduction %	3.51	6.96	5.17	13.6	17.4	15.8
Friant Community Plan						
Category	2031					
	ROG	NOx	CO	SO₂	PM₁₀	PM_{2.5}
	tons					
Area (Total)	5.34	0.259	4.25	0.002	0.040	0.040
Architectural Coatings	0.445	0	0	0	0	0
Consumer Products	4.75	0	0	0	0	0
Hearth	0.025	0.211	0.090	0.001	0.017	0.017
Landscaping	0.124	0.048	4.16	0.0002	0.023	0.023
Energy (Natural Gas)	0.277	2.48	1.84	0.015	0.192	0.192
Mobile (Total)	11.6	37.7	66.8	0.165	11.8	3.33
Community Plan Total	17.2	40.5	72.9	0.181	12.1	3.56
Mitigation Reduction %	5.99	4.58	9.99	16.5	17.1	27.5
Friant Ranch Specific Plan and Community Plan						
Project Total	32.5	47.2	117	0.253	18.8	5.65

A summary of the total annual mitigated emissions for each year of the development Project are shown below in Table 5-3 for the Specific Plan, Community Plan, and Construction.

**TABLE 5-3
MITIGATED ANNUAL OPERATION AND CONSTRUCTION EMISSIONS**

Year	Specific Plan - Total Operational Emissions - Mitigated (tons/year)									
	ROG	NO _x	CO	SO ₂	Fug PM ₁₀	Exh PM ₁₀	Total PM ₁₀	Fug PM _{2.5}	Exh PM _{2.5}	Total PM _{2.5}
2022	1.85	0.90	5.59	0.009	0.642	0.041	0.683	0.172	0.041	0.213
2023	3.58	1.67	10.7	0.017	1.28	0.078	1.36	0.344	0.077	0.421
2024	5.23	2.40	15.6	0.025	1.93	0.116	2.04	0.516	0.115	0.631
2025	6.81	3.09	20.1	0.032	2.57	0.154	2.72	0.688	0.153	0.841
2026	8.34	3.75	24.6	0.039	3.21	0.192	3.40	0.860	0.191	1.05
2027	9.83	4.57	28.8	0.047	3.85	0.245	4.09	1.03	0.243	1.27
2028	11.3	4.98	32.8	0.053	4.49	0.266	4.76	1.20	0.264	1.47
2029	12.6	5.59	36.8	0.059	5.13	0.303	5.43	1.37	0.300	1.67
2030	14.0	6.18	40.7	0.065	5.77	0.339	6.11	1.55	0.336	1.88
2031	15.3	6.77	44.5	0.071	6.41	0.374	6.79	1.72	0.372	2.09

Year	Community Plan - Total Operational Emissions - Mitigated (tons/year)									
	ROG	NO _x	CO	SO ₂	Fug PM ₁₀	Exh PM ₁₀	Total PM ₁₀	Fug PM _{2.5}	Exh PM _{2.5}	Total PM _{2.5}
2022	24.3	49.0	94.5	0.225	11.6	0.531	12.2	3.16	0.515	3.67
2023	22.9	44.6	91.1	0.218	11.6	0.454	12.1	3.16	0.442	3.60
2024	21.9	43.9	87.6	0.213	11.6	0.451	12.1	3.16	0.439	3.60
2025	21.0	43.1	84.5	0.207	11.6	0.447	12.1	3.16	0.436	3.59
2026	20.2	42.5	82.0	0.203	11.6	0.444	12.1	3.16	0.432	3.59
2027	19.5	41.9	79.6	0.198	11.6	0.439	12.1	3.16	0.428	3.58
2028	18.9	41.5	77.6	0.193	11.6	0.434	12.1	3.16	0.423	3.58
2029	18.3	41.0	75.7	0.188	11.6	0.429	12.1	3.15	0.419	3.57
2030	17.8	41.0	74.6	0.187	11.9	0.428	12.3	3.22	0.418	3.64
2031	17.2	40.5	72.9	0.181	11.6	0.421	12.1	3.15	0.411	3.56

