Appendix B

Air Quality and Greenhouse Gases
Technical Report and
Energy Demand Calculations

Highway 59 Composting Facility Air Quality and GHG Technical Report

Agromin Corporation
7040 N. Highway 59
Merced, CA 95348

March 2024

Prepared by:

Yorke Engineering, LLC
www.YorkeEngr.com

Office Locations:
Los Angeles, Orange County,
Riverside, Ventura, San Diego, Fresno, Merced,
Bakersfield, Berkeley, San Francisco

Tel: (949) 248-8490
Fax: (949) 248-8499

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List of Acronyms, Abbreviations, and Symbols

AAQA	Ambient Air Quality Analysis
AAQS	Ambient Air Quality Standards
AB	Assembly Bill
ADC	Alternate Daily Cover
APCO	Air Pollution Control Officer
AQAP	Air Quality Attainment Plan
ATC	Authority to Construct
ATCM	Airborne Toxic Control Measure
BACT	Best Available Control Technology
BAU	Business as Usual
BPS	Best Performance Standards
C_2H_3Cl	Vinyl Chloride
CA	California
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model®
CalRecycle	California Department of Resources Recycling and Recovery
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CASP	Covered Aerated Static Pile
CCAP	Climate Change Action Plan
CCR	California Code of Regulations
CDC	Centers for Disease Control and Prevention
CDFA	California Department of Food and Agriculture
CEQA	California Environmental Quality Act
CFC	Chlorofluorocarbon
CFR	Code of Federal Regulations
CH_4	Methane
C/N	Carbon to Nitrogen Ratio
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
County	Merced County
CTI	California Toxics Inventory
DOORS	Diesel Off-Road Online Reporting System
DPM	Diesel Particulate Matter
e-GGRT	Electronic Greenhouse Gas Reporting Tool
EO	Executive Order

EPA	[United States] Environmental Protection Agency
ERC	Emission Reduction Credit
FR	Federal Register
GAMAQI	[SJVAPCD] Guidance for Assessing and Mitigating Air Quality Impacts
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GWP	Global Warming Potential
H_2S	Hydrogen Sulfide
H&SC	[California] Health & Safety Code
HAP	Hazardous Air Pollutant
HFC	Hydrofluorocarbon
HI	Hazard Index
hr	Hour
HRA	Health Risk Assessment
IPCC	International Panel on Climate Change
ISR	Indirect Source Review
lb	Pound
LFG	Landfill Gas
MCRWMA	Merced County Regional Waste Management Authority
MPO	Metropolitan Planning Organization
MRF	Material Recovery Facility
MRR	[GHG] Mandatory Reporting Regulation
MT	Metric Ton
N_2O	Nitrous Oxide
NA	Not Applicable
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standards for Hazardous Air Pollutants
NH_3	Ammonia
NO	Nitric Oxide
NO_x	Oxides of Nitrogen
NO_2	Nitrogen Dioxide
NR	Not Required
NSPS	New Source Performance Standard
NSR	New Source Review
O_3	Ozone
OEHHA	[California] Office of Environmental Health Hazard Assessment
OIMP	Odor Impact Minimization Plan
PEER	Permit-Exempt Equipment Registration
PFC	Perfluorocarbon
PFRP	Process to Further Reduce Pathogens
PM	Particulate Matter

$PM_{2.5}$	Fine Particulate Matter (Less Than 2.5 Microns in Size)
PM_{10}	Respirable Particulate Matter (Less Than 10 Microns in Size)
ppb	Parts per Billion
ppm	Parts per Million
ppmv	Parts per Million by Volume
PS	Prioritization Score
PTO	Permit to Operate
PVC	Polyvinyl Chloride
RACT	Reasonably Available Control Technology
ROG	Reactive Organic Gas
RWQCB	Regional Water Quality Control Board
SAR	[IPCC] Second Annual Report
SB	Senate Bill
SF_6	Sulfur Hexafluoride
SIP	State Implementation Plan
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SLAMS	State and Local Air Monitoring Station
SLCP	Short-Lived Climate Pollutant
SO_2	Sulfur Dioxide
SO_4^{2-}	Sulfates
SO_x	Oxides of Sulfur
SSIPE	Stationary Source Increase in Permitted Emissions
SSPE1	Pre-Project Stationary Source Potential to Emit
SSPE2	Post-Project Stationary Source Potential to Emit
SWRCB	State Water Resources Control Board
TAC	Toxic Air Contaminant
TOG	Total Organic Gas
TPD	Tons per Day
TPY	Tons per Year
U.S.	United States
UFP	Ultra-Fine Particles
VCM	Vinyl Chloride Monomer
VERA	Voluntary Emissions Reduction Agreement
VOC	Volatile Organic Compound
WARM	Waste Reduction Model
WDR	Waste Discharge Requirement
yr	Year
°C	Degrees Celsius
°F	Degrees Fahrenheit

EXECUTIVE SUMMARY

Project Overview

Agromin intends to develop a compost facility featuring covered aerated static pile (CASP) technology to provide a waste management alternative in Merced County (the County) that would allow the County to comply with California organic waste diversion regulations. The proposed compost facility would be located adjacent to the existing Highway 59 Landfill, on a site that is currently used for windrow composting. The proposed compost facility will be designed to accept up to 75,000 tons per year (TPY) of organic material that would have otherwise been composted in the existing windrow operation (25,000 TPY)[1] or landfilled (50,000 TPY). The proposed compost facility would entail installation and operation of processing and composting equipment, paved compost pads, paved access road, and a lined storm water/contact water retention pond.

The objectives of the proposed Project are:

- Provide compost capacity for an organics diversion program in Merced County as required by California legislation;
- Reduce methane emissions from landfills by diverting organics from landfill, composting new feedstocks, and reducing emissions of greenhouse gases (GHGs) by sequestering nutrient-rich compost in soils;
- Modify an existing, strategically integrated waste management facility, the Highway 59 Landfill, to accommodate the growing regulatory demand for composting mixed materials, organic waste, and food waste;
- Receive and compost food wastes derived from commercial and residential sources to increase diversion of organic materials from landfills;
- Continue to provide economic benefits to the County through employment of local residents, expansion of operational solid waste management activities, and construction of new processing equipment;
- Contribute to the implementation of Assembly Bill (AB) 341, which directs the California Department of Resources Recycling and Recovery (CalRecycle) to increase statewide diversion of organic waste from landfills to 75% by 2020;
- Enhance the business community's ability to comply with AB 1826 which, as of April 1, 2016, requires businesses that generate more than a specific amount of organic waste per week to arrange for recycling services for that organic waste in a specified manner (such as composting) to substantially reduce landfill disposal of food wastes;
- Comply with San Joaquin Valley Air Pollution Control District (SJVAPCD) rules and regulations; and
- Create water saving opportunities by using compost to enhance agricultural soil.

[1] Permitted capacity of existing compost facility; actual throughput has been less than the permitted capacity.

Air Quality Impact Analyses

The air quality impact analyses consisted of a determination of the criteria pollutant[2] emissions due to construction and operations of the proposed Project. Potential health risks due to toxic air contaminants (TACs) were also evaluated. The potential for impacts due to odors from the proposed Project was reviewed.

Construction Emissions

The construction emissions analysis was performed using the California Emissions Estimator Model® (CalEEMod) version 2022.1.1.20 (CAPCOA 2023), the official statewide land use computer model designed to provide a uniform platform for estimating potential criteria pollutant emissions associated with construction of a land use project. The model quantifies direct emissions from construction, including vehicle use, and can incorporate mitigation such as enhanced dust control, if needed. Construction emissions are summarized in Table ES-1 and compared to the applicable SJVAPCD California Environmental Quality Act (CEQA) significance thresholds. As shown in Table ES-1, the criteria pollutant emissions due to Project construction would be less than significant.

Operations Emissions

Operations emissions were estimated based on the proposed throughput of the CASP compost operations using standard, agency-accepted emission factors. Annual criteria pollutant emissions are summarized in Table ES-1. In the SJVAPCD, sources subject to permitting are compared to the CEQA significance criteria separately from sources not required to obtain permits, such as on-road mobile sources.

As shown in the table, emissions from the proposed Project would be less than the SJVAPCD CEQA significance thresholds for all criteria pollutant emissions from operation of permitted and non-permitted sources, and the Project would yield an overall net reduction of respirable particulate matter (PM_{10}) emissions compared to the existing windrow composting operation.

Table ES-1: Comparison of Construction and Operations Emissions to SJVAPCD CEQA Significance Thresholds

Category	NO_x (TPY)	VOC (TPY)	CO (TPY)	SO_x (TPY)	PM_{10} (TPY)	$PM_{2.5}$ (TPY)
Project Construction Emissions	1.25	0.13	1.36	0.0023	0.95	0.17
CEQA Construction Threshold	10	10	100	27	15	15
Exceed Threshold?	*No*	*No*	*No*	*No*	*No*	*No*

[2] Criteria pollutants are pollutants for which federal or State ambient air quality standard have been set to protect human health and include, but are not limited to, nitrogen oxides (NO_x), sulfur oxides (SO_x), carbon monoxide (CO), and fine and respirable particulate matter (PM_{10} and $PM_{2.5}$). Volatile Organic Compounds (VOC), also known as reactive organic gases (ROGs), are also regulated as criteria pollutants since VOC are a precursor to ozone.

Category	NO_x (TPY)	VOC (TPY)	CO (TPY)	SO_x (TPY)	PM_{10} (TPY)	$PM_{2.5}$ (TPY)
Project Permitted Source Emissions	0.00	24.53	0.00	0.00	0.38	0.07
Contemporaneous Reductions (Baseline)	0.00	22.61	0.00	0.00	0.08	0.02
Net Emissions Increase	0.00	1.91	0.00	0.00	0.30	0.05
CEQA Permitted Source Threshold	10	10	100	27	15	15
Exceed Threshold?	*No*	*No*	*No*	*No*	*No*	*No*
Project Non-Permitted Source Emissions	2.85	0.56	9.98	0.03	1.59	0.27
Contemporaneous Reductions (Baseline)	1.10	0.34	5.91	0.01	2.80	0.32
Net Emissions Increase or Decrease	1.74	0.22	4.06	0.02	(1.21)	(0.05)
CEQA Non-Permitted Source Threshold	10	10	100	27	15	15
Exceed Threshold?	*No*	*No*	*No*	*No*	*No*	*No*
Total Net Project Permitted + Non-Permitted Source Emissions	1.74	2.13	4.06	0.02	(0.91)	0.00

Ambient Air Quality Analysis (AAQA)

Consistent with SJVAPCD guidance, Project emissions were compared to an AAQA screening threshold of 100 pounds per day for each criteria pollutant for construction, permitted sources, and permit-exempt sources. The results are summarized in Table ES-2. As shown in the table, Project emissions do not exceed the screening thresholds, which indicates that the proposed Project would have a less than significant impact on ambient air quality. Additional modeling is not required.

Table ES-2: Project Emissions Compared to Daily AAQA Screening Level

Category	NO_x (lb/day)	VOC (lb/day)	CO (lb/day)	SO_x (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
Project Construction Emissions	36.09	3.74	33.99	0.05	15.08	4.13
AAQA Construction Screening Level	100	100	100	100	100	100
Exceed Screening Level?	*No*	*No*	*No*	*No*	*No*	*No*

Category	NO_x (lb/day)	VOC (lb/day)	CO (lb/day)	SO_x (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
Project Permitted Source Emissions	0.00	134.38	0.00	0.00	2.39	0.44
Contemporaneous Reductions (Baseline)	0.00	123.92	0.00	0.00	0.48	0.12
Net permitted emissions increase	0.00	10.47	0.00	0.00	1.91	0.33
AAQA Permitted Source Screening Level	100	100	100	100	100	100
Exceed Screening Level?	*No*	*No*	*No*	*No*	*No*	*No*
Project Non-Permitted Source Emissions	18.25	3.59	63.94	0.21	10.22	1.73
Contemporaneous Reductions (Baseline)	7.08	2.16	37.90	0.09	14.21	1.69
Net non-permitted emissions increase or decrease	11.18	1.42	26.05	0.12	(3.98)	0.04
AAQA Non-Permitted Source Screening Level	100	100	100	100	100	100
Exceed Screening Level?	*No*	*No*	*No*	*No*	*No*	*No*

Health Risk Prioritization

The SJVAPCD requires the evaluation of TAC emissions from the Project to determine the potential health risk impacts. A two-step process can be followed, where initially a screening risk prioritization is conducted. If the potential for high health risks is found, then a Health Risk Assessment (HRA) may be required. The HRA predicts the potential acute, chronic, and carcinogenic health risks from the Project.

The California Air Pollution Control Officers Association (CAPCOA) prioritization guidelines outline a technique for calculating a prioritization score (PS) that helps air districts identify priority facilities for risk assessment, which involves consideration of potency, toxicity, quantity of emissions, and proximity to sensitive receptors such as hospitals, daycare centers, schools, worksites, and residences. If the PS exceeds the intermediate risk level or high risk level after consideration of additional factors, a refined HRA is recommended to determine if the Project's potential health risks are significant.

- Low Score: Projects having a PS of less than 1 are low risk and are not likely to have an adverse health risk.
- Intermediate Score: Projects having a PS of at least 1 and less than 10 need to evaluate additional factors to determine if the project's TAC emissions will have a less than significant health risk.
- High Score: Projects having a PS equal to or over 10 may have high risk. A refined HRA may be necessary to demonstrate that the project's TAC emissions will have a less than significant health risk.

To assess the potential health risk from the proposed Project, a PS was calculated at the nearest residential receptor; the results are shown in Table ES-3. The nearest residential receptor is a farmhouse located approximately 1 mile south of the Project site. Since the PS is low, the population density in the vicinity of the Project is low, and the nearest sensitive receptor is 1 mile away, the Project's health risk impacts are less than significant.

Table ES-3: Summary of Prioritization Scores

Project Phase	Acute	Chronic	Cancer	Prioritization Score
Construction	0.00	4.1E-04	0.276	Low
Operations	5.10E-03	5.61E-03	0.50	Low

Odor Impacts

The proposed Project will process organic waste in a CASP composting system, which will replace the existing windrow composting process, and will divert additional organics, including commercial food waste, from landfill to the CASP compost facility. The CASP compost operations are less likely to cause odor impacts than the windrow composting they will replace because the CASP compost piles do not have to be turned during the active phase of composting like windrows do, and the CASP system will employ a biofilter to reduce emissions and odors. The facility will develop and implement an Odor Impact Minimization Plan (OIMP). The nearest sensitive receptor is 1 mile from the facility. The potential for odor impacts was determined to be less than significant.

GHG Emissions Impact Analyses

Impacts due to GHG[3] emissions from the proposed Project were also analyzed.

Construction Emissions

CalEEMod (version 2022.1.1.20) was used to estimate potential GHG emissions associated with construction of the proposed Project. CalEEMod quantifies direct GHG emissions from construction, including vehicle use, as well as indirect GHG emissions, such as emissions from energy use, solid waste disposal, vegetation planting and/or removal, and water use. Total construction GHG emissions are amortized over the assumed 30-year life of the Project to determine the annualized GHG contribution from construction activities. Construction GHG emissions are summarized in Table ES-4.

Operations Emissions

The proposed Project would take organic wastes, including commercial food waste, destined for landfill and divert those materials to composting. This waste management alternative is specifically identified in the AB 32 Scoping Plan to reduce methane emissions from landfills, as methane is a powerful climate pollutant. Thus, the proposed Project is consistent with, and helps to achieve, the goals of the State's climate action plans.

The proposed Project would also convert the existing windrow composting operation to CASP composting. The CASP technology reduces water use during composting, thus reducing GHG emissions associated with pumping requirements, and reduces fuel consumption in heavy equipment by reducing the waste management activities associated

[3] GHGs include, but are not limited to, carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O).

with windrow composting, such as periodic turning of the compost piles by a windrow turner.

The GHG emissions from the proposed Project are summarized in Table ES-4. As shown, the proposed Project yields a net reduction in GHG emissions of more than 2,300 metric tons (MT) of carbon dioxide equivalents (CO_2e) per year.

Table ES-4: Proposed Project GHG Emissions and Net Emission Change

Activity	CO_2 (MT/yr)	CH_4 (MT/yr)	N_2O (MT/yr)	CO_2e (MT/yr)
Construction (amortized over 30 years)	8.72	0.00	0.00	8.80
Project Mobile Sources	3,187	70	14	3,260
Compost Facility	0	0	0	0
Baseline Landfill	-	-	-	(4,169)
Baseline – Mobile Sources	(1,395)	(41.23)	(8.10)	(1,416)
Net Change	-	-	-	(2,315)

Conclusions

The CEQA Guidelines Appendix G checklist questions applicable to air quality and GHG emissions were reviewed to determine the significance of the impacts and any mitigation requirements. The findings are summarized below:

- The proposed Project would not conflict with or obstruct implementation of the applicable air quality plan. Vehicle use and emissions related to waste management have been accounted for in the regional planning emissions inventories and forecasts. Compliance with the SJVAPCD's New Source Review (NSR) program and other applicable regulations would ensure that the Project is consistent with these plans.
- Criteria pollutant emissions would not exceed CEQA significance thresholds for any aspect of the Project (construction, permitted source operations, non-permitted source operations) for any pollutant.
- Project construction, permitted source, and non-permitted source emissions would not exceed the SJVAPCD daily AAQA screening threshold of 100 pounds per day for any pollutant. Therefore, the proposed Project would have less than significant ambient air quality impact, and additional modeling is not required.
- Impacts from TAC emissions were found to have a low risk PS at the nearest residential receptor. Because the closest residential receptor is 1 mile from the Project location and the population density is low in the vicinity of the Project site, a low PS indicates that the Project would have less than significant health risk impacts.
- The proposed Project was evaluated for the potential to cause adverse impacts due to odors. In this case, the closest sensitive receptor is located approximately 1 mile to the south of the Project location. With the proper operation of the CASP and implementation of an OIMP, odor impacts are expected to be less than significant.

- The proposed CASP compost facility would support California's goals related to waste diversion that aim to reduce GHG emissions by composting rather than landfilling. Reducing GHG emissions would have a beneficial impact on the environment and would be consistent with applicable plans.

Given the analyses summarized above and detailed in this report, and with the implementation of the Project features, air quality impacts from the proposed Project would be either beneficial (i.e., cause a net reduction in emissions) or less than significant.

GHG emissions would be reduced with the implementation of the Project, and hence, the Project would be beneficial with respect to GHG emissions.