Year	Friant Ranch - Total Annual Construction Emissions - Mitigated (tons/year)									
	ROG	NO _x	CO	SO ₂	Fug PM ₁₀	Exh PM ₁₀	Total PM ₁₀	Fug PM _{2.5}	Exh PM _{2.5}	Total PM _{2.5}
2022	0.293	3.86	5.42	0.010	0.086	0.190	0.475	0.104	0.085	0.189
2023	0.483	5.07	10.6	0.019	0.610	0.209	0.819	0.163	0.209	0.373
2024	2.77	2.92	8.50	0.016	0.285	0.121	0.405	0.077	0.120	0.197
2025	0.368	4.16	9.26	0.017	0.506	0.195	0.700	0.139	0.194	0.334
2026	4.73	2.84	8.41	0.016	0.267	0.111	0.378	0.072	0.111	0.183
2027	3.44	3.68	9.84	0.018	0.603	0.149	0.752	0.153	0.149	0.302
2028	0.197	1.98	4.20	0.009	0.251	0.081	0.332	0.068	0.081	0.149
2029	4.17	4.98	10.8	0.020	0.551	0.236	0.788	0.151	0.236	0.388
2030	0.122	0.878	3.93	0.008	0.113	0.011	0.125	0.031	0.011	0.042
2031	3.28	0.985	4.16	0.008	0.057	0.026	0.082	0.015	0.026	0.041

Year	Friant Ranch - Total Annual Operational and Construction Emissions - Mitigated (tons/year)									
	ROG	NO _x	CO	SO ₂	Fug PM ₁₀	Exh PM ₁₀	Total PM ₁₀	Fug PM _{2.5}	Exh PM _{2.5}	Total PM _{2.5}
2022	26.5	53.7	106	0.244	12.4	0.761	13.3	3.43	0.64	4.07
2023	27.0	51.3	112	0.254	13.5	0.741	14.3	3.67	0.73	4.39
2024	29.9	49.2	112	0.254	13.9	0.688	14.5	3.75	0.67	4.42
2025	28.2	50.4	114	0.257	14.7	0.796	15.5	3.98	0.78	4.77
2026	33.3	49.1	115	0.257	15.1	0.747	15.9	4.09	0.73	4.82
2027	32.8	50.2	118	0.263	16.1	0.833	16.9	4.34	0.82	5.16
2028	30.4	48.4	115	0.254	16.4	0.781	17.2	4.43	0.77	5.19
2029	35.1	51.6	123	0.267	17.3	0.968	18.3	4.68	0.96	5.64
2030	31.9	48.0	119	0.261	17.8	0.778	18.5	4.80	0.77	5.56
2031	35.8	48.2	122	0.260	18.1	0.821	18.9	4.89	0.81	5.69

6.0 PEAK DAILY EMISSIONS FOR HEALTH IMPACT MODELING

Peak daily emissions are required for regional Health Impact Analysis (HIA) modeling. To determine the highest peak daily emissions, the combined operational plus construction emissions for each year were evaluated. The highest peak daily emission rate for each pollutant was applied to the 2020 and 2031 background regional emissions data to demonstrate the most conservative health impacts. The 2020 and 2031 regional emissions data inputs used for the HIA were developed from modeling information obtained from CARB, as developed for the San Joaquin Valley 2018 PM_{2.5} State Implementation Plan (SJVAPCD 2018). A discussion on the regional emissions inputs to the HIA is provided in the separate HIA report (BlueScape 2021).

Without the Project emissions included, the 2020 scenario year represents the CEQA baseline for existing conditions prior to Project development. The 2031 scenario year represents the “no project” conditions that account for reasonably foreseeable development that will have occurred by that year, and is adequate as a cumulative CEQA baseline. The 2031 year full-buildout Project impacts were then added to these two CEQA baseline years, to understand the potential specific health impacts above baseline.

The following tables show unmitigated and mitigated peak daily emissions for operational and construction emissions combined. Table 6-1 shows the unmitigated peak daily emissions and then the mitigated peak daily emissions that were applied to the regional health impact model, for the Project. Construction emissions and operational emissions are defined separately, by source category. Peak daily NO_x emissions occur in year 2023 for the unmitigated scenario and year 2022 for the mitigated scenario. Peak daily ROG and PM emissions occur in year 2029 for both the unmitigated and mitigated scenarios. Although operational emissions associated with the Specific Plan and Community Plan are highest at Project build-out, year 2031, the combination of construction emissions with operational emissions in these years (2022, 2023 and 2029) represents a worst-case peak day scenario for those pollutants.