1.0 INTRODUCTION

1.1 Project Overview

Agromin intends to replace the existing 25,000 TPY green waste windrow composting facility operated by the County with a 75,000 TPY CASP system to compost green waste and food waste to comply with Senate Bill (SB) 1383, AB 341, AB 1826, and other California regulations. The compost facility would be located on the County's Highway 59 Landfill property, which encompasses approximately 609.64 acres, of which the proposed compost facility would occupy the same 10 acres as the current compost facility. The Agromin facility will be designed to accept up to 75,000 TPY of green waste and food waste and would store up to 100,000 cubic yards of organic material on-site that would have otherwise been landfilled. The composting facility would include installing CASP technology with processing and composting equipment on a paved or compacted soil compost pad draining to a lined pond.

The following are the objectives of the proposed Project:

- Provide compost capacity for a transformative organics diversion program in California as required by California legislation;
- Reduce methane emissions from landfills by removing organics from landfills, composting new feedstocks, and reducing GHG emissions by sequestering nutrient-rich compost in soils;
- Modify an existing, strategically integrated waste management facility (Highway 59 Landfill) to accommodate the growing regulatory demand for mixed materials, organic waste, and food waste composting;
- Receive and compost food wastes derived from commercial and residential sources, increase diversion of organic materials from landfills by expanding the approved feedstock list to include digestates;
- Allow pre-processing food waste operations at the facility;
- Continue to provide economic benefits to Merced County through employment of local residents, the expansion of operational solid waste management activities, and construction of new processing equipment;
- Comply with SJVAPCD rules and regulations;
- Facilitate the implementation of AB 341, which directs CalRecycle to increase statewide diversion from landfills to 75% by 2020;
- Enhance the business community's ability to comply with SB 1383 which, as of January 2022, requires businesses that generate a specific amount of organic waste per week to arrange for recycling services for that organic waste in a specified manner (such as composting) to substantially reduce landfill disposal of food wastes; and
- Create water saving opportunities by using compost to enhance agricultural soil.

1.2 Project Location and Surrounding Land Uses

The proposed composting facility would be located adjacent to the existing Highway 59 Landfill in Merced County (outside of the Merced city limits). Lands surrounding the Highway 59 Landfill are used for grazing and agriculture. All land surrounding the site is zoned A-1 and A-2 General Agricultural Zone. The site is in a region of Merced County and the San Joaquin Valley that is transitional between the agriculturally intensive valley floor and the Sierra Nevada foothills. This area is typified by undulating, westerly-tending slopes and agricultural uses that do not require irrigation and tillage. The United States (U.S.) Soil Conservation Service has characterized soils in this corridor along the east side of Merced County as having limitations that make them less desirable for most types of farming. Therefore, this region generally supports rangeland for beef and cattle grazing and is less developed in terms of agricultural activities. The area lacks urban development. Figure 1-1 shows the regional location of the Agromin composting site. Figure 1-2 shows an aerial view of the composting site boundary. Figure 1-3 provides a site plan of the proposed operations.

1.3 Current Operations

The Project site is currently used for windrow composting and curing, with a throughput limit (as defined by the SJVAPCD air permits for the facility) of 25,000 TPY. Supporting activities include green waste receiving and storage, grinding and screening, finished compost storage, and finished compost load-out. The air quality permits currently associated with the site are listed in Table 1-1. These permits are in the process of being transferred from Merced County to Agromin. The facility has permits from other State agencies; these other permits are not related to air quality and are not listed.

Table 1-1: List of Current Agromin Composting Facility Air Permits

Permit Number	Equipment Description	Status
N8533-1	Green Waste Receiving	Active
N8533-2	Windrow Composting	Active
N8533-3	Compost Load-out	Active
N8533-4	Screening	Active
N8533-6	Grinding	Active

Figure 1-1: Regional Location of the Agromin Composting Site

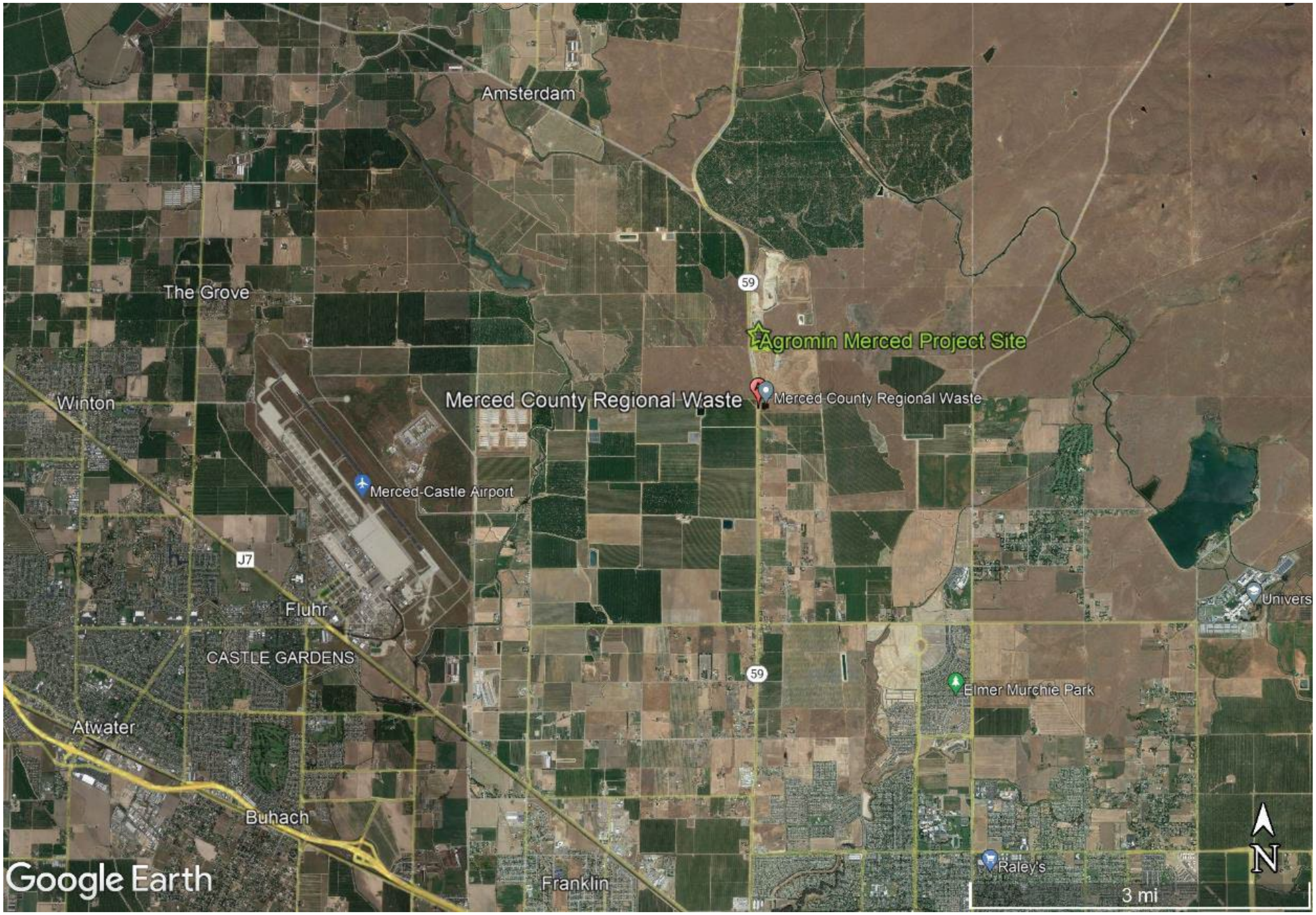
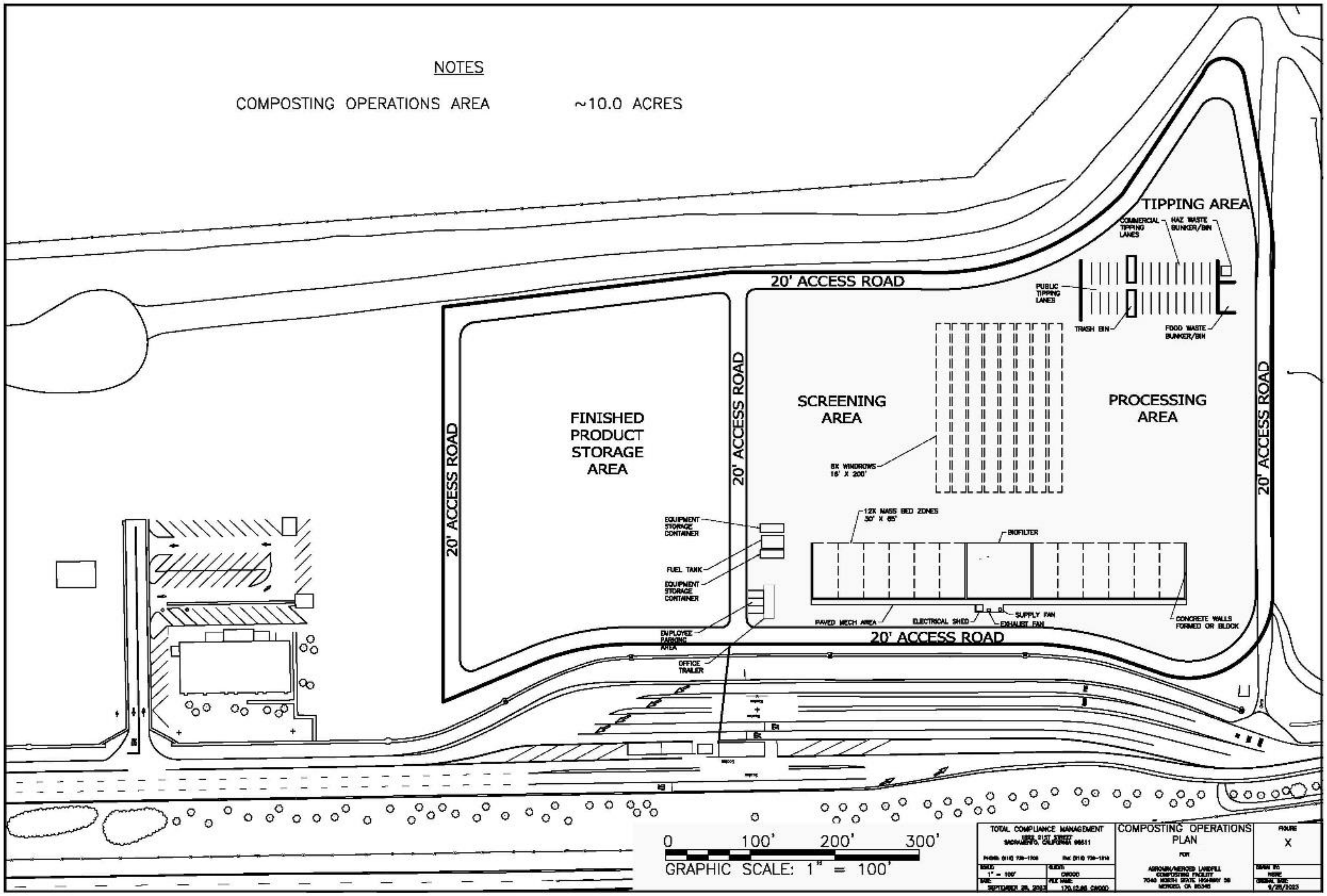


Figure 1-2: Aerial View of the Agromin Composting Facility Site Boundary

Figure 1-3: Plot Plan of the Proposed Composting Facility



1.4 Proposed Project

1.4.1 Site Preparation/Construction

The 10-acre site is located where the existing green waste composting and food waste transfer facility is currently operating. Construction at the site would last approximately 5 to 6 months and would include the installation of processing and composting equipment for a 75,000 TPY CASP module, a 10-acre compacted soil and concrete compost pad, and a lined pond to collect contact water. Figure 1-3 provides a site plan of the proposed operations.

Temporary construction equipment would include a grader, tractor, loader, backhoe, and rubber-tired bulldozer. The existing access to the landfill would be utilized to gain access to the compost facility.

The Central Valley Regional Water Quality Control Board (RWQCB) would require site improvements as part of the approval process for this Project. The landfill property currently has site-specific Waste Discharge Requirements (WDRs) for water quality protection. The WDRs would need to be revised to reflect operational changes associated with the proposed compost facility and additional regulatory requirements imposed by the RWQCB for compacted and/or paved compost pads and lined contact water storage ponds. Alternatively, the compost facility may be placed under the General Order instead of revised site-specific WDRs. Regardless, site improvements would include constructing a new lined wastewater storage pond, making additional on-site drainage improvements to continue to direct storm water and process water runoff into the detention pond, and improving working surfaces such as paving active composting and/or processing areas or amending/compacting the soil to meet the RWQCB's specifications.

1.4.2 Proposed Operations

The planned maximum annual throughput of the compost facility is 75,000 TPY, and the maximum daily throughput is 300 tons per day (TPD). However, composting operations emit VOCs over the entire duration of processing, lasting 6 weeks or more. Thus, the average daily throughput of 240 TPD better represents the process than maximum daily throughput with respect to VOC emissions generation. Maximum daily throughput impacts particulate emission rates for the initial material handling operations (grinding and material transfer), but average daily throughput better represents all subsequent process steps. To simplify the analysis and discussion, average daily throughput is used for all daily emission calculations.

1.4.2.1 Organic Waste and Material Types

Composting is the biological decomposition of organic material under aerobic conditions (i.e., in the presence of oxygen). Composting is a self-limiting biological process. Conditions that limit the microbial population include nutrient availability, temperature, aeration, moisture content, and pH. The composting process requires that microorganisms be supplied with the primary nutrients carbon and nitrogen. Carbon to nitrogen (C/N) ratios ranging from 20:1 to 30:1 are considered optimal for microorganisms. The more the C/N ratio deviates from this range, the slower the decomposition process becomes. With a ratio greater than 40:1, nitrogen represents a limiting factor, and the reaction rate slows. With a

C/N ratio lower than 15:1, excess nitrogen is driven off as ammonia (NH_3). While this loss of nitrogen is not detrimental to the decomposition process, it does lower the nutrient value of the compost product and generates ammonia emissions.

CASP technology can be designed to process a variety of composting feedstocks, including all types of compostable organic wastes, green wastes, food wastes, and clean wood wastes. Many compost facilities receive feedstocks that are predominately composed of tree prunings, leaves, grass clippings, and a small percentage of food waste. Leaves generally have a high C/N ratio. Lawn clippings and food waste lack the structure necessary to maintain porosity for aeration but have a favorable C/N ratio and moisture content for composting. The CASP compost "recipe" would vary over time as the participation in residential food waste collection programs increases over time, along with diversion of SB 1383 commercial organic wastes from landfill; however, the recipe would have a balanced C/N ratio that would yield an excellent finished compost product.

The Highway 59 Landfill currently accepts construction and demolition debris, green waste, wood waste, and agricultural waste for diversion operations, as well as municipal solid waste for landfill disposal. The Highway 59 Landfill currently disposes of organic waste within the municipal solid waste stream. Following implementation of the proposed Project, up to 75,000 TPY of organic waste would be diverted from the landfill to the compost facility.[4]

The proposed Project would be authorized to receive and handle any "compostable material" or "digestate" as authorized under current regulations [i.e., Title 14 of the California Code of Regulations (CCR), AB 1826, and SB 1383], as well as the expanded list of organic wastes that can be accepted at a Compostable Materials Handling Facility. The additional types of "mixed materials" and organic wastes would include all types of food material (including post-consumer food waste, food-soiled paper, and compostable plastics) and digestate. Some organic material may be delivered pre-processed and feedstock-ready from local material recovery facilities (MRFs) and may be deposited directly into the CASP unit without additional processing. Any feedstock approved to be processed at the facility would comply with all applicable regulations. Table 1-2 provides a description of the feedstocks the proposed composting facility would accept. The definitions are consistent with current CalRecycle and State Water Resources Control Board (SWRCB) regulations.

[4] The existing compost facility is permitted to process up to 25,000 TPY; however, throughput in the last few years has been much less. The proposed facility would divert more than 50,000 new tons of organic waste from landfill.

Table 1-2: Feedstock Definitions for Feedstocks to be Accepted under the Project

Feedstock	Definition/Description
Agricultural Materials	Waste material of plant or animal origin, which results directly from the conduct of agriculture, animal husbandry, horticulture, aquaculture, silviculture, vermiculture, viticulture and similar activities undertaken for the production of food or fiber for human or animal consumption or use, which is separated at the point of generation, and which contains no other solid waste. With the exception of grape pomace or material generated during nut or grain hulling, shelling, and processing, agricultural material has not been processed except at its point of generation and has not been processed in a way that alters its essential character as a waste resulting from the production of food or fiber for human or animal consumption or use. Material that is defined in this Section 17852 as "food material" or "vegetative food material" is not agricultural material. Agricultural material includes, but is not limited to, manures, orchard and vineyard prunings, grape pumice, and crop residues. (14 CCR §17852)
Food Material	A waste material of plant or animal origin that results from the preparation or processing of food for animal or human consumption and that is separated from the municipal solid waste stream. Food material includes, but is not limited to, food waste from food facilities as defined in Health and Safety Code Section 113789 (such as restaurants), food processing establishments as defined in Health and Safety Code section 111955, grocery stores, institutional cafeterias (such as, prisons, schools, and hospitals) and residential food scrap collection. Food material does not include any material that is required to be handled only pursuant to the California Food and Agricultural Code and regulations. (14 CCR §17852)
Digestate	Organic by-product (solid or liquid) of anaerobic digestion process.
Green Material	Any plant material except food material and vegetative food material that is separated at the point of generation, contains no greater than 1.0% of physical contaminants by dry weight, and meets the requirements of section 17868.5. Green material includes, but is not limited to tree and yard trimmings, untreated wood wastes, natural fiber products, wood waste from silviculture and manufacturing, and construction and demolition wood waste. Green material does not include food material, vegetative food material, biosolids, mixed material, material separated from commingled solid waste collection or processing, wood containing lead-based paint or wood preservative, or mixed construction and demolition debris. Agricultural material, as defined in this section 17852(a) (5), that meets this definition of "green material" may be handled as either agricultural material or green material. (14 CCR §17852)
Mixed Material	Any compostable material that is part of the municipal solid waste stream, and is mixed with or contains non-organics, processed industrial materials, mixed demolition or mixed construction debris, or plastics. A feedstock that is not source separated or contains 1.0% or more of physical contaminants by dry weight is mixed material. (14 CCR §17852)

Feedstock	Definition/Description
Organic Wastes	Solid wastes containing material originated from living organisms and their metabolic waste products, including but not limited to food waste, green waste material, landscape and pruning waste, applicable organic textiles and carpets, wood, lumber, fiber, paper products, printing and writing paper, manure, biosolids, digestate, and sludges. (SB 1383 or as may be amended)
Pre-processed feedstock-ready CASP materials	Some organic material may be delivered pre-processed and feedstock-ready from local material recovery facilities and may be deposited directly into the CASP unit without further processing.

The proposed Project would obtain a Solid Waste Facility Permit that would prohibit the following types of wastes at the compost facility:

- Hazardous, radioactive, designated, and medical wastes;
- Dead animals, septage, ash, and painted or treated wood;
- Mixed (municipal) solid waste and mixed construction and demolition materials;
- Burning material;
- Manure from known infected herds or sources as monitored and reported by the California Department of Food and Agriculture (CDFA); and
- Biosolids or any type of sewage sludge.

1.4.2.2 Hours of Operation

The operating schedule for the proposed compost facility would generally be consistent with the operating schedule for the adjacent landfill. The landfill and existing compost facility are permitted to be open 24 hours per day, 7 days per week; however, the Highway 59 Landfill is currently open to the public from 8:00 a.m. to 3:30 p.m. Monday-Friday and 8:00 a.m. to 12:00 p.m. Saturday, as well as seven nights per week from 3:00 a.m. to 7:00 a.m. for commercial hauling vehicles only. The landfill and composting facilities may be closed on federal holidays.

1.4.2.3 Feedstock Receiving and Storage

An existing 25,000 TPY windrow composting operation is currently operated at the Project site. The proposed Project would increase composting capacity at the site to 75,000 TPY. The additional tonnage would primarily be diverted from the adjacent landfill. The landfill currently accepts construction and demolition debris, green waste, wood waste, and agricultural waste. The compost facility would be designed to process organic waste that would be considered new tons to comply with SB 1383. The organic waste would be delivered to the proposed compost facility by collection vehicles, transfer trailers, and self-haul vehicles. Recovered green waste and wood waste would be diverted into the composting facility.

The Project allows for pre-processed feedstock-ready material to be placed directly into the CASP unit, bypassing storage. However, much of the feedstock will require blending to ensure the proper moisture content, bulk density, porosity, and C/N ratio (blending is discussed in more detail below). To ensure that materials are available for blending, some feedstock storage is anticipated. Co-collected residential organic wastes and mixed materials with food waste may be stored outdoors for up to 48 hours. Green waste may be stored outdoors for up to 7 days in a designated area. Wood waste may be stored outdoors for up to 30 days in a designated area.

1.4.2.4 Green Waste Pre-Processing Operations

Through education, awareness, monitoring, and reporting, the Merced County Regional Waste Management Authority (MCRWMA) will work with the County, the cities, and their haulers to minimize contamination placed in organic waste carts and bins. Once received, the organic green waste would be load-checked for non-compatible wastes and contamination, which would be removed manually on the sort floor for outdoor operations or by mechanical processing equipment operated inside a building. Non-compostable residual material would be sorted and containerized on-site and transported for landfill disposal within 48 hours of collection.

1.4.2.5 Chipping and Grinding

In preparation for the active composting phase, feedstock materials may be processed by grinding. Grinding of the feedstock reduces the volume of material, increases the surface area to promote biological decomposition, and provides a relatively uniform mixture of material and particle size.

Chipping and grinding would generally occur on the day of receipt for co-collected residential organics, and up to 7 days following receipt for green waste.

1.4.2.6 Feedstock Storage

The outdoor organic waste processing area would have a capacity to store up to 10,000 cubic yards of wood waste, green waste, and co-collected waste. Stockpiles would be separated by 20-foot-wide fire lanes consistent with applicable fire district standards. Green waste and co-collected residential organics would be stockpiled on a pad for a maximum period of 48 hours. Wood waste may be stored for up to 30 days. The processed co-collected organics material storage area would be constructed with a compacted all-weather pad equipped with a gravity drain to the lined contact water storage pond.

1.4.2.7 Food Waste Pre-Processing

Food waste material will be processed before being deposited in the CASP, either on-site or off-site. For those feedstocks that are not pre-processed off-site, the Project would allow for reception and pre-processing of commercial organic waste and food material/mixed material pre-processing at the facility. Statistics on the comingled commercial loads materials indicate loads have an average of approximately 30% by weight non-compostable contamination rate, even when best management practices are followed at the source. Transfer trailers, collection trucks, or end dump vehicles would transport unprocessed commercial organic waste to the Project site, where it would be weighed on certified scales. Delivery trucks would travel to a dedicated receiving and storage area within a designated bunker where the material would be offloaded. Vectors would be controlled by good housekeeping practices and covering the storage bunkers with tarps for overnight storage.

The proposed Project would utilize state-of-the-art extruder-type food processing technology to pre-process commercial organic waste. Using a front-end loader, materials and organic waste would be loaded from the bunker into an infeed bin to be mechanically separated from the non-compostable waste.

1.4.2.8 Blending

Feedstock may consist of organic materials, including green waste, clean dimensional lumber, agricultural materials (such as grape pomace), and food wastes. The amounts of these materials that make up the feedstock "recipe" are critical for optimizing the C/N ratio, bulk density, and porosity. Green waste materials with small percentages of food waste introduced to the mixture are ideal for the CASP technology, based on experience with the materials generated in the region. High percentages of food waste or other similar high-density materials may be too dense to be composted as-is, because dense materials do not allow for proper airflow through the CASP. Bulking materials, such as compost overs or shredded wood waste, can be added to decrease the bulk density and improve porosity. A typical recipe for CASP compost systems can vary from 10% to 25% food material to green waste and wood materials.

The existing Solid Waste Facility Permit for the landfill property allows for reception and storage of green waste and wood waste and the grinding process. In addition to grinding, this Project would allow further processing through a screen or similar equipment to further size-separate the feedstock. Feedstock would be blended with processed food waste in a ratio of 10% to 35% food material to green waste and wood materials, which would then be placed in the CASP for composting. Additional equipment, such as a grinder, conveyors, food waste processing, and screen, would be installed on the Project site to complete these process operations.

The co-collection of green waste with food material from residential sources (co-collected residential organics) is an emerging trend in California to meet SB 1383 objectives. The amount of residential food material varies from 3% to 7%, with seasonal peaks up to 10%, of the green waste volume, based on seasonal factors and special holiday events. The co-collected residential organics would be delivered to the site by local collection vehicles or from transfer trailers and would be received and processed outdoors in the tipping area, unless an alternate method is developed as part of an enhanced odor mitigation plan.

Establishing the proper moisture content for a composting pile is important; the optimum water content is about 50% by weight. If the pile is too dry, the microbes go dormant. Therefore, if the feedstock is too dry, water is added to establish the proper moisture content prior to introduction into the CASP. If the compost pile is too wet, saturated conditions can cause the pile to become anaerobic due to poor oxygen circulation. In this case, the moisture content of the feedstock is adjusted by blending with drier materials prior to placing the material into the CASP.

1.4.2.9 Covered Aerated Static Pile (CASP) Composting

The proposed CASP composting process consists of primary and secondary operations, with both positive and/or negative aeration capability. CASP technology is superior to traditional composting methods, such as windrows, because air is mechanically added to the piles as needed based on continuous temperature monitoring. When operating with positive airflow,[5] a "cap" or "cover" of cured compost is placed over the pile to serve as a biofilter layer to significantly reduce the VOC emissions. When operating with negative airflow, the exhaust air is routed through a fixed bed biofilter for emissions control.

Composting piles remain in the primary CASP unit for 24 days prior to being moved by a loader or conveyance system to the secondary CASP unit[6] for another 24 days, with some variation in composting time depending on feedstock composition, temperature, moisture, season of the year, and stability of the compost at the end of the primary phase. The secondary CASP serves to ensure that adequate decomposition is attained in the event uniform decomposition was not achieved during the primary phase. After secondary composting, the material is moved to the curing pad to mature.

<u>Pile Construction</u>

Following pre-processing, grinding, and blending or receipt of feedstock-ready materials (as discussed above), the materials would be placed in static piles not exceeding 250 feet long by 100 feet wide and approximately 10 feet in height within the primary CASP unit.

The piles would be constructed using a loader to stack the material. Underlying the piles would be perforated pipes (up to 32 pipes and eight blowers per CASP unit, or fan group), which may be embedded in the concrete pad or may be flexible pipes placed on grade within each static pile, which provide positive aeration to the bottom of the piles from air handling units or "blowers" as part of the initial phases to aerate the mass. After the piles are constructed, they are covered with approximately 12 inches of cured compost material, which acts as a biofilter to reduce harmful emissions and potential odors. The compost cover itself is moisture-conditioned using a sprinkler system through the active composting phase, as needed, to maintain its effectiveness in controlling emissions and odors.

<u>Temperature Control</u>

The composting process produces heat as a result of bacteriological metabolism. Initially, the heat generated by mesophilic bacteria elevates the pile temperature to about 50°C (122°F) or more. As the mesophilic bacteria population decreases due to the high temperature, thermophilic bacteria take over and elevate the temperature up to 60°C (140°F) or more. Over time and under the proper environmental conditions (i.e., the presence of oxygen, water, and nutrients), the microorganisms are self-limiting, and the temperature stabilizes between 55°C (131°F) and 75°C (167°F).

The composting piles are instrumented with wireless automated temperature probes for ongoing temperature monitoring throughout the active composting process. Temperatures would be monitored to ensure that the prescribed regulatory period of 72 consecutive hours

[5] Positive aeration occurs when air is pushed through the perforated pipes under positive pressure. The air is forced from the bottom of the pile to the top and is exhausted to the atmosphere from the surface of the static piles. Negative aeration occurs when the perforated pipes are put under negative pressure (i.e., a vacuum). Under negative aeration, air is drawn downward through the pile and is exhausted through the blower discharge to a fixed bed biofilter for emissions control.

[6] The primary and secondary CASP units would be identical in construction, layout, and operation. Moving the material from the primary to the secondary CASP unit would allow for re-blending of the organic materials, which eliminates hot spots, eliminates areas where clumping or channeling occurred, and provides the opportunity for moisture adjustment, all of which would improve the composting process and final product.

at no less than 55°C (131°F) is satisfied for the Process to Further Reduce Pathogens (PFRP) requirement.

Pile temperature can be moderated using the aeration system. Based on monitoring and operational protocol, the aeration system is activated to induce airflows through the CASP. Increasing the airflow provides oxygen, which increases metabolic activity and raises temperature; reducing airflow reduces oxygen levels, which reduces biological activity and lowers temperature. A vast excess of air can also be used to dissipate heat from the piles.

Aeration System

The Project design may consist of negative air, positive air, or reversing air scenarios that would be analyzed as the Project is developed. There are several aeration floor designs to be considered as well, including pipe-on-grade with a static pile placed on top or an in-floor Trench or Sparger system within concrete bunkers. The CASP system includes infrastructure to push airflow into the compost material (positive aeration) and/or pull airflow from the compost material (negative aeration) during the active compost phase, which may include both primary and secondary batch systems.

The CASP aeration process is highly automated and controlled. The aeration timing and flow rates are varied, as needed, to optimize the composting process and minimize odors and emissions. A push/pull system can then switch from positive to negative airflow.

An active aeration system provides ideal conditions for the composting process and is expected – on a per ton of compost basis – to reduce system footprint, composting retention time, movement of material once on-site, the amount of off-road equipment needed, and odor and VOC emissions compared to traditional windrow composting. The system would be designed to satisfy the requirements of SJVAPCD Rule 4566, which regulates organic material composting operations.

Emission Control

The CASP composting system would use wet suppression/water sprays to help reduce fugitive dust during material receiving/mixing, active and curing phase composting, and finished compost storage and loadout.

As described above, the aeration system would utilize either positive and/or negative aeration. A biofilter layer on the static pile is used for emissions control during periods of positive aeration. A fixed bed biofilter is utilized for emissions control during negative aeration. A push/pull system can switch between positive and negative airflow and would therefore utilize both a biofilter layer and a fixed bed biofilter, depending on the orientation of the airflow.

1.4.2.10 Curing

When the active composting phase is complete, the curing phase begins. The composting piles are dismantled and transported to the curing area by a front-end loader. Curing allows the compost material to mature and is essential in the development of a stable, high-quality product. Curing piles are constructed with front loaders and are approximately 20 feet wide, 250 feet long, and 15 feet high. Material placed in the curing area would typically cure for 3 months or more. Moisture may also be added to the curing windrows, as needed, to maintain suitable curing conditions and control dust.

1.4.2.11 Screening

After the curing process, the composted materials are screened based on customer demand, but typically to 3/8 inch and smaller (sometimes referred to as the "unders"), to remove oversized particles and contaminants (plastic, glass, etc.) and provide a final compost product specific for its end use.

This screening process also produces an oversized finished compost (typically >3/8 inch) product. This material is typically referred to as "overs" and generally consists of composted pieces of woody material. Overs are not generally considered a residual; they are a valuable part of the finished compost. There are many uses for overs, such as composted mulch, biofilter media, erosion control, compost bulking agent, and soil amendment. However, due to the rather low nitrogen content and size of this material, the value tends to be less than the unders fraction. In addition, film plastic contaminants, a common problem when composting residential wastes, tend to be concentrated into the overs fraction of the finished compost. Because of this contamination, some end uses of the overs may be limited or unavailable. Depending on inbound feedstock contamination levels and the tendency to concentrate film plastics into the overs fraction through screening, a portion of overs may end up as landfill alternate daily cover (ADC).

1.4.2.12 Odor Control

As described above, a biofilter layer on the static pile is used for emissions control during periods of positive aeration. A fixed bed biofilter is utilized for emissions control during negative aeration. Because many of the volatile organic emissions from composting are malodorous, VOC emissions control also controls odors.

A site-specific OIMP will be prepared consistent with CalRecycle requirements, which includes multiple design and operational measures to reduce odors, including a time limit for outdoor storage of 48 hours for unprocessed co-collected materials.

1.4.2.13 Equipment List

The proposed Project would operate equipment for material handling, size reduction and screening, and residual/contamination removal (such as film plastic) from the feedstocks, composted materials, and finished compost. The proposed equipment supports the following processes:

1. Pre-processing to support receipt of green material, food material, mixed material, and organic waste;
2. Chipping and grinding to ensure uniform particle size;
3. Static pile construction and deconstruction;
4. Post-processing to size and classify finished compost; and
5. On-site conveyance connecting process areas to transport material.

Table 1-3 provides a summary of the equipment proposed for the facility.

Table 1-3: Equipment List

Equipment	Quantity	Process Used In	Power Source
Fuel Truck	1	Refueling Equipment	Diesel
Tractor	2	Material Transfer	Diesel
Excavator	1	Material Transfer	Diesel
Loader	6	Material Transfer	Diesel
Office Vehicle	1	Off-Road Equipment	Diesel
Sweeper Truck	1	Off-Road Equipment	Diesel
Water Trucks	2	Off-Road Equipment	Diesel
Shop Truck	1	Off-Road Equipment	Diesel
Grinder	2	Feedstock Products (Mulching)	Electric
Conveyors	2	Feedstock Products (Mulching)	Electric
Pre-Processing Line Shredders/Grinders	Lot	Feedstock Pre-Processing Line	Electric
Pre-Processing Line Conveyors	Lot	Feedstock Pre-Processing Line	Electric
Food Waste Processing Equipment	Lot	De-package and remove contaminates to produce slurry feedstock	Electric
Processing Trommel	2	Finished Processing	Electric
Film Plastic Separator	1	Finished Processing Line	Electric
Processing Line Sizing Screen	Lot	Finished Processing Line	Electric
Processing Line Conveyors	Lot	Finished Processing Line	Electric
Shop Truck	1	Off-Road Equipment	Diesel
Processing Trommel	2	Finished Processing Line	Electric
Film Plastic Separator	1	Finished Processing Line	Electric
Processing Line Sizing Screen	Lot	Finished Processing	Electric
Processing Line Sizing Screen	Lot	Finished Processing	Electric

2.0 EXISTING AIR QUALITY SETTING

The Highway 59 Landfill is located in the San Joaquin Valley near the community of Merced in Merced County. The existing settings related to topography, meteorology, and climate; pollutant health effects and air quality background; and air quality regulatory framework are discussed in this section.

2.1 Existing Environment

The transport and dispersion of air pollutants within the valley are influenced by many complex factors. Global and regional weather patterns, local topography, and climate affect the way that pollutants are formed and dispersed. The following discussion of the existing environment is taken from the SJVAPCD's Guidance for Assessing and Mitigating Air Quality Impacts (GAMAQI) (SJVAPCD 2015).

2.1.1 Introduction

The San Joaquin Valley Air Basin (SJVAB) consists of eight counties: Fresno, Kern (western and central), Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare (see Figure 2-1). Cumulatively, these counties represent approximately 16% of California's geographic area, making the SJVAB the second largest air quality basin in California based on area. Air pollution in the SJVAB can be attributed to both human-related (anthropogenic) and natural (non-anthropogenic) activities that produce emissions. Air pollution from significant anthropogenic activities in the SJVAB includes a variety of industrial-based sources as well as on- and off-road mobile sources. Activities that tend to increase mobile activity include increases in population, increases in general traffic activity (including automobiles, trucks, aircraft, and rail), urban sprawl (which increases commuter driving distances), and general local land management practices as they pertain to modes of commuter transportation. These sources, coupled with geographical and meteorological conditions unique to the area, stimulate the formation of unhealthy air.

The San Joaquin Valley's topography and meteorology provide ideal conditions for trapping air pollution for long periods of time and producing harmful levels of air pollutants, including ozone and particulate matter. Low precipitation levels, cloudless days, high temperatures, and light winds during the summer in the San Joaquin Valley are conducive to high ozone levels resulting from the photochemical reaction of oxides of nitrogen (NO_x) and VOCs. Inversion layers in the atmosphere during the winter can trap emissions of directly emitted $PM_{2.5}$ (particulate matter that is 2.5 microns or less in diameter) and $PM_{2.5}$ precursors [such as NO_x and sulfur dioxide (SO_2)] within the valley for several days, accumulating to unhealthy levels.

The region also houses the State's major arteries for goods and people movement through the Central Valley, Interstate 5 and Highway 99, thereby attracting a large volume of vehicular traffic. Another compounding factor is the region's historically high rate of population growth compared to other regions of California. Increased population typically results in an even greater increase in vehicle activity and consumer product use, leading to increased emissions of air pollution, including NO_x. In fact, mobile sources account for about 80% of the valley's total NO_x emissions inventory. Since NO_x is a significant precursor for both ozone and $PM_{2.5}$, reducing NO_x from mobile sources is critical for progressing the valley toward attainment of ozone and $PM_{2.5}$ standards.