**TABLE 6-1
PEAK DAILY OPERATION AND CONSTRUCTION EMISSIONS**

Category	Peak Day Unmitigated Emissions (lb/day)					
	ROG	NO _x	Fugitive PM ₁₀	Exhaust PM ₁₀	Fugitive PM _{2.5}	Exhaust PM _{2.5}
	Construction					
On-Road Mobile	0.773	3.13	2.59	0.014	0.699	0.013
Off-Road Mobile	9.36	111	15.6	4.10	4.34	3.79
Area/Energy	104	0	0	0	0	0
	Operational (Specific Plan plus Community Plan)					
On-Road Mobile	127	294	124	1.59	33.4	1.51
Off-Road Mobile	0	0	0	0	0	0
Area/Energy	101	28.9	0	27.0	0	27.0
Total	342	438	142	32.7	38.4	32.3

Category	Peak Day Mitigated Emissions (lb/day)					
	ROG	NO _x	Fugitive PM ₁₀	Exhaust PM ₁₀	Fugitive PM _{2.5}	Exhaust PM _{2.5}
	Construction					
On-Road Mobile	0.773	2.63	2.59	0.014	0.699	0.013
Off-Road Mobile	3.83	60.4	6.08	3.49	1.69	3.49
Area/Energy	104	0	0	0	0	0
	Operational (Specific Plan plus Community Plan)					
On-Road Mobile	126	304	107	1.42	28.8	1.35
Off-Road Mobile	0	0	0	0	0	0
Area/Energy	81.8	22.9	0	4.82	0	4.82
Total	316	389	115	9.74	31.2	9.66

Note: Area source exhaust PM originates from natural gas combustion and landscaping.

Table 6-2 shows the unmitigated peak daily emissions, on an annual basis from 2022 through 2031. The maximum daily emission rate for each pollutant was selected for the peak daily rate. Table 6-3 shows the mitigated peak daily emissions, on an annual basis from 2022 through 2031. These tables include all of the criteria pollutant emissions, but since contributions to regional ozone and fine particulate are minimal, CO and SO₂ were not included in the regional HIA modeling.

**TABLE 6-2
UNMITIGATED PEAK DAILY OPERATION AND CONSTRUCTION**

Year	Friant Ranch - Total Peak Daily Operational Emissions - Unmitigated (lb/day)									
	ROG	NO _x	CO	SO ₂	Fug PM ₁₀	Exh PM ₁₀	Total PM ₁₀	Fug PM _{2.5}	Exh PM _{2.5}	Total PM _{2.5}
2022	199	346	869	2.13	89.0	26.3	115	24.1	26.2	50.3
2023	201	323	888	2.15	94.0	26.2	120	25.4	26.1	51.5
2024	205	325	905	2.18	99.0	26.6	126	26.7	26.5	53.3
2025	209	326	922	2.21	104	27.0	131	28.1	26.9	55.0
2026	213	328	943	2.24	109	27.4	136	29.4	27.3	56.7
2027	219	334	965	2.29	114	28.2	142	30.7	28.1	58.8
2028	224	332	985	2.29	119	28.2	147	32.1	28.1	60.2
2029	228	335	1,008	2.32	124	28.5	153	33.4	28.5	61.9
2030	233	338	1,032	2.34	129	28.9	158	34.7	28.8	63.6
2031	237	342	1,057	2.38	134	29.3	163	36.1	29.2	65.3