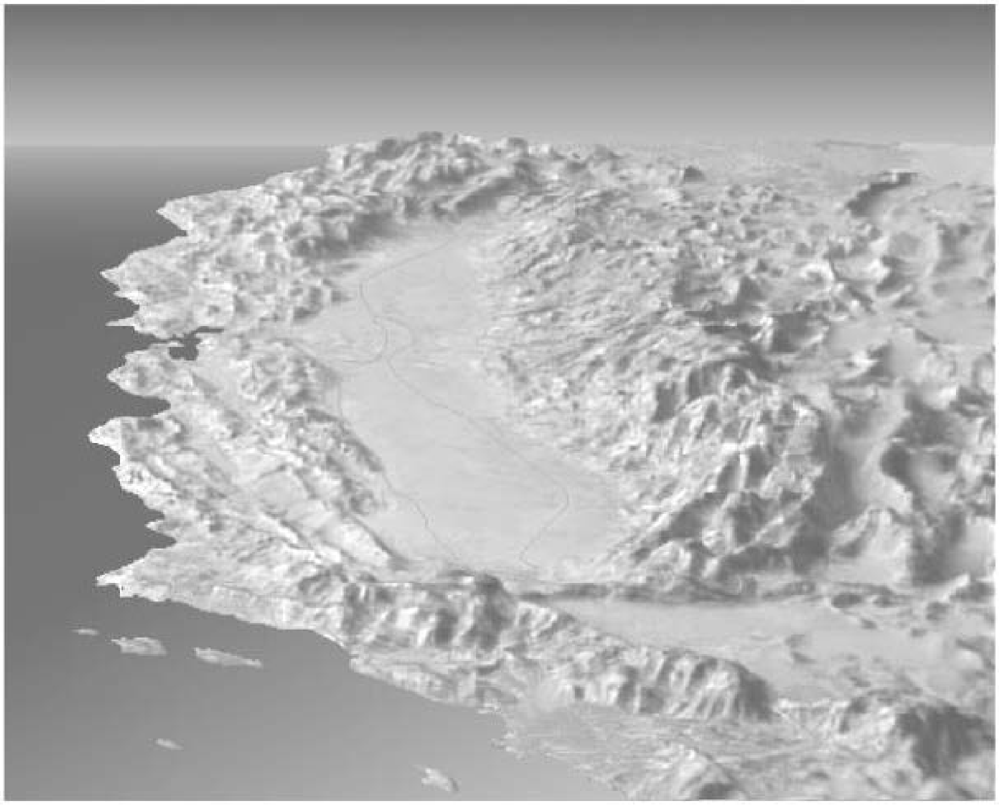
Figure 2-1: San Joaquin Valley Air Pollution Control District Boundaries

The geography of mountainous areas to the east, west, and south, in combination with long summers and relatively short winters, contributes to local climate episodes that prevent the dispersion of pollutants. Transport, as affected by wind flows and inversions, also plays a role in the creation of air pollution.

2.1.2 Topography

The climate of the San Joaquin Valley is modified by topography. This creates climatic conditions that are particularly conducive to air pollution formation. Figure 2-2 provides an aerial view of the San Joaquin Valley, illustrating its bowl shape. As shown, the San Joaquin Valley is surrounded by mountains on three sides and open to the Sacramento Valley and the San Francisco Bay Area to the north.

Figure 2-2: Aerial View of the San Joaquin Valley Air Basin



The SJVAB is in the southern half of California's Central Valley and is approximately 250 miles long and averages 35 miles wide. The San Joaquin Valley is bordered by the Sierra Nevada Mountains to the east (8,000 to 14,491 feet in elevation), the Coast Ranges to the west (averaging 3,000 feet in elevation), and the Tehachapi Mountains to the south (6,000 to 7,981 feet in elevation).

There is a slight downward elevation gradient from Bakersfield at the southeast end (elevation 408 feet) to sea level at the northwest end, where the valley opens to the San Francisco Bay at the Carquinez Straits. At its northern end is the Sacramento Valley, which comprises the northern half of California's Central Valley. The bowl-shaped topography inhibits movement of pollutants out of the valley.

2.1.3 Climate

The San Joaquin Valley is in a Mediterranean Climate Zone. Mediterranean Climate Zones occur on the west coasts of continents at 30 to 40 degrees latitude and are influenced by a subtropical high-pressure cell most of the year. Mediterranean climates are characterized by sparse rainfall, which occurs mainly in winter. Summers are hot and dry. Summertime maximum temperatures often exceed 100°F.

The subtropical high-pressure cell is strongest during spring, summer, and fall and produces subsiding air, which can result in temperature inversions in the valley. A temperature inversion can act like a lid, inhibiting vertical mixing of the air mass at the surface. Pollutant emissions can be trapped below the inversion. Most of the surrounding mountains are above the normal height of summer inversions (1,500 to 3,000 feet).

Wintertime high-pressure events can often last many weeks, with surface temperatures often dropping to between 30 and 40°F. During these events, fog can be present, and inversions are extremely strong. These wintertime inversions can inhibit vertical mixing of pollutants to a few hundred feet.

2.1.4 Wind Patterns

Wind speed and direction play an important role in dispersion and transport of air pollutants. Wind at the surface and aloft can disperse pollution by mixing and transporting the pollution to other locations.

Winds in the valley most frequently blow from the northwest, especially in summer. The region's topographic features restrict air movement and channel the air mass toward the southeastern end of the valley. Marine air can flow into the basin from the San Joaquin River Delta and over Altamont Pass and Pacheco Pass, where it can flow along the axis of the valley over the Tehachapi Pass into the Southeast Desert Air Basin. The Coastal Range is a barrier to air movement to the west, and the high Sierra Nevada range is a significant barrier to the east. Many days in the winter are marked by stagnation events where winds are very weak. Transport of pollutants during winter can be very limited. A secondary but significant summer wind pattern comes from the southeast and can be associated with nighttime drainage winds, prefrontal conditions, and summer monsoons.

Two significant diurnal wind cycles that occur frequently in the valley are the sea breeze and mountain-valley upslope and drainage flows. The sea breeze can accentuate the northwest wind flow, especially on summer afternoons. Nighttime drainage flows can accentuate the southeast movement of air down the valley. In the mountains during periods of weak synoptic scale winds, winds tend to be upslope during the day and downslope at night. Nighttime and drainage flows are especially pronounced during the winter when flow from the east is enhanced by nighttime cooling in the Sierra Nevada. Eddies can form in the valley wind flow and recirculate a polluted air mass for an extended period. Such an eddy occurs in the Fresno area during both winter and summer.

2.1.5 Temperature, Sunlight, and Ozone Production

Solar radiation and temperature are particularly important in the chemistry of ozone formation. The SJVAB averages over 260 sunny days per year. Photochemical air pollution (primarily ozone) is produced by the atmospheric reaction of organic substances (such as VOCs) and nitrogen dioxide (NO_2) under the influence of sunlight.

Ozone concentrations are dependent on the amount of solar radiation, especially during late spring, summer, and early fall. Ozone levels typically peak in the afternoon. After the sun goes down, the chemical reaction between nitrous oxide (N_2O) and ozone begins to dominate. This reaction tends to scavenge the ozone in the metropolitan areas through the early morning hours, resulting in the lowest ozone levels and possibly reaching zero at sunrise in areas with high NO_x emissions. At sunrise, NO_x tends to peak, partly due to low levels of ozone at this time and also due to the morning commuter vehicle emissions of NO_x.

Generally, the higher the temperature, the more ozone formed, since reaction rates increase with temperature. However, extremely hot temperatures can "lift" or "break" the inversion layer. Typically, if the inversion layer does not lift to allow the buildup of contaminants to be dispersed, the ozone levels will peak in the late afternoon. If the inversion layer breaks and the resultant afternoon winds occur, the ozone will peak in the early afternoon and decrease in the late afternoon as the contaminants are dispersed or transported out of the SJVAB.

Ozone levels are low during winter periods when there is much less sunlight to drive the photochemical reaction.

2.1.6 Temperature Inversions

The vertical dispersion of air pollutants in the San Joaquin Valley can be limited by persistent temperature inversions. Air temperature in the lowest layer of the atmosphere typically decreases with altitude. A reversal of this atmospheric state, where the air temperature increases with height, is termed an inversion. The height of the base of the inversion is known as the "mixing height." This is the level to which pollutants can mix vertically. Mixing of air is minimized above and below the inversion base, which represents an abrupt density change where little air movement occurs.

Inversion layers are significant in determining pollutant concentrations. Concentration levels can be related to the amount of mixing space below the inversion. Temperature inversions that occur on summer days are usually encountered 2,000 to 2,500 feet above the valley floor. In winter months, overnight inversions occur 500 to 1,500 feet above the valley floor.

2.1.7 Precipitation, Humidity, and Fog

Precipitation and fog may reduce or limit some pollutant concentrations. Ozone needs sunlight for its formation, and clouds and fog can block the required solar radiation.

Wet fogs can cleanse the air during winter as moisture collects on particles and deposits them on the ground. Atmospheric moisture can also increase pollution levels. In fogs with less water content, the moisture acts to form secondary ammonium nitrate particulate matter. This ammonium nitrate is part of the valley's $PM_{2.5}$ and PM_{10} problem.

The winds and unstable air conditions experienced during the passage of winter storms result in periods of low pollutant concentrations and excellent visibility. Between winter storms, high pressure and light winds allow cold, moist air to pool on the San Joaquin Valley floor. This creates strong low-level temperature inversions and very stable air conditions, which can lead to Tule fog. Wintertime conditions favorable to fog formation are also conditions favorable to high concentrations of $PM_{2.5}$ and PM_{10}.

2.2 Existing Air Quality

2.2.1 Characteristics of Common Air Pollutants

The Clean Air Act (CAA) requires the U.S. Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for six common air pollutants. These commonly found air pollutants (also known as "criteria pollutants") are found all over the U.S. Criteria pollutants include particle pollution [often referred to as particulate matter (i.e., PM_{10} and $PM_{2.5}$)], ground-level ozone, carbon monoxide (CO), SO_2, NO_2, and lead. These pollutants can harm individual health and the environment and cause property damage. Of these six pollutants, particle pollution and ground-level ozone are the most widespread health threats. The U.S. EPA calls these pollutants "criteria" air pollutants because it regulates them by developing human health-based and/or environmentally based criteria (science-based guidelines) for setting permissible levels. The limits based on human health are called primary standards. Another set of limits intended to prevent environmental and property damage is called secondary standards.

The following section summarizes the pollutants of greatest importance in the San Joaquin Valley. For each air pollutant, a description of the physical properties, health and other effects, sources, and the extent of problems is provided. These pollutants are identified in District Rule 1020 (Definitions) and District Rule 2201 (New and Modified Stationary Source Review Rule) as "Affected Pollutants." In general, primary pollutants are directly emitted into the atmosphere, and secondary pollutants are formed by chemical reactions in the atmosphere. Air pollution in the valley results from emissions generated in the valley, as well as from emissions and secondary pollutants transported into the valley. It is thought that the bulk of the valley's summer and winter air pollution is caused by locally generated emissions. Due to the valley's meteorology, topography, and the chemical composition of the air pollutants, NO_x is the primary culprit in the formation of both ozone and $PM_{2.5}$. The valley has been in attainment with the lead standard for decades, so lead is not discussed further.

2.2.1.1 Criteria Pollutants

Ozone (O_3) is a reactive gas consisting of three atoms of oxygen. In the troposphere, it is a product of the photochemical process involving the sun's energy. It is a secondary pollutant that is formed when NO_x and VOCs react in the presence of sunlight. However, in the stratosphere, ozone exists naturally and shields the Earth from harmful incoming ultraviolet radiation. Ozone at the Earth's surface is a major component of smog and causes numerous adverse health effects.

High concentrations of ground-level ozone can adversely affect the human respiratory system and aggravate cardiovascular disease and many respiratory ailments. Ozone also damages natural ecosystems, such as forests, as well as foothill communities, agricultural crops, and some human-caused materials, such as rubber, paint, and plastics.

Oxides of Nitrogen (NO_x) is a family of gaseous nitrogen compounds and is a precursor to the formation of ozone and particulate matter. The major component of NO_x, NO_2, is a reddish-brown gas that is toxic at high concentrations. NO_x results primarily from the combustion of fossil fuels under high temperature and pressure. Fuel combustion in on-road and off-road motor vehicles is the major source of this pollutant.

Volatile Organic Compounds (VOCs) are hydrocarbon compounds that exist in the ambient air. VOCs contribute to the formation of smog and may themselves be toxic. VOC emissions are a major precursor to the formation of ozone. VOCs often have an odor, and some examples include gasoline, alcohol, and the solvents used in paints. VOCs are sometimes referred to as reactive organic gases (ROGs).

Total Organic Gases (TOGs) include all of the ROGs, in addition to low-reactivity organic compounds like methane and acetone. ROGs and VOCs are subsets of TOG.

Particulate Matter (PM), also known as particle pollution, is a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. The size of the particles is directly linked to their potential for causing health problems. The U.S. EPA is concerned about particles that are 10 micrometers in diameter or smaller because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. The U.S. EPA groups particle pollution into three categories based on particle size and where they are deposited:

- "Inhalable coarse particles ($PM_{2.5-10}$)," such as those found near roadways and dusty industries, are between 2.5 and 10 micrometers in diameter. $PM_{2.5-10}$ is deposited in the thoracic region of the lungs.
- "Fine particles ($PM_{2.5}$)," such as those found in smoke and haze, are 2.5 micrometers in diameter and smaller. These particles can be directly emitted from sources such as forest fires, or they can form when gases emitted from power plants, industries, and automobiles react in the air. They penetrate deeply into the thoracic and alveolar regions of the lungs.
- "Ultra-fine particles (UFP)" are particles less than 0.1 micrometer in diameter largely resulting from the combustion of fossils fuels, meat, wood, and other hydrocarbons. While UFP mass is a small portion of $PM_{2.5}$, its high surface area, deep lung penetration, and transfer into the bloodstream can result in disproportionate health impacts relative to their mass.

PM_{10}, $PM_{2.5}$, and UFP include primary pollutants (emitted directly to the atmosphere) and secondary pollutants (formed in the atmosphere by chemical reactions among precursors). Generally speaking, $PM_{2.5}$ and UFP are emitted by combustion sources like vehicles, power generation, industrial processes, and wood burning, while PM_{10} sources include these same sources plus roads and farming activities. Fugitive windblown dust and other area sources are also sources of airborne particulate matter in the valley.

Acute and chronic health effects associated with high particulate levels include the aggravation of chronic respiratory diseases, heart and lung disease, coughing, bronchitis, and respiratory illnesses in children.

Carbon Monoxide (CO) is an odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels and is emitted directly into the air.

Because of the local nature of CO impacts, the California Air Resources Board (CARB) and the U.S. EPA designate urban areas as CO nonattainment areas, instead of the entire basin as with ozone and PM_{10}. Motor vehicles are by far the largest source of CO emissions. With the introduction of new automotive emission controls and fleet turnover, emissions from motor vehicles have been declining since 1985, despite increases in vehicle miles traveled. Other CO sources in the valley include other mobile sources, miscellaneous processes, and fuel combustion in stationary sources (e.g., boilers, heaters).

Sulfur Dioxide (SO_2) is a colorless, irritating gas formed primarily by the combustion of sulfur-containing fossil fuels. The SJVAB is in attainment of both the federal and California standards for SO_2. However, like airborne NO_x, suspended oxides of sulfur (SO_x) particles contribute to the poor visibility that sometimes occurs in the valley. These SO_x particles can also combine with other pollutants to form $PM_{2.5}$. The prevalence of low-sulfur fuel use in the valley has minimized impacts from this pollutant.

2.2.1.2 Other Pollutants

California has established air quality standards for some pollutants not addressed by federal standards. CARB established State standards for hydrogen sulfide, sulfates, vinyl chloride, and visibility-reducing particles. This section provides a description of these pollutants' physical properties, health and other effects, sources, and the extent of impacts.

Hydrogen Sulfide (H_2S) is associated with geothermal activity, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations. Hydrogen sulfide is extremely hazardous in high concentrations, especially in enclosed spaces [800 parts per million (ppm) can cause death]. The Occupational Safety and Health Administration regulates workplace exposures to H_2S. H_2S has a characteristic rotten egg smell.

Sulfates (SO_4^{2-}) are the fully oxidized, ionic form of sulfur. Sulfates occur in combination with metals and/or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to SO_2 during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place comparatively rapidly and completely in urban areas of California due to regional meteorological features.

The sulfates standard is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilatory function, aggravation of asthmatic symptoms, and an increased risk of cardio-pulmonary disease. Sulfates are particularly effective in degrading visibility and, due to the fact that they are usually acidic, can harm ecosystems and damage materials and property. Data collected in the SJVAB demonstrate levels of sulfates significantly less than the health standards.

Visibility-Reducing Particles are a mixture of suspended particulate matter consisting of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. The standard is intended to limit the frequency and severity of visibility impairment due to regional haze. Regional haze is characterized as a nominal visual range of less than 10 miles.

Vinyl Chloride [C_2H_3Cl, also known as vinyl chloride monomer (VCM)] is a colorless gas that does not occur naturally. It is formed when other substances such as trichloroethane, trichloroethylene, and tetrachloroethylene break down in the atmosphere. Vinyl chloride is also an industrial chemical used to make polyvinyl chloride (PVC), which is used to make a variety of plastic products, including pipes, wire and cable coatings, and packaging materials.

2.2.1.3 Infectious Agents

Valley Fever (Coccidioidomycosis) is primarily a disease of the lungs caused by inhalation of spores of the *Coccidioides immitis* fungus. The spores are found in the soil, become airborne when the soil is disturbed, and are subsequently inhaled into the lungs. After the fungal spores have settled in the lungs, they change into a multicellular structure called a spherule. Fungal growth in the lungs occurs as the spherule grows and bursts, releasing endospores, which then develop into more spherules.

The ecological factors conductive to survival and replication of the spores appear to be high summer temperatures, mild winters, sparse rainfall, and alkaline sandy soils.

Valley Fever symptoms generally occur within 1 to 4 weeks of exposure. Approximately 60% of Valley Fever cases are mild and display flu-like symptoms or no symptoms at all. Of those who are exposed and seek medical treatment, the most common symptoms are fatigue, cough, chest pain, fever, rash, headache, and joint aches. In some cases, painful red bumps may develop. These symptoms are not unique to Valley Fever and may be caused by other illnesses as well. Valley Fever is not contagious and cannot be passed from person to person. Most of those who are infected will recover without treatment within 6 months and will have lifelong immunity to the fungal spores (Valley Fever Center for Excellence 2019).

In 2017, there were 14,364 cases of Valley Fever reported to the Centers for Disease Control and Prevention (CDC 2019). Most of these cases were in people who live in Arizona or California. On average, there were approximately 200 coccidioidomycosis-associated deaths each year. The number of Valley Fever cases reported to the CDC likely underestimates the true number of Valley Fever cases. Tens of thousands more illnesses are likely to occur and may be misdiagnosed because many patients are not tested for Valley Fever.

New residents to the San Joaquin Valley have usually never been exposed to Valley Fever and are particularly susceptible to infection. Longtime residents of the valley are less prone to infection.