Year	Friant Ranch - Total Peak Daily Construction Emissions - Unmitigated (lb/day)									
	ROG	NO _x	CO	SO ₂	Fug PM ₁₀	Exh PM ₁₀	Total PM ₁₀	Fug PM _{2.5}	Exh PM _{2.5}	Total PM _{2.5}
2022	9.09	83.2	83.0	0.155	16.5	3.76	20.3	4.38	3.47	7.84
2023	12.6	114	122	0.235	19.0	4.94	23.9	5.06	4.57	9.63
2024	72.2	56.2	72.5	0.138	2.36	2.41	4.74	0.636	2.24	2.87
2025	10.1	86.2	107	0.217	17.7	3.46	21.2	4.94	3.20	8.14
2026	127	53.7	71.6	0.140	2.19	2.16	4.36	0.591	2.01	2.60
2027	95.5	98.6	121	0.241	22.8	4.09	26.8	5.54	3.78	9.31
2028	2.78	22.7	30.0	0.070	1.98	0.773	2.75	0.535	0.719	1.25
2029	114	99.2	122	0.242	18.2	4.12	22.3	5.04	3.81	8.85
2030	2.41	12.2	26.3	0.062	0.89	0.223	1.11	0.241	0.223	0.463
2031	90.2	21.4	42.3	0.084	0.58	0.67	1.25	0.156	0.668	0.824

Year	Friant Ranch - Total Peak Daily Operational and Construction Emissions - Unmitigated (lb/day)									
	ROG	NO _x	CO	SO ₂	Fug PM ₁₀	Exh PM ₁₀	Total PM ₁₀	Fug PM _{2.5}	Exh PM _{2.5}	Total PM _{2.5}
2022	209	429	952	2.28	105	30.1	136	28.4	29.7	58.1
2023	214	438	1,009	2.39	113	31.2	144	30.5	30.7	61.2
2024	277	381	977	2.32	101	29.0	130	27.4	28.8	56.1
2025	219	412	1,029	2.42	122	30.5	152	33.0	30.1	63.1
2026	341	382	1,015	2.38	111	29.6	141	30.0	29.3	59.3
2027	314	433	1,087	2.53	137	32.3	169	36.3	31.9	68.1
2028	226	355	1,015	2.36	121	28.9	150	32.6	28.8	61.4
2029	342	434	1,130	2.56	142	32.7	175	38.4	32.3	70.7
2030	235	350	1,058	2.41	130	29.2	159	35.0	29.1	64.0
2031	328	364	1,100	2.46	135	30.0	165	36.2	29.9	66.1

**TABLE 6-3
MITIGATED PEAK DAILY OPERATION AND CONSTRUCTION**

Year	Friant Ranch - Total Peak Daily Operational Emissions - Mitigated (lb/day)									
	ROG	NO _x	CO	SO ₂	Fug PM ₁₀	Exh PM ₁₀	Total PM ₁₀	Fug PM _{2.5}	Exh PM _{2.5}	Total PM _{2.5}
2022	181	326	707	1.53	78.2	4.02	82.2	21.1	3.92	25.1
2023	182	306	725	1.55	82.3	3.95	86.2	22.2	3.87	26.1
2024	186	308	741	1.57	86.4	4.34	90.7	23.3	4.26	27.6
2025	190	309	759	1.60	90.5	4.73	95.2	24.4	4.65	29.1
2026	194	311	778	1.62	94.5	5.12	99.7	25.5	5.04	30.5
2027	199	317	800	1.67	98.6	5.86	105	26.6	5.78	32.4
2028	203	315	819	1.67	103	5.87	109	27.7	5.79	33.5
2029	208	318	841	1.69	107	6.24	113	28.8	6.16	34.9
2030	212	323	866	1.73	112	6.63	119	30.3	6.56	36.8
2031	217	325	888	1.75	115	6.99	122	31.0	6.91	37.9

Year	Friant Ranch - Total Peak Daily Construction Emissions - Mitigated (lb/day)									
	ROG	NO _x	CO	SO ₂	Fug PM ₁₀	Exh PM ₁₀	Total PM ₁₀	Fug PM _{2.5}	Exh PM _{2.5}	Total PM _{2.5}
2022	4.55	63.0	87.0	0.155	7.48	1.50	8.98	1.99	1.47	3.45
2023	5.94	72.4	134.0	0.235	8.75	3.10	11.8	2.34	3.10	5.44
2024	69.5	31.5	78.4	0.138	2.36	1.57	3.90	0.64	1.57	2.20
2025	4.53	54.7	119	0.217	8.29	2.60	10.9	2.30	2.60	4.90
2026	125	32.1	78.4	0.140	2.19	1.59	3.78	0.59	1.59	2.18
2027	89.7	56.1	135	0.241	10.5	2.55	13.0	2.59	2.55	5.13
2028	1.57	15.2	32.9	0.070	1.98	0.624	2.60	0.53	0.62	1.16
2029	109	67.9	136	0.242	8.67	3.50	12.2	2.39	3.50	5.89
2030	0.955	6.7	30.3	0.062	0.890	0.088	0.978	0.241	0.087	0.328
2031	88.7	18.0	46.2	0.084	0.580	0.939	1.52	0.156	0.939	1.10

Year	Friant Ranch - Total Peak Daily Operational and Construction Emissions - Mitigated (lb/day)									
	ROG	NO _x	CO	SO ₂	Fug PM ₁₀	Exh PM ₁₀	Total PM ₁₀	Fug PM _{2.5}	Exh PM _{2.5}	Total PM _{2.5}
2022	185	389	794	1.68	85.6	5.52	91.2	23.1	5.39	28.5
2023	188	379	859	1.78	91.0	7.05	98.1	24.6	6.97	31.5
2024	255	340	820	1.71	88.7	5.91	94.6	24.0	5.83	29.8
2025	194	364	878	1.81	98.7	7.34	106	26.7	7.25	34.0
2026	319	343	857	1.76	96.7	6.71	103	26.1	6.62	32.7
2027	289	374	935	1.91	109	8.41	117	29.2	8.33	37.5
2028	205	330	852	1.74	105	6.49	111	28.2	6.41	34.6
2029	316	386	977	1.93	115	9.74	125	31.2	9.66	40.8
2030	213	330	896	1.80	113	6.72	120	30.5	6.64	37.2
2031	305	343	934	1.83	116	7.93	124	31.1	7.85	39.0

7.0 REFERENCES

- BAAQMD 2017. California Environmental Quality Act Air Quality Guidelines, Bay Area Air Quality Management District, May 2017. Available online at: www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en
- BlueScape 2021. Regional Air Quality Modeling and Health Impact Analysis: Friant Ranch Community Development. 2021.
- CAPCOA 2017. California Air Pollution Control Officer's Association, Recommendation of CalEEMod. Available online at: www.capcoa.org/caleemod/
- CARB 2017. Consumer Products Program, low vapor pressure VOC. Available online at: ww2.arb.ca.gov/our-work/programs/consumer-products-program/lvp-voc-research
- CARB 2017. California Air Resources Board, Mobile Source Emission Factors for On-road vehicles, EMFAC2017. Available online at: <https://arb.ca.gov/emfac/>
- Caltrans 2017. Peak Hour Volume Data, Fresno County. Available online at: <https://dot.ca.gov/programs/traffic-operations/census>
- County of Fresno 2009. Friant Community Plan Update and Friant Ranch Specific Plan, Draft Environmental Impact Report. October 2009. Available online at: www.co.fresno.ca.us/home/showpublisheddocument?id=14246
- Department of Finance (DOF) 2017, State of California. Demographics forecasting website, Available online at: www.dof.ca.gov/Forecasting/Demographics/
- SJVAPCD 2012. Draft Guidance for Assessing and Mitigating Air Quality Impacts – 2012, SJVAPCD, May 2012. Available online at: www.valleyair.org/transportation/gamaqidraft-2012/gamaqi-2012-draft-may312012.pdf
- SJVAPCD, 2018. Photochemical Modeling for the 2018 San Joaquin Valley Annual/24-Hour PM2.5 State Implementation Plan, prepared by the California Air Resources Board, October 2018. www.valleyair.org/pmplans/