2.2.2 Attainment Status and Designations

The NAAQS established by the U.S. EPA apply to all areas throughout the nation. In most cases, the NAAQS define the maximum acceptable concentrations that may be reached, but not exceeded more than once per year. The California Ambient Air Quality Standards (CAAQS) are in some cases more stringent than the NAAQS and are not to be exceeded. These standards are designed to protect the public with a reasonable margin of safety. Areas that meet the ambient standards are designated as "attainment;" areas where the measured concentrations exceed the ambient standards are designated "nonattainment;" and areas where insufficient data exist to make a determination are "unclassified."

The SJVAB is currently designated as attainment (or unclassified) for the NAAQS and the CAAQS for NO_2, CO, and SO_2. The air basin is designated as nonattainment for federal and State standards for ozone and $PM_{2.5}$. The air basin is designated as attainment for federal and nonattainment for State standards for PM_{10} (CARB 2023a). Criteria pollutant concentrations have declined in the valley in recent years due to stringent control requirements promulgated by the SJVAPCD, CARB, and U.S. EPA. However, the NAAQS and/or CAAQS established for ozone, PM_{10}, and $PM_{2.5}$ are still exceeded in the SJVAB.

Attaining air quality standards in the San Joaquin Valley has proven to be challenging due to the unique topographical and meteorological conditions found in the region. The valley encompasses nearly 25,000 square miles and is surrounded by mountain ranges to the west, east, and south. The airflow through the valley can be constrained by these mountain ranges, limiting dispersion. During the winter, high-pressure systems can cause the atmosphere to become stagnant for long periods of time, where wind flow is calm and air movement is minimal. These stagnant weather systems can also cause severe nighttime temperature inversions, which exacerbate the buildup of air contaminants.

Despite these challenges, significant progress has been made in attaining the NAAQS and improving public health for valley citizens. Due to the efforts made by San Joaquin Valley businesses and residents and stringent regulatory programs by the SJVAPCD and CARB, the valley's emissions are at historically low levels, and air quality over the past few years has been better than any other time on record. Emissions from stationary sources have been reduced by 85%, cancer risk from exposure to TACs has been reduced by 95%, population exposure to elevated $PM_{2.5}$ levels has been reduced by 85%, and population exposure to elevated ozone levels has been reduced by 90% (SJVAPCD 2018).

The NAAQS and CAAQS are summarized in Table 2-1, along with the current air quality designations for the SJVAB.

Table 2-1: Ambient Air Quality Standards and SJVAB Attainment Status

Pollutant and Averaging Period		NAAQS	CAAQS	SJVAB Attainment Status	
				NAAQS	CAAQS
Ozone (O_3)	1-Hour	–	0.09 ppm	–	Nonattainment/ Severe
	8 Hour	0.070 ppm	0.070 ppm	Nonattainment/ Extreme	Nonattainment
NO_2	1-Hour	0.100 ppm	0.18 ppm	Attainment/ Unclassified	Attainment
	Annual	0.053 ppm	0.030 ppm	Attainment/ Unclassified	Attainment
CO	1-Hour	35 ppm	20 ppm	Attainment/ Unclassified	Attainment/ Unclassified
	8-Hour	9 ppm	9.0 ppm	Attainment/ Unclassified	Attainment/ Unclassified
PM_{10}	24-Hour	150 $\mu g/m^3$	50 $\mu g/m^3$	Attainment	Nonattainment
	Annual	–	20 $\mu g/m^3$	–	Nonattainment
$PM_{2.5}$	24-Hour	35 $\mu g/m^3$	–	Nonattainment	–
	Annual	12.0 $\mu g/m^3$	12 $\mu g/m^3$	Nonattainment	Nonattainment

Pollutant and Averaging Period		NAAQS	CAAQS	SJVAB Attainment Status	
				NAAQS	CAAQS
SO_2	1-Hour	0.075 ppm	0.25 ppm	Attainment/ Unclassified	Attainment
	24-Hour	0.14 ppm	0.04 ppm	Attainment/ Unclassified	Attainment
	Annual	0.03 ppm	–	Attainment/ Unclassified	–
Lead	Month	–	1.5 µg/m^3	–	Attainment
	Quarter	1.5 µg/m^3	–	Attainment	–

ppm = parts per million; µg/m^3 = micrograms per cubic meter

Sources: CARB 2016a, CARB 2018, SJVAPCD 2023.

2.2.3 Air Quality Monitoring Data

CARB and the SJVAPCD operate a regional monitoring network that measures the ambient concentrations of criteria pollutants and TACs. Locations of the State and local air monitoring stations (SLAMS) operated within the SJVAB are shown in Figure 2-3.

The monitoring sites in the network include instruments that measure ambient levels of gaseous and particulate air pollutants and, at some stations, meteorological parameters. The air quality trends at these monitoring stations are typically considered to be representative of the ambient air quality in the surrounding areas. Local air quality within a given area is affected by how pollutants are dispersed into the atmosphere, the types and quantities of emissions released, prevailing wind patterns, and atmospheric conditions.

Background air quality representative of the Project area was determined from maximum concentrations recorded at nearby monitoring stations operated by CARB or the SJVAPCD. Monitored concentrations within the Project area at the closest monitoring stations to the Project for the most recent 3 years available are summarized in Table 2-2. The closest monitoring stations for the pollutants shown in the table are the Merced M Street and Merced Coffee stations. Data were not available for CO or SO_2 in Merced. The M Street station, located at 2334 M Street, is approximately 6.5 miles south-southeast from the Project site. The Coffee station, located at 385 S. Coffee Street, is approximately 9 miles south-southeast from the Project site.

Figure 2-3: San Joaquin Valley Air Monitoring Sites

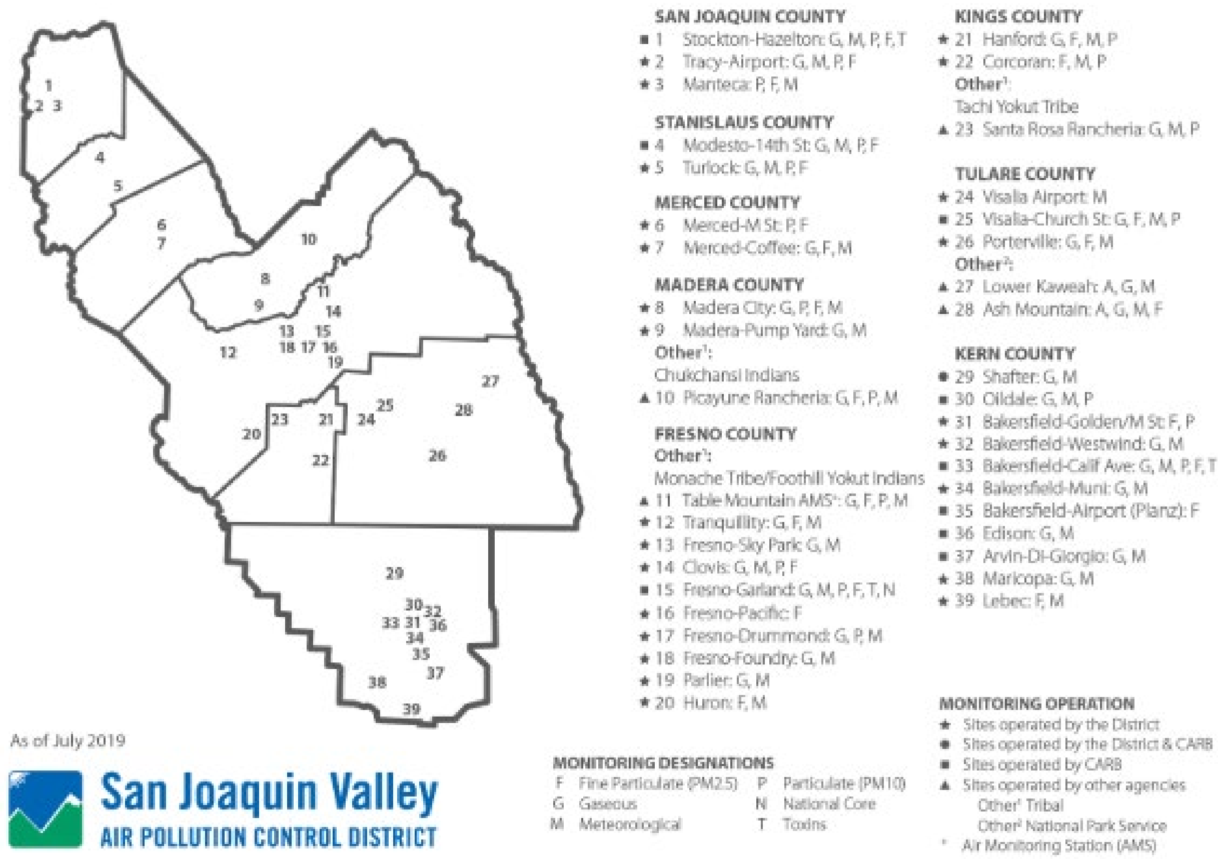


Table 2-2: Maximum Observed Criteria Pollutant Concentrations and Number of Days Over the Applicable Ambient Air Quality Standard

Pollutant[a] and Averaging Period		2020		2021		2022	
		Max. Conc.[b]	Days Exceeded	Max. Conc.[b]	Days Exceeded	Max. Conc.[b]	Days Exceeded
O_3	State 1-Hour	0.100	2	0.099	2	0.096	2
	National 8-Hour	0.087	20	0.089	21	0.083	9
NO_2	State 1-Hour	38	0	38	0	39	0
	National 1-Hour	38.5	0	38.2	0	39.1	0
	Annual	6	–	*	–	7	–
PM_{10}	State 24-Hour	209.9	13	85.8	10	100.5	60
	State Annual	*	*	*	*	*	*
	National 24-Hour	210.7	5.8	86.9	*	46.4	*
$PM_{2.5}$	State 24-hour	117.4	–	77.3	–	39.6	–
	State Annual	14.7	–	11.2	–	9.8	–
	National 24-Hour	117.4	23	77.3	13	39.6	1
	National Annual	14.6	–	11.2	–	9.7	–

Notes:

a. O_3, NO_2, and $PM_{2.5}$ data from the Coffee Street monitoring station; PM_{10} data from the M Street monitoring station.

b. O_3, NO_2, and SO_2 maximum concentrations in parts per billion (ppb); PM_{10} and $PM_{2.5}$ in micrograms per cubic meter (μg/m^3).

*Insufficient data.

Source: CARB 2023b.

2.2.4 Toxic Air Contaminants

The U.S. EPA and CARB have identified over 700 substances that are emitted into the air that may adversely affect human health. Some of these substances are considered to be carcinogens, while others are known to have short-term acute or long-term chronic health impacts.

2.2.4.1 Air Toxics Emissions Inventories

As part of ongoing efforts to identify and assess potential health risks to the public, the SJVAPCD has collected and compiled air toxics emissions data from industrial and commercial sources of air pollution throughout the San Joaquin Valley. The State has developed similar inventories for mobile sources of air pollution. These District and State inventories have been combined into CARB's California Toxics Inventory (CTI), which provides the latest emissions estimates available for hazardous air pollutants (HAPs) of concern from all sources. A summary of the latest available CTI data for key pollutants is presented in Table 2-3.

Table 2-3: Summary of San Joaquin Valley TAC Emissions

Pollutant Inventory	(TPY)
Acetaldehyde	3,512
Diesel Particulate Matter	2,520
Formaldehyde	2,318
Benzene	1,020
Perchloroethylene	448
1,3-Butadiene	269
Methylene Chloride	247
PAHs	238
Manganese	217
Acrolein	153
p-Dichlorobenzene	130
Styrene	96
Trichloroethylene	46
Chromium (total)	34
Lead	28
Nickel	18
Acrylonitrile	7
Vinyl Chloride	7
Arsenic	5
Cadmium	3
Mercury	2
Chloroform	2
Ethylene Oxide	0
Ethylene Dichloride	0
Beryllium	0
Carbon Tetrachloride	0
Dioxins/Benzofurans	0
Chromium, Hexavalent	0

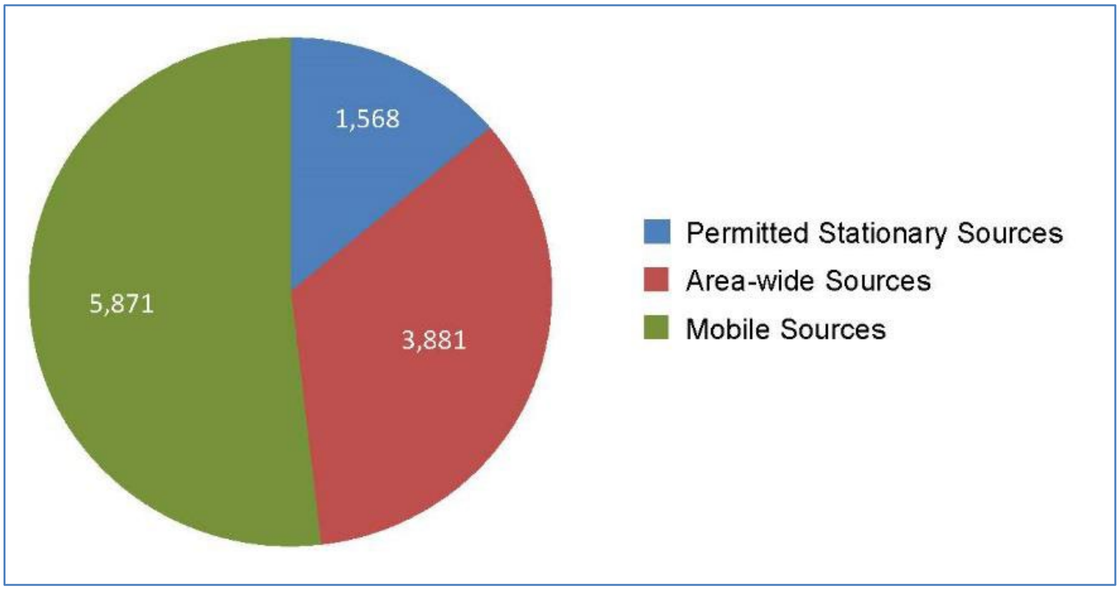
Reference: SJVAPCD 2022.

TACs[7] are emitted from mobile sources (e.g., cars, trucks, buses, tractors, etc.), which are primarily regulated by the State and the U.S. EPA; area sources (e.g., consumer products), which are regulated by the State, the U.S. EPA, and the SJVAPCD; and stationary sources, which are regulated primarily by the SJVAPCD. Figure 2-4 shows a comparison of mobile, area, and stationary source emissions of HAPs in the San Joaquin Valley. Of these sources, approximately 86% of HAP emissions occurring in the valley are from mobile sources and area sources. Mobile sources include trucks, passenger vehicles, and off-road mobile sources such as tractors and construction equipment (e.g., bulldozers, front-end loaders).

[7] TACs are also referred to as air toxics. The term “hazardous air pollutants” (HAPs) is used by the U.S. EPA and sometimes within the SJVAPCD, depending on the context. The universe of TACs is not identical to the universe of HAPs, although there is considerable overlap between the lists.

Area-wide sources are those that emit over an unspecified area. This could include paved roads, unpaved roads, or consumer product emitting sources. The balance of the TAC emissions is from stationary sources. Stationary sources include point source emissions that are usually subject to SJVAPCD permitting requirements. Stationary sources include refineries, boilers, emergency engines, gas stations, and dry cleaners.

Figure 2-4: Mobile, Area-Wide, and Stationary Source TAC Emissions (tons) in the San Joaquin Valley



Reference: SJVAPCD 2022.

2.2.4.2 Diesel Exhaust Emissions

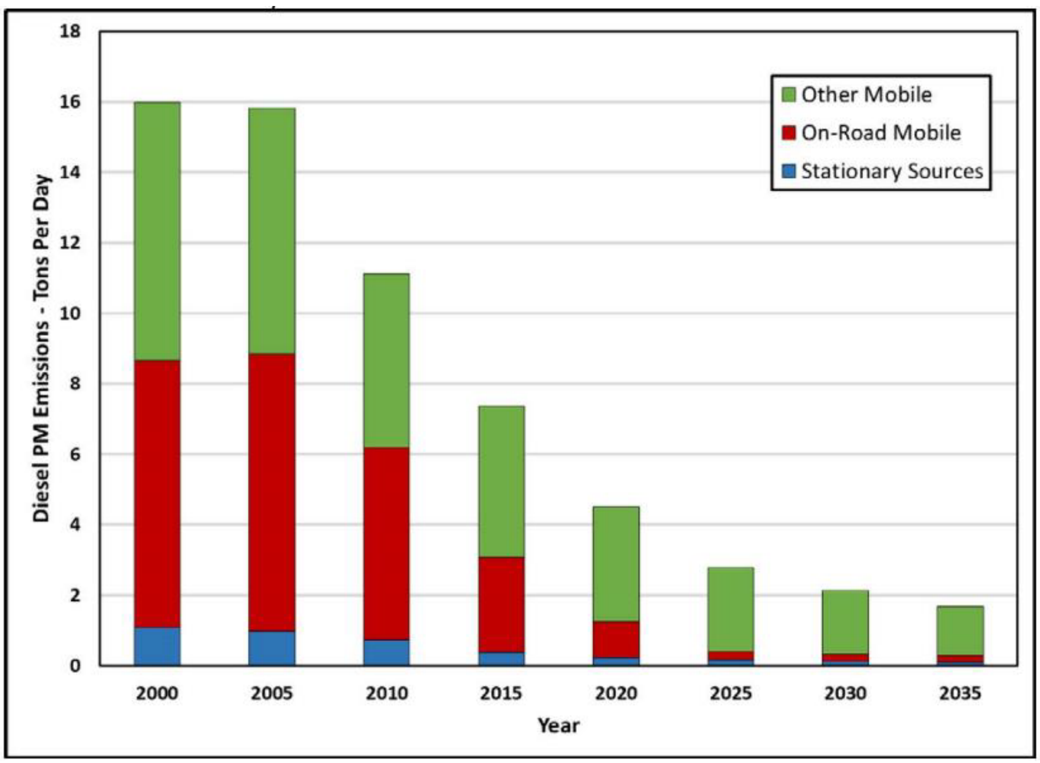
CARB identified particulate matter emissions from diesel-fueled engines as a TAC with the potential to pose a significant cancer risk to the public. Historically, the cancer risk from the exhaust of diesel internal combustion engines has been determined to be far higher than the estimated cancer risk from all other sources of air pollution combined. In its comprehensive assessment of diesel exhaust, the California Office of Environmental Health Hazard Assessment (OEHHA) analyzed more than 30 studies of people who worked around diesel equipment, including truck drivers, railroad workers, and equipment operators. The studies showed these workers were more likely to develop lung cancer than workers who were not exposed to diesel emissions. These studies provide strong evidence that long-term occupational exposure to diesel particulate matter (DPM) increases the risk of lung cancer. Using information from the OEHHA's assessment, CARB estimated that diesel particle levels measured in California's air in 2000 could cause 540 "excess" cancer cases (beyond what would occur if there were no DPM in the air) in a population of 1 million people over a 70-year lifetime (CARB 2009). Other researchers and scientific organizations, including the National Institute for Occupational Safety and Health, have calculated cancer risks from DPM that are similar to those developed by the OEHHA and CARB.