APPENDIX A

TABLES

**TABLE A-1
MITIGATION STRATEGIES FOR EMISSION REDUCTION**

Mitigation Strategy	FEIR 3.3.1/3.3.2	ISR Application	CalEEMod Applied
Construction Clean Fleet	3.3.1: Diesel oxidation catalyst with 40% NO _x reduction (cranes/forklift 15%)	Mitigation Measure 1: District Rule 9510 (ISR requires the clean fleet data template to verify the NO _x and PM ₁₀ emission reductions)	CalEEMod can apply oxidation catalysts, diesel particulate filters, and upgraded engine Tier 2, 3, or 4, or alternate fuels (Bio, CNG, Electric) ¹
Increase Density		Mitigation Measure 2a: 2,000 DU within ½ mi radius of Project	Applied as 2,000 in CalEEMod
Increase Diversity		Mitigation Measure 2b: Mixed-Use development	Applied as increased diversity in CalEEMod
Increase Walkability Design		Mitigation Measure 2c: 7 intersections	Applied as intersections per square miles in CalEEMod
Improve Destination Accessibility		Mitigation Measure 2d: ¼ mile	Applied as ¼ mi to job center or downtown in CalEEMod
Increase Transit Accessibility	3.3.2 Transportation related mitigation measures	Mitigation Measure 2e: ¼ mi to transit station	Applied as ¼ mi to transit station in CalEEMod
Improve pedestrian network	Bicycle usage is considered a design strategy, not mitigation	Mitigation Measure 3a: Provide pedestrian access network within Project site and connecting offsite	Applied as pedestrian access network within Project site and connecting offsite in CalEEMod
Provide traffic calming measures		Mitigation Measure 3b: 100% of streets with improvement within ½ mile of Project site	Applied as 100% of streets with improvement within ½ mile of Project site in CalEEMod
Implement Neighborhood Electric Vehicle Network		Mitigation Measure 3c: Provide NEV Network	Applied as NEV network provided in CalEEMod
Encourage Telecommuting and Alt Work Schedules		Mitigation Measure 5c: 25% of employees to participate in telecommuting 1.5 days	Applied as 25% of employees to participate in telecommuting 1.5 days in CalEEMod
Hearth		Mitigation Measure 6: NG only hearth	Applied as NG only hearth
Exceed Title 24	3.3.2: Reduce residential energy consumption 10-20% from 2008 Title 24. (These energy efficiency standards are now considered design requirements and are outdated as mitigation.)	Mitigation Measure 7a: ISR states: TBD	Apply Title 24 reduction (see below)
			Single family homes built under 2019 Energy Standards use 7% less energy than 2016 Standards. Assume 7% reduction to 2031.
			Lighting energy reduction based on an average 29% for the lighting power density from 2016 to 2019 (non-residential buildings). Assume 20% reduction to 2031.
			Low-flow plumbing, toilets, sinks, showers in accordance with Title 24 as of 2019 and water efficient irrigation, in CalEEMod.
Landscape Equipment		Mitigation Measure 7b: ISR states "yes"	3% electric will be applied in CalEEMod, as noted to be the assumed statewide average

**TABLE A-1
MITIGATION STRATEGIES FOR EMISSION REDUCTION**

Mitigation Strategy	FEIR 3.3.1/3.3.2	ISR Application	CalEEMod Applied
Solar Panels		Mitigation Measure 8: ISR states "yes"	kW of total power output will be entered into CalEEMod
Electric Vehicle Charger		Mitigation Measure 9: ISR states "TBD"	Number of charging outlets to be entered into CalEEMod
Solid Waste Reduction			Fresno County is required to meet the state mandated 75% reduction in solid waste by 2020. CalEEMod will apply 75% recycling and composting.
Low VOC Paints	3.3.1: 45% ROG emission reduction compared to existing architectural coating rules (defined defaults were Res: 130 g/L and Non-res: 250 g/L)		The FEIR measure is outdated. SJV Rule 4601 requires VOC limit of 50 g/L for flat and non-flat coatings, effective after 1/1/2022. 50 g/L will be used in CalEEMod.
Fugitive Dust	SJV Reg VIII Control Measures		Apply 3x per day watering frequency (61% reduction in PM10/2.5), vehicle speed 15 mph
EMFAC 2017 and SAFE Factor Adjustment			Emission factors for mobiles sources will be adjusted in CalEEMod to update vehicle emissions

1. The ISR does not state specific measures, only the general clean fleet data, which is submitted to verify emission reductions meet the rule after each construction phase is completed. A combination of Tier 3 and Tier 4 engines was applied in CalEEMod to demonstrate the reductions, but they are not specified in the ISR or the EIR.

APPENDIX B

CALEEMOD FILES
(PROVIDED ELECTRONICALLY)