Exposure to DPM can have immediate health effects. DPM can irritate the eyes, nose, throat, and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. In studies with human volunteers, DPM made people with allergies more susceptible to the materials to which they are allergic, such as dust and pollen. Exposure to DPM also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks. In California, DPM has been identified as a carcinogen.

DPM is emitted from both mobile and stationary sources. In California, on-road diesel-fueled engines are estimated to contribute approximately 38% of the total DPM emissions, with an additional 60% attributed to other mobile sources such as construction and mining equipment, agricultural equipment, and transport refrigeration units. Stationary sources contribute about 1% of total DPM (CARB 2009).

Because of the high level of risk associated with diesel exhaust, and because of the prevalence of the engines, the State chose not to address diesel exhaust using the existing risk management guidance. Instead, the State decided to establish an advisory committee of interested parties and developed a comprehensive risk management plan that would result in significant reductions in emissions of DPM. CARB adopted the Risk Reduction Plan to Reduce Particulate Matter Emissions from mobile and stationary diesel-fueled engines. Figure 2-5 illustrates the trend and forecast of DPM emissions in the San Joaquin Valley through the year 2035.

Figure 2-5: DPM Emissions Trend, San Joaquin Valley



Reference: SJVAPCD 2022, (CARB CEPAM Database 2019 v1.04).

2.3 State and Federal Air Quality Plans, Rules, and Regulations

California contains a wide variety of climates, physical features, and emissions sources. This variety makes the task of improving air quality complex, because what works in one area may not be effective in another area. To better manage common air quality problems, California is divided into 15 air basins. An air basin generally has similar meteorological and geographical conditions throughout. To the extent possible, the air basin boundaries follow along political boundary lines.

Air quality is managed through federal (U.S. EPA), State (CARB), and regional air quality management agencies (e.g., SJVAPCD). This section identifies air quality regulations applicable to, or potentially applicable to, the proposed Project.

2.3.1 Federal Regulation

The U.S. EPA is responsible for implementing programs established under the federal CAA, establishing NAAQS, and judging the adequacy of State Implementation Plans (SIPs). The SIP is a State-level document that identifies all air pollution control programs within California that are designed to help the State meet the NAAQS. The U.S. EPA also has regulatory and enforcement jurisdiction over emissions sources beyond State waters (outer continental shelf) and those that are under the exclusive authority of the federal government, such as aircraft, locomotives, and interstate trucking. The U.S. EPA sets federal vehicle and stationary source emission standards, as well as providing research and guidance for air pollution programs. The U.S. EPA may also delegate authority to implement some federal programs to the states while retaining oversight authority to ensure that the programs are properly implemented.

Title V of the federal CAA, as amended in 1990, created an operating permit program for certain defined sources. One of the primary Title V applicability criteria is based on the facility's potential to emit, and the emission threshold varies by the attainment status of the local area. For example, owners/operators of industrial sources that emit more than 100 TPY of NO_x or VOCs must possess a Title V permit. If a source is located in a federal ozone nonattainment area classified as "Serious Nonattainment," this threshold is lowered to 50 TPY. For "Severe Nonattainment" areas, the threshold is lowered to 25 TPY, and for "Extreme Nonattainment" areas, the threshold is further lowered to 10 TPY. The lowering of the thresholds results in more businesses having to comply with Title V permitting requirements in areas with worse air quality. The U.S. EPA defined the basic requirements of the Title V program under the Code of Federal Regulations (CFR) Title 40 Part 70, and each air district, including the SJVAPCD, has adopted rules specific to their area to implement the Title V program. The SJVAPCD Title V program is codified under Rule 2520, as discussed in Section 2.3.4. Title V is not meant to impose any new air pollution standards, require installation of any new controls on the affected facilities, or require emissions reductions. Title V does enhance public and U.S. EPA participation in the permitting process and requires additional recordkeeping and reporting by businesses, which may result in additional administrative requirements.

The U.S. EPA also establishes New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP) for a variety of stationary sources of emissions, codified in 40 CFR Parts 60, 61, and 63. Implementation and enforcement of most of these standards has been delegated to the SJVAPCD. NSPS and NESHAP standards are discussed in Section 2.3.4.

2.3.2 California Regulation

CARB is responsible for establishing and reviewing the CAAQS, compiling the California SIP (composed of attainment plans from each air district classified as nonattainment of the NAAQS and/or CAAQS), and securing approval of the SIP from the U.S. EPA. CARB acts as an oversight agency for activities conducted by air districts, which are organized at the regional or county level. CARB is also responsible for the following types of regulatory activities:

- <u>Mobile Sources and Portable Equipment:</u> Establishing tailpipe standards and regulating emissions from on-road and off-road mobile sources and portable equipment;
- <u>TAC Emissions:</u> Identifying TACs, developing airborne toxic control measures (ATCMs), and overseeing implementation of regulations, including the Air Toxics "Hot Spots" Program (AB 2588), which requires air toxics emissions inventories, HRAs, and risk reduction programs; and
- <u>Greenhouse Gases:</u> Implementing regulations designed to reduce emissions of GHGs, such as methane and carbon dioxide. AB 32 requires that California implement regulations designed to reduce GHG emissions (See Section 5 for additional details).

Potentially applicable California regulations are discussed below.

- <u>CCR Title 13, Chapter 9, Article 4.8, Section 2449</u>: CARB has enacted a regulation for the reduction of DPM and criteria pollutant emissions from in-use off-road diesel-fueled vehicles. This regulation provides target emission rates for PM and NO_x emissions from owners of fleets of diesel-fueled off-road vehicles and applies to equipment fleets of three specific size categories. The target emission rates are reduced over time. This regulation may be applicable to the heavy equipment operated at the Project site to manage feedstock and compost, e.g., front-end loaders.
- <u>California Health and Safety Code (H&SC) 41700 (Health Risk Assessment):</u> These requirements are generally implemented through the local air districts. Pursuant to SJVAPCD Policy APR 1905 – Risk Management Policy for Permitting New and Modified Sources, for an increase in TAC emissions associated with a proposed new source or modification to an existing source, an analysis is needed to determine the potential health risk impacts to the nearest resident or worksite. An HRA will be completed during the air permit application review.
- <u>California Diesel Fuel Regulations:</u> With the California Diesel Fuel Regulations, CARB set sulfur limitations for diesel fuel sold in California for use in on-road and off-road motor vehicles. Under this rule, the sulfur content of diesel fuel used in motor vehicles, except harbor craft and intrastate locomotives, is limited to 15 ppm.
- <u>14 CCR Chapter 3.1, §17863.4; California Integrated Waste Management Board:</u> All commercial composting facilities in California are required to "prepare, implement, and maintain" a site-specific OIMP. OIMPs must provide guidance to on-site operations personnel by describing the following items:

- An odor monitoring and data collection protocol for on-site odor sources, which describes the proximity of possible odor receptors and a method for assessing odor impacts at the locations of the possible odor receptors;
- A description of meteorological conditions affecting migration of odors and/or transport of odor-causing material off-site; seasonal variations that affect wind velocity and direction shall also be described;
- A complaint response and recordkeeping protocol;
- A description of design considerations and/or projected ranges of optimal operation to be employed in minimizing odor, including method and degree of aeration, moisture content of materials, feedstock characteristics, airborne emissions production, process water distribution, pad and site drainage and permeability, equipment reliability, personnel training, weather event impacts, utility service interruptions, and site-specific concerns as applicable; and
- A description of operating procedures for minimizing odor, including aeration, moisture management, feedstock quality, drainage controls, pad maintenance, wastewater pond controls, storage practices (e.g., storage time and pile geometry), contingency plans (i.e., equipment, water, power, and personnel), biofiltration, and tarping as applicable.

Odor regulation and enforcement at compost facilities are regulated by CalRecycle, the successor agency to the California Integrated Waste Management Board.

- <u>In-Use Off-Road Diesel-Fueled Fleets Regulation:</u> All self-propelled off-road diesel vehicles 25 horsepower or greater used in California and most two-engine vehicles (except on-road two-engine sweepers) are subject to the Regulation for In-Use Off-Road Diesel-Fueled Fleets (Off-Road Regulation). This includes vehicles that are rented or leased.

  The purpose of the Off-Road Regulation is to reduce emissions of NO_x and PM from off-road diesel vehicles operating within California. The Off-Road Regulation:

  - Imposes limits on idling, requires a written idling policy, and requires a disclosure when selling vehicles;
  - Requires vehicles to be reported to CARB [using the Diesel Off-Road Online Reporting System (DOORS)] and labeled;
  - Restricts the addition of older vehicles into fleets starting on January 1, 2014; and
  - Requires fleets to reduce their emissions by retiring, replacing, or repowering older engines, or installing Verified Diesel Emission Control Strategies (i.e., exhaust retrofits).

- <u>ATCM for Portable Diesel-Fueled Engines:</u> The purpose of the Portable Diesel ATCM is to protect public health by controlling PM emissions from diesel-fueled portable engines rated at 50 horsepower and greater operating in California. All existing portable diesel engines were required to be certified by January 1, 2010, and all new portable engines were required to meet the latest certification standards. In addition, the ATCM contains stringent DPM fleet standards that apply after 2010.

The latest version of the ATCM became effective on November 30, 2018, and contains stringent emissions standards and operational requirements that impact new and existing portable diesel engines. The SJVAPCD has been implementing the requirements of the Portable ATCM in the review of applications for District Portable Registrations and permits for portable diesel engines. This ATCM is expected to continue to result in a substantial reduction in valley DPM emissions over the next several years.

- ATCM for Stationary Diesel-Fueled Engines: The purpose of the Stationary Diesel ATCM is to protect public health by controlling PM and criteria pollutant emissions from stationary diesel-fueled portable engines rated at 50 horsepower and greater operating in California.

  This ATCM is satisfied via SJVAPCD Rule 4702 (Internal Combustion Engines) in combination with District permitting or the Permit-Exempt Equipment Registration (PEER) program. These District programs have collectively been found by CARB to be equivalent to the Stationary ATCM for stationary agricultural engines. This ATCM and District Rule 4702 are expected to continue to result in a substantial reduction in valley DPM emissions over the next several years.

- ATCM to Limit Diesel-Fueled Commercial Motor Vehicle Idling: CARB initially adopted this ATCM to reduce emissions of toxics and criteria pollutants by limiting idling of new and in-use sleeper berth-equipped diesel trucks. The emission performance requirements require technologies used as alternatives to idling the truck's main engine. The new engine requirements required 2008 and newer model year heavy-duty diesel engines to be equipped with non-programmable engine shutdown systems that automatically shut down the engine after 5 minutes of idling or, alternatively, meet a more stringent NO_x idling emission standard. Beginning January 1, 2008, in-use truck requirements require operators of both in-state and out-of-state registered sleeper berth-equipped trucks to manually shut down their engine when idling more than 5 minutes at any location within California. Each year, heavy-duty diesel truck idling contributes to hundreds of pounds of PM and other pollutants within the valley. The SJVAPCD Incentive Program has subsidized truck stop support equipment to reduce diesel truck idling along the main goods movement corridors. Tests conducted by the District and CARB have determined that an idling truck can consume up to 1 gallon of diesel fuel per hour. The idling of heavy-duty trucks, at the time of delivery, represents a high percentage of emissions around developed areas in the valley.

- California Environmental Quality Act (CEQA): CEQA requires each public agency to adopt objectives, criteria, and specific procedures consistent with CEQA Statutes and the CEQA Guidelines for administering its responsibilities under CEQA, including the orderly evaluation of projects and preparation of environmental review documents. The purpose of CEQA is to:

- Inform governmental decisionmakers and the public about the potential significant environmental effects of proposed activities;
- Identify the ways that environmental damage can be avoided or significantly reduced;
- Prevent significant avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible; and
- Disclose to the public the reasons why a governmental agency approved the project in the manner the agency chose, if significant environmental effects are involved.

2.3.3 SJVAPCD Regional Air Quality Attainment Plans

The CAA requires that each state develop a SIP that demonstrates how the NAAQS will be achieved, maintained, and enforced. Each air district in California is responsible for developing the portion of the air quality attainment plan (AQAP) for the region under its jurisdiction. Air districts such as the SJVAPCD are responsible for regulating stationary sources at industrial and commercial facilities and for preparing the AQAPs that are required under the federal CAA and California CAA.

Management of air quality in the SJVAB is the responsibility of the SJVAPCD. The SJVAPCD is responsible for monitoring air quality within the valley, preparing AQAPs to ensure that NAAQS are attained as expeditiously as practical, implementing regulations/rules that have been identified in the AQAP, and developing control measures to reduce existing emissions and improve air quality. To that end, the SJVAPCD has developed AQAPs demonstrating attainment of the NAAQS for ozone, PM_{10}, and $PM_{2.5}$. AQAPs potentially applicable to the proposed Project are summarized below.

2.3.3.1 SJVAPCD 2023 Maintenance Plan and Redesignation Request for the Revoked 1-Hour Ozone Standard

The U.S. EPA set the 1-hour ozone NAAQS at 124 ppb on February 8, 1979, and later revoked the standard in 2004 to be replaced by a more health-protective 8-hour ozone NAAQS in 1997 of 84 ppb. This standard was lowered in 2008 to 75 ppb, and then once more in 2015 to 70 ppb. When the U.S. EPA revoked the 1-hour standard, it identified the revoked requirements applicable to implementation of the 1-hour standard and those that remained in effect. The U.S. EPA adopted anti-backsliding provisions to preserve existing 1-hour ozone control measures and emission reduction obligations; therefore, nonattainment areas were still obligated to meet Rate of Progress emission reduction targets, adopt mandatory control measures, and any extant attainment demonstration obligations. In order to terminate anti-backsliding provisions for the revoked 1-hour ozone standard, including Section 185 (nonattainment fees), the District must meet all five criteria of Section 107(d)(3)(E) of the CAA. The 2023 Maintenance Plan and Redesignation Request for the Revoked 1-Hour Ozone Standard includes such requirements and all provisions for a maintenance plan. The plan includes a list of contingency measures that would be used to ensure future compliance once triggered. The contingency measures focus primarily on commercial/industrial combustion sources such as boilers, flares, dryers, ovens, engines, and turbines.

2.3.3.2 SJVAPCD 2022 Plan for the 2015 8-Hour Ozone Standard, Adopted December 15, 2022

The 2022 Ozone Plan builds upon comprehensive strategies already in place from adopted District plans and CARB statewide strategies. The District's current rules and regulations reflect technologies and methods that are beyond control levels established under the CAA. Overall, the aggressive control strategy included in the 2022 Ozone Plan will reduce NO_x emissions by 72% between 2018 and 2037, contributing to the valley's progress toward attainment of the 2015 8-hour ozone standard. In addition to the regulatory strategy contained in the Plan, the District and State incentive programs will also reduce emissions from mobile sources in the coming years.

The 2022 Ozone Plan includes a number of measures committing the District to explore and implement a variety of stationary source emission reduction opportunities, including:

- Six proposed source-specific rules focused on VOC emissions from the oil and gas sector;
- An incentive program (grant funding) to accelerate the replacement of older, high emitting equipment with lower emitting equipment and technologies; and
- Identified areas of future study, focused on NO_x emissions from small combustion sources and VOC emissions from stationary sources, including oil and gas and composting.

This plan relies heavily on mobile source reductions from CARB and the U.S. EPA to achieve attainment with the 2015 8-hour ozone standard.

2.3.3.3 CARB 2022 State Strategy for the State Implementation Plan

The 2022 State SIP Strategy includes a number of commitments to reduce emissions from mobile sources, consumer products, pesticides, and primarily federally and internationally regulated sources.

2.3.3.4 2020 Reasonably Available Control Technology (RACT) Demonstration for the 2015 8-Hour Ozone Standard (June 18, 2020)

The U.S. EPA's Final Rule for Implementation of the 2015 8-Hour Ozone NAAQS establishes guidance for air districts to demonstrate that RACT levels of emission controls are being implemented. Much of the approach from the SIP demonstration elements under the 2008 Ozone SIP Requirements Rule [80 Federal Register (FR) 12265, March 6, 2015] is retained for the 2015 Ozone NAAQS.

Pursuant to U.S. EPA guidance, this RACT Demonstration is composed of several main elements:

- A demonstration that U.S. EPA Control Technique Guidelines are being implemented in the valley, and a discussion and recertification of the negative declarations for categories that do not exist in the valley;

- A demonstration that all major NO_x and VOC sources in the valley are covered by RACT rules; and
- A demonstration that the District's rules for ozone precursors (NO_x and VOCs) satisfy RACT levels of stringency, applicability, and enforceability.

2.3.3.5 2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards (November 15, 2018)

The SVJAB is designated as a serious nonattainment area for the annual and 24-hour NAAQS for $PM_{2.5}$. The SJVAPCD has prepared multiple plans for addressing the $PM_{2.5}$ NAAQS, which was promulgated in 1997.

On October 15, 2018, the SJVAPCD adopted the 2018 Integrated Plan for the $PM_{2.5}$ NAAQS. The AQAP includes a strategy that demonstrates attainment with the $PM_{2.5}$ standards by December 2025.

2.3.3.6 The 2007 PM_{10} Maintenance Plan

The SJVAPCD adopted the "2007 PM_{10} Maintenance Plan" in September 2007 to formally request that the U.S. EPA redesignate the valley as a PM_{10} attainment area and to ensure continued attainment of the PM_{10} standards.

On September 12, 2008, the U.S. EPA redesignated the SJVAB as an attainment area for the PM_{10} NAAQS. The U.S. EPA noted that the maintenance plan retains all PM_{10} controls and monitoring for the SJVAB, provides a demonstration that the area will continue to be in attainment until 2020, and provides for contingency measures if the area does not continue to be in attainment.

2.3.4 SJVAPCD Rules and Regulations

The SJVAPCD is responsible for establishing and enforcing air quality rules and regulations. SJVAPCD rules applicable or potentially applicable to the proposed Project are presented in this section. Federal regulations have been incorporated into many SJVAPCD rules, and the applicability of each federal rule is described.

2.3.4.1 Rule 2010 – Permits Required

Rule 2010 requires that an Authority to Construct (ATC) and a Permit to Operate (PTO) be obtained prior to constructing, altering, replacing, or operating any device which emits or may emit air contaminants.

2.3.4.2 Rule 2201 – New and Modified Stationary Source Review

Rule 2201 provides for the review of new and modified stationary sources of air pollution and provides mechanisms, including emissions offsets, by which ATCs of such sources may be granted without interfering with the attainment or maintenance of an ambient air quality standard (AAQS). The SJVAPCD NSR rule applies to new stationary sources and modifications to existing stationary sources which are subject to SJVAPCD permitting requirements. The rule generally requires that new or modified equipment meet Best Available Control Technology (BACT) requirements and that emissions increases above specified thresholds be offset. Some sources may require public noticing during application processing, and some sources may require ambient air quality modeling.

- Best Available Control Technology (BACT)

  Pursuant to Section 4.1 of Rule 2201, BACT is triggered on a pollutant-by-pollutant basis and on an emissions unit-by-emissions unit basis. While the proposed Project yields a net decrease in VOC emissions compared to the existing operations, the proposed Project will emit more than 2 pounds of VOCs per day and will trigger BACT for VOC emissions.

  The compost facility will be constructed with CASP technology for aerating the compost piles. Emission controls include a biofilter layer of cured compost to control emissions during periods of positive aeration and a fixed bed biofilter to control emissions during periods of negative aeration. Aerated piles with biofilter controls satisfy BACT for composting.

- Offsets

  Pursuant to Section 4.5.3 of Rule 2201, offsets are triggered on a pollutant-by-pollutant basis and are required if the post-Project stationary source potential to emit is equal to or greater than the emissions offset threshold levels listed in Rule 2201. District Rule 2201 specifies two methodologies for calculating the required offset quantity: 1) District offset quantity and 2) federal offset quantity.

  For a new major facility, federal offsets would be required. These provisions do not apply to the proposed Project because the proposed Project is neither a new facility nor a major source.

  For a modified facility, as would be the case for the proposed Project, Rule 2201 requires District offsets when the post-project emissions exceed the pre-project emissions and the net increase exceeds the applicable offset threshold. The proposed Project will yield a net reduction in VOC emissions from stationary sources and a small increase in PM_{10} and $PM_{2.5}$ emissions. VOC emission reductions do not trigger offset requirements, and the PM_{10} and $PM_{2.5}$ emissions are well below the offset thresholds. Thus, offsets are not required for this Project.

- Ambient Air Quality Analysis (AAQA)

  Emissions from a new or modified stationary source shall not cause or make worse the violation of an AAQS. In making this determination, the Air Pollution Control Officer (APCO) shall take into account the increases in minor and secondary source emissions as well as the mitigation of emissions through offsets obtained pursuant to this rule. Compliance with this requirement would be demonstrated through modeling.

  At the discretion of the APCO, a new or modified source which is not subject to the public noticing requirements of Section 5.4 (of Rule 2201) shall be exempted from the modeling requirements of Section 4.15.1 of the rule.

- Public Notification

  Pursuant to Section 5.4 of Rule 2201, public notification and publication are required for the following types of applications:

- New Major Sources, Federal Major Modifications, and SB 288 Major Modifications;
- Any new emissions unit with a potential to emit greater than 100 pounds during any 1 day for any one affected pollutant;
- Modifications that increase the Pre-Project Stationary Source Potential to Emit (SSPE1) from a level below the emissions offset threshold level to a level exceeding the emissions offset threshold level for one or more pollutants;
- New stationary sources with Post-Project Stationary Source Potential to Emit (SSPE2) exceeding the emissions offset threshold level for one or more pollutants; and
- Any permitting action resulting in a Stationary Source Increase in Permitted Emissions (SSIPE) exceeding 20,000 pounds per year for any one pollutant.

The proposed Project does not meet any of the above criteria. Therefore, public notification will not be required for the air permit application(s).

2.3.4.3 Rule 2520 – Federally Mandated Operating Permits

Operating permits are required for major sources with a potential to emit over specific thresholds based on the attainment status of the area, major sources of HAPs, and sources that are subject to certain federal regulations. This requirement comes from Title V of the CAA Amendments of 1990. Consequently, these types of operating permits are called Title V permits. In the San Joaquin Valley, Title V permits are issued by the SJVAPCD pursuant to Rule 2520.

Pursuant to Rule 2201, for determining Major Source status, fugitive emissions shall only be included for calculating the SSPE2 if the source is included in one of the source categories listed in 40 CFR Section 51.165(a)(1)(iv)(C), or when determining if a stationary source is a major air toxics source as defined in Rule 2520. CASP composting is not a source category listed in Part 51.

The Project includes both “point sources” and “fugitive sources.” In simple terms, point sources are those sources that can reasonably be routed through a stack, and fugitive sources are those sources that cannot. The SJVAPCD has determined that CASP composting will be regulated as a point source. Other sources at the facility, including raw material storage, finished product storage, and road dust, are regulated as fugitive sources.

Excluding fugitive sources, the facility VOC emissions would be approximately 5.5 TPY, which would not exceed the Major Source threshold of 10 TPY. Emissions of all other pollutants would be well below Major Source thresholds. The facility would not be subject to Title V permitting requirements.

2.3.4.4 Rule 4001 – New Source Performance Standards

This rule incorporates the NSPS from 40 CFR Part 60 and applies to new sources of air pollution and modifications of existing sources of air pollution that meet the applicability requirements listed in 40 CFR Part 60.

The proposed grinders and screens will be powered by electric motors, not diesel engines, so the NSPS for stationary engines will not apply. The compost operation itself, i.e., the CASP, is not subject to any federal NSPS.

2.3.4.5 Rule 4002 – National Emission Standards for Hazardous Air Pollutants

This rule incorporates the NESHAPs from 40 CFR Parts 61 and 63 and applies to sources of HAPs as defined in each subpart.

The proposed grinders and screens would be powered by electric motors, not diesel engines, so the NESHAPs for stationary engines would not apply. The compost operation itself, i.e., the CASP, is not subject to any federal NESHAPs.

2.3.4.6 Rule 4101 – Visible Emissions

Rule 4101 prohibits visible air contaminant discharge into the atmosphere for a period or periods aggregating more than 3 minutes in any 1 hour with 20% opacity or greater.

Paved working surfaces, the use of street sweepers, and the application of water for dust suppression would ensure compliance with this rule.

2.3.4.7 Rule 4102 – Nuisance

Rule 4102 prohibits discharge of air contaminants which could cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public; endanger the comfort, repose, health, or safety of any such person or the public; or cause or have a natural tendency to cause injury or damage to business or property.

In addition to being visible emissions, fugitive dust can also be a nuisance. Paved working surfaces, the use of street sweepers, and the application of water for dust suppression would ensure that fugitive dust emissions from the facility are in compliance with this rule.

Odors from industrial sources are generally regulated by the SJVAPCD under Rule 4102; however, odors from compost facilities are regulated by CalRecycle pursuant to the Public Resources Code. The requirement under this regulation for an OIMP would ensure that odors from the compost facility are not a nuisance.

2.3.4.8 Rule 4201 – Particulate Matter Concentration

Rule 4201 applies to sources that emit or may emit dust, fumes, or total suspended particulate. The rule prohibits discharge of dust, fumes, or total particulate into the atmosphere from any single source operation in excess of 0.1 grain per dry standard cubic foot.

This rule applies primarily to sources that exhaust through a stack and would not normally be applied to compost or storage piles.

2.3.4.9 Rule 4202 – Particulate Matter Emission Rate

Rule 4202 limits PM emissions by establishing allowable emission rates. PM emissions from any source operation shall not exceed the hourly emission rate allowed by Rule 4202.

Compost and storage piles would be routinely watered to enhance biological degradation during composting, enhance emission control of gaseous emissions from the piles, and reduce dust emissions.

The maximum daily throughput of the facility is 300 TPD, with a 9-hour workday, or an average throughput of 33.33 tons per hour. For throughputs in excess of 60,.000 pounds per hour, PM emissions are limited by rule according to the following formula:

$$E = 17.31 \times P^{0.16}$$

Where P is the process rate.

For a throughput of 33.33 tons per hour, the emission limit is 30.33 pounds per hour. As shown in Table 3.4, total PM_{10} emissions from all composting activities are 2.39 pounds per day, or about 0.27 pounds per hour. Compliance with Rule 4202 is expected.

2.3.4.10 Rule 4565 – Biosolids, Animal Manure, and Poultry Litter Operations

The purpose of this rule is to limit emissions of VOCs from operations involving the management of biosolids, animal manure, or poultry litter. The provisions of this rule apply to all facilities whose throughput consists entirely or in part of biosolids, animal manure, or poultry litter and operators who landfill, land apply, compost, or co-compost these materials.

Operators of composting/co-composting facilities with throughputs of at least 20,000 wet tons per year but less than 100,000 wet tons per year must either implement at least four Class One mitigation measures listed in Table 2 of the rule or implement at least three Class One mitigation measures in addition to one Class Two mitigation measure on active composting processes.

The proposed Project may process biosolids or animal waste material. Therefore, the requirements of this rule would apply to the proposed Project. The Project design incorporates the following rule-specified mitigation measures: regular sweeping all areas that are used to manage compost, watering the compost piles, managing oxygen content of the compost piles, and providing aeration to the compost piles. Compliance is expected.

2.3.4.11 Rule 4566 – Composting Operations

The proposed compost facility would be subject to the provisions of this rule. The rule requires that active composting be initiated within 3 days following receipt of the organic material, covered with a waterproof material, or removed from the site. While composting, the facility must implement mitigation measures as specified in the rule. The compost facility is expected to be in compliance with the applicable rule requirements.

2.3.4.12 Rule 4801 – Sulfur Compounds

This rule limits the emissions of sulfur compounds. The rule applies to any discharge to the atmosphere of sulfur compounds which would exist as a liquid or a gas at standard conditions. The rule prohibits the discharge into the atmosphere of sulfur compounds in concentrations greater than 2,000 parts per million by volume (ppmv) as SO_2 on a dry basis averaged over 15 consecutive minutes. Use of CARB diesel fuel in the operating equipment would ensure compliance at the proposed compost facility.

2.3.4.13 Rule 8011 – General Requirements

The purpose of Regulation VIII (Fugitive PM_{10} Prohibitions) is to reduce ambient concentrations of PM_{10} by requiring actions to prevent, reduce, or mitigate fugitive dust emissions. The rules contained in Regulation VIII have been developed pursuant to U.S. EPA guidance for serious PM_{10} nonattainment areas. The rules are applicable to specified anthropogenic fugitive dust sources. Fugitive dust contains PM_{10} and particles larger than PM_{10}.

Paved working surfaces, the use of street sweepers, and the application of water for dust suppression would ensure compliance with this rule.

2.3.4.14 Rule 8021 – Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities

This rule limits fugitive dust emissions from construction, demolition, excavation, extraction, and other earthmoving activities. This rule applies to any such activity and other earthmoving activities, including, but not limited to, land clearing, grubbing, scraping, travel on-site, and travel on access roads to and from the site.

Paved working surfaces, the use of street sweepers, and the application of water for dust suppression would ensure compliance with this rule.

2.3.4.15 Rule 8031 – Bulk Materials

The purpose of the rule is to limit fugitive dust emissions from outdoor handling, storage, and transport of bulk materials. Paved working surfaces, the use of street sweepers, and the application of water for dust suppression would ensure compliance with this rule.

2.3.4.16 Rule 8041 – Carryout and Track-Out

This rule limits fugitive dust emissions from carryout and track-out. The rule applies to all sites that are subject to any of the following rules where carryout or track-out has occurred or may occur on paved public roads or the paved shoulders of a paved public road: Rules 8021 (Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities), 8031 (Bulk Materials), 8061 (Paved and Unpaved Roads), and 8071 (Unpaved Vehicle and Equipment Traffic Areas).

Paved working surfaces, the use of street sweepers, and the application of water for dust suppression would ensure compliance with this rule.

2.3.4.17 Rule 8051 – Open Areas

The purpose of this rule is to limit fugitive dust emissions from open areas. This rule applies to any open area having 0.5 acres or more within urban areas or 3.0 acres or more within rural areas that contains at least 1,000 square feet of disturbed surface area.

Paved working surfaces, the use of street sweepers, and the application of water for dust suppression would ensure compliance with this rule.

2.3.4.18 Rule 8061 – Paved and Unpaved Roads

This rule limits fugitive dust emissions from paved and unpaved roads by implementing control measures and design criteria. This rule applies to any new or existing public or private paved or unpaved road, road construction project, or road modification project.

Paved working surfaces, the use of street sweepers, and the application of water for dust suppression would ensure compliance with this rule.

2.3.4.19 Rule 8071 – Unpaved Vehicle/Equipment Traffic Areas

The purpose of this rule is to limit fugitive dust emissions from unpaved vehicle and equipment traffic areas. This rule applies to any unpaved vehicle/equipment traffic area.

The proposed compost facility is designed with paved work and travel surfaces.

2.3.4.20 Rule 9110 – General Conformity

This rule specifies the criteria and procedures for determining the conformity of federal actions with the SJVAPCD's air quality implementation plan. The rule generally applies to federal actions (federal approval of projects) which would result in regionally significant emissions increases or a major increase in emissions of nonattainment pollutants that are not otherwise subject to NSR.

This Project is not subject to federal approval (i.e., is not a "federal action") and would not trigger requirements for conducting a general conformity analysis.

2.3.4.21 Rule 9510 – Indirect Source Review

The purpose of Indirect Source Review (ISR) is to reduce emissions of NO_x and PM_{10} from new development projects. New development projects may contribute to the air pollution problem in the valley by increasing the number of vehicles and vehicle miles traveled.

Rule 9510 applies to development projects that have not yet gained discretionary approval. However, there are several types of sources that are exempt. These include transportation projects that meet certain conditions, reconstruction projects that result from a natural disaster, and development projects on a facility whose primary functions are subject to Rule 2201 (New and Modified Stationary Source Review Rule) or Rule 2010 (Permits Required), including but not limited to solid waste landfills.

The Project is exempt from ISR requirements pursuant to Rule 9510, Section 4.4.3, because the sources would be subject to NSR.

2.3.5 Merced County General Plan

The 2030 Merced County General Plan, adopted in 2013 and updated in 2016, provides the policy context for the County to achieve its vision for air quality and GHG emissions reduction. The plan recognizes that air pollution can adversely affect human health, degrade the natural and built environments, adversely impact the production and quality of agricultural crops, and change the Earth's climate. Air quality is a major factor in defining the quality of life for County residents, and the San Joaquin Valley air basin has air pollution levels that are among the worst in the nation.

Besides regulating point-source pollution, such as industrial sources of pollution, the primary means for local government to improve air quality is by changing land use patterns and reducing automobile travel. For a rural area like Merced County, the primary role in this strategy is to direct development to existing urban areas and to minimize parcelization and residential development on agricultural and open space land. Goals and policies in this element of the plan are organized under the following headings:

- Greenhouse Gas Reduction and Climate Change Adaptation;
- Environmental Assessment and Mitigation;

- Public Facilities and Operations;
- Congestion Management and Transportation Control Measures;
- Toxic and Hazardous Emissions; and
- Fugitive Dust and PM_{10}.

Specific policy measures adopted into the plan that are or may be applicable to the proposed Project include:

Policy AQ-1.1: Energy Consumption Reduction

Encourage new residential, commercial, and industrial development to reduce air quality impacts from energy consumption.

Policy AQ-1.2: Business Energy Reduction Strategies

Encourage all businesses to replace high mileage fleet vehicles with more efficient and/or alternative fuel vehicles; increase the energy efficiency of facilities; transition toward the use of renewable energy instead of non-renewable energy sources; adopt purchasing practices that promote emissions reductions and reusable materials; and increase recycling.

Policy AQ-1.5: Climate Action Plan

Prepare a Climate Action Plan that includes an inventory of 1990 and 2010 GHG emissions, determines project air quality impacts using analysis methods and significance thresholds recommended by the SJVAPCD, and identify strategies to achieve State emission reduction targets.

Policy AQ-2.1: Air Quality Plan Compliance

Require all development projects to comply with applicable regional air quality plans and policies.

Policy AQ-2.2: Development Review Process

Use the development review process to achieve measurable reductions in criteria pollutant, TAC, and GHG emissions.

Policy AQ-2.3: Cumulative Impacts

Encourage the reduction of cumulative air quality impacts produced by projects that are not significant by themselves, but result in cumulatively significant impacts in combination with other development.

Policy AQ-2.4: Mitigation

Require that local and regional air quality impacts identified during CEQA review for projects reviewed and approved by the County are consistently and fairly mitigated.

Policy AQ-2.5: Innovative Mitigation Measures

Encourage innovative mitigation measures and project redesign to reduce air quality impacts by coordinating with the SJVAPCD, project applicants, and other interested parties.

Policy AQ-2.6: County Decision-Making Process

Require climate change planning and program implementation in the County decision making process.

Policy AQ-2.7: Air District Best Performance Standards

Require the County to use the Best Performance Standards (BPS) adopted by SJVAPCD during the development review and decision-making process to ensure new projects meet the targets set by the District.

Policy AQ-3.2: Clean Fleet Vehicles

Require vehicle replacement practices that prioritize the replacement of older higher emission vehicles and the purchasing of the lowest emission technology vehicles, consistent with cost-effective management of the program.

Policy AQ-5.1: Residential Buffers

Require effective buffers between residential and other sensitive land uses and non-residential land uses that generate hazardous air emissions such as highways (e.g., Interstate 5 and State Route 99), trucking centers, gasoline dispensing facilities, and dry cleaners. Effective buffers shall be determined by requiring consultation with the SJVAPCD for any project that may have a health risk impact, including those projects that would otherwise appear to be exempt from CEQA requirements.

Policy AQ-5.2: New Point Sources

Require new air pollution point sources such as, but not limited to, industrial, manufacturing, and processing facilities to be located an adequate distance from residential areas and other sensitive receptors.

Policy AQ-6.1: Particulate Emissions from Construction

Support the SJVAPCD's efforts to reduce particulate emissions from construction, grading, excavation, and demolition to the maximum extent feasible and consistent with State and federal regulations.

Policy AQ-6.8: Voluntary Emissions Reduction Agreement

Require all project applicants, where project emissions for any criteria pollutant have been evaluated to exceed SJVAPCD significance thresholds, to consult with the SJVAPCD regarding the establishment of a Voluntary Emissions Reduction Agreement (VERA) between the applicant and the SJVAPCD. Support the SJVAPCD in its efforts to fund the Emission Reduction Incentive Program.

The proposed Project furthers the goals and policies of the General Plan as it provides an alternative to landfill disposal, and the proposed technology will achieve emissions reductions compared to existing operations at the site, even with an increase in throughput. Compliance with the SJVAPCD rules and regulations will ensure conformance with many of the General Plan goals and policies. Compliance with CEQA and the application of mitigation measures under CEQA will ensure compliance with several other goals and policies. Agromin will implement mitigation practices, including regular watering of disturbed areas to reduce particulate emissions during construction. Because the proposed

Project results in emissions reductions of VOC, PM_{10}, and $PM_{2.5}$, and less than significant increases in NO_x, CO, and SO_x, contributions to the VERA program are not anticipated.

3.0 EMISSIONS

Project construction, stationary source, and mobile source emissions are discussed and presented in this section. Because the proposed Project would replace an existing compost facility, baseline emissions are also estimated.

3.1 Construction Emissions

The construction emissions analysis was performed using CalEEMod version 2022.1.1.20 (CAPCOA 2023), the official statewide land use computer model designed to provide a uniform platform for estimating potential criteria pollutant and GHG emissions associated with construction of land use projects. The model quantifies direct emissions from construction (including vehicle use), as well as indirect emissions, such as GHG emissions from energy use, solid waste disposal, vegetation planting and/or removal, and water use. The mobile source emission factors used in the model include the Pavley standards and Low Carbon Fuel Standards. The model also identifies project design features, regulatory measures, and mitigation measures to reduce criteria pollutant and GHG emissions, along with calculating the benefits achieved from the selected measures.

A project's construction phase produces many types of emissions, but PM_{10} (including $PM_{2.5}$) in fugitive dust and diesel engine exhaust is the pollutant of greatest concern. Fugitive dust emissions can result from a variety of construction activities, including excavation, grading, demolition, vehicle travel on paved and unpaved surfaces, and vehicle exhaust. The use of diesel-powered construction equipment emits DPM, as well as ozone precursors NO_x and VOCs. Asphalt paving and/or the use of architectural coatings and other materials associated with finishing buildings may emit VOCs and TACs.

Daily and total annual construction emissions are summarized in Table 3-1. A complete discussion and emission calculations are provided in Appendix A.

Table 3-1: Mitigated Construction Emissions Summary

Period	NO_x	VOC	CO	SO_x	PM_{10}	$PM_{2.5}$
Maximum Daily Emissions (lb/day)	36.09	3.74	33.99	0.05	15.08	4.13
Maximum Annual Emissions (TPY)	1.25	0.13	1.36	0.0023	0.95	0.17

3.2 Operational Emissions

3.2.1 Mobile Source Emissions

Emissions estimates were prepared for the mobile sources required to operate the proposed CASP composting facility. The mobile sources include trucks used for feedstock shipment to the facility, vehicles used by employees for travel to and from the facility, support vehicles, heavy equipment operation needed to move feedstock into the processing units, and finished compost delivery vehicles. The SJVAPCD has developed CEQA significance thresholds for non-permitted sources, which include mobile sources. Emissions estimates have been prepared for the following sources and source categories:

- Vehicle and Equipment Exhaust Emissions:
    - On-Road Vehicle Exhaust Emissions; and

    - Off-Road Equipment Exhaust Emissions;
- Dust/Particulate Emissions:
    - Fugitive Dust from Travel on Paved Roads; and
    - Fugitive Dust from Travel on Unpaved Areas;
- TAC Emissions:
    - Vehicle and Equipment Exhaust TAC Emissions:
        - Diesel Exhaust Emissions; and
        - Gasoline Exhaust Emissions;
    - Dust and Particulate TAC Emissions:
        - Paved Road Dust TAC Emissions; and
        - Unpaved Road Dust TAC Emissions.

Daily and annual operational mobile source emissions are summarized in Tables 3-2 and 3-3, respectively. A complete discussion and calculations of operational mobile source-related emissions are provided in Appendix B. TAC emissions estimates for these sources are also provided in Appendix B.

Table 3-2: Summary of Daily Mobile Source Operating Emissions

Activity	NO_x (lb/day)	VOC (lb/day)	CO (lb/day)	SO_x (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
On-Road Vehicle Exhaust	11.20	0.29	2.80	0.10	0.90	0.38
On-Road Vehicle Paved Road Dust	-	-	-	-	1.34	0.33
On-Road Vehicle Unpaved Road Dust	-	-	-	-	0.00	0.00
Off-Road Equipment Exhaust	7.06	3.29	61.15	0.12	0.24	0.24
Off-Road Equipment Unpaved Dust	-	-	-	-	7.75	0.77
Total	18.25	3.59	63.94	0.21	10.22	1.73

Table 3-3: Summary of Annual Mobile Source Operating Emissions

Activity	NO_x (lb/yr)	VOC (lb/yr)	CO (lb/yr)	SO_x (lb/yr)	PM_{10} (lb/yr)	$PM_{2.5}$ (lb/yr)
On-Road Vehicle Exhaust	3,493	91	872	30	281	120
On-Road Vehicle Paved Road Dust	-	-	-	-	407	102
On-Road Vehicle Unpaved Road Dust	-	-	-	-	0	0
Off-Road Equipment Exhaust	2,201	1,027	19,078	36	73	73
Off-Road Equipment Unpaved Dust	-	-	-	-	2,418	242
Total (lb/yr)	5,695	1,119	19,951	66	3,179	536
Total (TPY)	2.85	0.56	9.98	0.03	1.59	0.27

3.2.2 Composting Facility Emissions

Composting emissions fall into two basic categories: 1) fugitive dust emissions from material handling and wind erosion, and 2) gaseous emissions from the decomposition of the organic feedstock.

Operations that involve the movement of material or that expose or disturb erodible surfaces may generate fugitive dust. During composting operations, fugitive dust (particulate matter) is generated by activities such as grinding, screening, material handling, and wind erosion. Particulate emissions are speciated into TAC emissions using published speciation profiles that are appropriate for the material. The screening and grinding equipment would be electrically driven, so particulate emissions are the only emissions expected (i.e., there would be no combustion engines powering grinding or screening equipment).

Composting operations would emit VOCs due to the decomposition of the organic materials during the composting and curing operations. VOC is the only criteria pollutant that would be emitted directly from the decomposition of organic matter in the composting process.

Organic TAC emissions for raw material storage, composting, curing, and finished compost storage were estimated by speciating the VOC emissions using published TAC speciation profiles.

Ammonia may be emitted from organic waste processing operations due to decomposition of nitrogen-bearing compounds present in the feedstock. Ammonia can form if the C/N ratio is low or there is insufficient oxygen.

Emissions estimates have been prepared for the proposed composting facility for the following sources and source categories:

- Dust/Particulate Emissions:
    - Grinding and Screening;
    - Material Handling; and
    - Wind Erosion;
- Composting Operations, including raw material storage, composting, curing, and finished compost storage; and
- TAC Emissions:
    - Dust and Particulate TAC Emissions; and
    - Composting TAC Emissions:
        - Screening, grinding, material handling, and wind erosion;
        - Ammonia; and
        - Organic TACs.

Daily and annual composting facility emissions are summarized in Tables 3-4 and 3-5, respectively. A complete discussion and calculations of emissions due to these sources are provided in Appendix C. TAC emissions estimates from these sources are also provided in Appendix C.

Table 3-4: Summary of Proposed Daily Composting Emissions

Activity	NO_x (lb/day)	VOC (lb/day)	CO (lb/day)	SO_x (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
Composting/Curing	-	134.38	-	-	-	-
Grind and Screen	-	-	-	-	1.47	0.22
Material Handling	-	-	-	-	0.57	0.09
Wind Erosion	-	-	-	-	0.34	0.14
Total	0.00	134.38	0.00	0.00	2.39	0.44

Table 3-5: Summary of Proposed Annual Composting Emissions

Activity	NO_x (lb/yr)	VOC (lb/yr)	CO (lb/yr)	SO_x (lb/yr)	PM_{10} (lb/yr)	$PM_{2.5}$ (lb/yr)
Composting/Curing	-	49,050	-	-	-	-
Grind and Screen	-	-	-	-	459.00	68.85
Material Handling	-	-	-	-	178.69	27.06
Wind Erosion	-	-	-	-	125.39	50.16
Total (lb/yr)	0.00	49,050	0.00	0.00	763.08	146.06
Total (TPY)	0.00	24.53	0.00	0.00	0.38	0.07

3.3 Baseline Emissions

As explained in the Project description, the Highway 59 Landfill is an existing facility permitted to compost up to 25,000 TPY in a windrow composting operation. Emissions associated with this operation include transportation emissions to haul organic waste to the facility, worker commute emissions, material handling emissions, emissions from the windrow composting operation itself, and transportation emissions due to finished compost delivery. The proposed Project would expand composting operations by an additional 50,000 TPY. This additional 50,000 TPY of throughput is assumed to be diverted from landfill. There are emissions associated with landfill disposal of organic waste. The proposed Project would eliminate emissions from the existing windrow composting operations and landfilling of an additional 50,000 TPY of organic waste. Baseline emissions are presented in this section.

3.3.1 Baseline Throughput

The existing compost facility has a permitted throughput of 25,000 TPY; however, actual throughput has been less than that over the last 3 years. Annual composting throughput for the past 3 years is presented in Table 3-6. The average throughput for the last 2 full years of operations was used to estimate baseline emissions from the existing facility.

Table 3-6: Historic Annual Throughput – Baseline

Calendar Year	Throughput (TPY)
2022	9,344
2021	13,316
2020	16,345

3.3.2 Baseline Operational Mobile Source Emissions

The calculation procedures explained in Section 3.2 and Appendix B were used to estimate baseline operational mobile source emissions. Baseline operational mobile source emissions were based on the average throughput of the last 2 years of operation. Emission factors for on-road vehicles were based on the EMFAC database for calendar year 2023 for Merced County. Daily and annual baseline operational mobile source emissions are presented in Tables 3-7 and 3-8, respectively. Emission calculation worksheets are provided in Appendix D.

3.3.3 Baseline Composting Facility Emissions

The calculation procedures explained in Section 3.3 and Appendix C were used to estimate baseline composting emissions. Baseline composting emissions were based on the average throughput of the last 2 years of operation. A VOC emission factor of 3.58 pounds per wet ton was used to estimate VOC emissions, consistent with the current permit. The value of 3.58 pounds per ton represents emissions from composting and curing; the composting emission factor was assumed to be 90% of that value, and the curing emission factor was assumed to be 10% of that value, consistent with SJVAPCD guidance (SJVAPCD 2010). Daily and annual baseline composting emissions are summarized in Tables 3-7 and 3-8, respectively. Emission calculation worksheets are provided in Appendix D.

3.3.4 Baseline Landfill Emissions

The Highway 59 Landfill is an existing facility that is permitted to dispose of up to 1,500 TPD of waste. The proposed composting facility would have the capacity to divert up to 75,000 TPY from landfill to composting. Logically, diverting organic waste from the landfill will reduce emissions from the landfill. However, the landfill will continue to operate and intends to retain the ability to operate at the permitted capacity of 1,500 TPD of waste. Thus, from the standpoint of permitted capacity, the landfill staffing, vehicles, and equipment required to operate the landfill would remain unchanged following the implementation of the proposed compost facility. Although the Project would avoid emissions that would have otherwise occurred had the organic material been landfilled rather than composted, emissions associated with landfill operation are assumed to be the same following Project implementation as they are pre-Project and are not estimated or incorporated into this analysis.

3.3.5 Summary of Baseline Emissions

Total daily and annual baseline emissions are presented in Tables 3-7 and 3-8, respectively.

Table 3-7: Daily Emissions – Baseline

Project Element	NO_x (lb/day)	VOC (lb/day)	CO (lb/day)	SO_x (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
Mobile Sources (Non-permitted)	7.08	2.16	37.90	0.09	14.21	1.69
Compost Facility (Permitted)	0.00	123.92	0.00	0.00	0.48	0.12
Total Baseline (lb/day)	7.08	126.08	37.90	0.09	14.69	1.80

Table 3-8: Annual Emissions – Baseline

Activity	NO_x (lb/yr)	VOC (lb/yr)	CO (lb/yr)	SO_x (lb/yr)	PM_{10} (lb/yr)	$PM_{2.5}$ (lb/yr)
Mobile Sources (Non-permitted)	2,207	678	11,824	29	5,601	642
Compost Facility (Permitted)	0.00	45,229	0.00	0.00	159	40
Total Baseline (lb/yr)	2,207	45,907	11,824	29	5,760	682
Total Baseline (TPY)	1.10	22.95	5.91	0.01	2.88	0.34

3.4 Summary of Emissions

Total daily and annual Project emissions are presented in Tables 3-9 and 3-10, respectively.

Table 3-9: Summary of Daily Project Construction and Operational Emissions

Category	NO_x (lb/day)	VOC (lb/day)	CO (lb/day)	SO_x (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
Project Construction Emissions	36.09	3.74	33.99	0.05	15.08	4.13
Project Permitted Source Emissions	0.00	134.38	0.00	0.00	2.39	0.44
Contemporaneous Reductions (Baseline)	0.00	123.92	0.00	0.00	0.48	0.12
Net permitted emissions increase	0.00	10.47	0.00	0.00	1.91	0.33
Project Non-Permitted Source Emissions	18.25	3.59	63.94	0.21	10.22	1.73
Contemporaneous Reductions (Baseline)	7.08	2.16	37.90	0.09	14.21	1.69
Net non-permitted emissions increase or decrease	11.18	1.42	26.05	0.12	(3.98)	0.04
Total Net Project Permitted + Non-Permitted Source Emissions	11.18	11.89	26.05	0.12	(2.08)	0.37

Table 3-10: Summary of Annual Project Construction and Operational Emissions

Category	NO_x (TPY)	VOC (TPY)	CO (TPY)	SO_x (TPY)	PM_{10} (TPY)	$PM_{2.5}$ (TPY)
Project Construction Emissions	1.25	0.13	1.36	0.00	0.95	0.17
Project Permitted Source Emissions	0.00	24.53	0.00	0.00	0.38	0.07
Contemporaneous Reductions (Baseline)	0.00	22.61	0.00	0.00	0.08	0.02
Net Emissions Increase	0.00	1.91	0.00	0.00	0.30	0.05
Project Non-Permitted Source Emissions	2.85	0.56	9.98	0.03	1.59	0.27
Contemporaneous Reductions (Baseline)	1.10	0.34	5.91	0.01	2.80	0.32
Net Emissions Increase or Decrease	1.74	0.22	4.06	0.02	(1.21)	(0.05)
Total Net Project Permitted + Non-Permitted Source Emissions	1.74	2.13	4.06	0.02	(0.91)	0.00

4.0 AIR QUALITY SIGNIFICANCE FINDINGS AND MITIGATION

Project impacts are evaluated relative to Appendix G of the CEQA Guidelines using the SJVAPCD significance criteria from the SJVAPCD GAMAQI.

4.1 CEQA Significance Criteria

Merced County relies upon Appendix G of the Guidelines for the Implementation of CEQA (Title 14, Division 6, Chapter 3, January 2018), which states that a project would have a significant air quality impact if it would:

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

Each of these impacts is evaluated against the significance criteria identified in the SJVAPCD GAMAQI. The CEQA air quality impact areas are discussed in the following sections.

4.2 Impact AQ-1: Would the Project Conflict with or Obstruct Implementation of the Applicable Air Quality Plan?

4.2.1 Evaluation Criteria

The SJVAPCD GAMAQI does not list specific criteria for evaluating this impact area, so a qualitative approach is used to compare the Project design and emissions to applicable air quality plans.

4.2.2 Discussion

As discussed in Section 2.3.3, the SJVAPCD has prepared AQAPs for the 8-hour ozone standard and the $PM_{2.5}$ standards and maintenance plans for the 1-hour ozone and PM_{10} standards. An attainment plan must be prepared for pollutants which exceed the NAAQS, and a maintenance plan has been prepared for pollutants for which the valley is designated as attainment or unclassifiable with respect to the NAAQS. A maintenance plan is prepared to ensure that additional emissions of the attainment/unclassified pollutants will not adversely affect air quality to the extent that it would result in a violation of the applicable air quality standard.

Rule 2201, New Source Review, is a major component of the SJVAPCD's attainment strategy. NSR provides mechanisms, including emissions trade-offs, by which ATCs/PTOs may be granted without interfering with the attainment or maintenance of the AAQS. The SJVAPCD's implementation of NSR ensures that there is no net increase in emissions above specified thresholds from new or modified stationary sources for nonattainment pollutants and their precursors. Permitted emissions above offset thresholds must be offset to below the rule threshold, adjusted for the distance of the source of emission reduction credits (ERCs) to the project, and also adjusted by a factor to provide a net air quality benefit for ozone precursors. Furthermore, the SJVAPCD's NSR program is designed to ensure that project-specific emissions increases that are below NSR offset thresholds would not prevent the SJVAPCD from achieving attainment. The SJVAPCD's attainment plans demonstrate that this level of emissions increase (i.e., increases that do not exceed the offset threshold) would not interfere with attainment or maintenance of the AAQS. Consequently, emissions impacts from sources permitted consistent with NSR requirements are consistent with the SJVAPCD's AQAPs and hence are not individually or cumulatively significant.

The SJVAPCD's attainment plans must account for emissions from existing projects and also provide for future growth. The attainment plans must ensure that on a valley-wide basis (i.e., cumulative basis), there is no increase in emissions of nonattainment pollutants or precursors (NO_x, VOCs, and $PM_{2.5}$). District plans must treat anticipated future growth as actual "in the air" emissions, and the plans must include control measures that achieve reductions needed to offset (mitigate) such growth and ensure reasonable further progress toward attainment of the AAQS.

Because the proposed Project would result in a net decrease in VOC emissions compared to the baseline, the Project furthers the goals of the 2018 Ozone AQAP and the 2023 Ozone Maintenance Plan.

The 2018 Integrated $PM_{2.5}$ AQAP accounts for current and projected future growth of waste management-related emissions. For example, the plan includes 0.3 TPD of $PM_{2.5}$ emissions for the Waste Management category starting in 2020. As shown in Table 3-10, there will be a net $PM_{2.5}$ emissions reduction of 0.02 TPY from the proposed CASP composting facility. Therefore, it is reasonable to conclude that both the permitted and non-permitted emissions associated with the proposed Project would not conflict with or obstruct implementation of the applicable air quality plan.

Many design features would be implemented as part of the proposed Project that would minimize and mitigate emissions, including a dust control plan. The ATCs and PTOs that would be issued by the SJVAPCD would require BACT on new sources subject to permitting and would impose permit conditions that ensure compliance with SJVAPCD rules and regulations (see Section 2.3.4).

4.2.3 Level of Significance

The proposed Project would not conflict with or obstruct implementation of the applicable air quality plan. Therefore, the proposed Project would have a less than significant impact on air quality.

4.2.4 Proposed Mitigation

Mitigation measures required by SJVAPCD Rules 4565 and 4566 are required by regulation, and no additional mitigation would be needed.

4.3 Impact AQ-2: Would the Project Result in a Cumulatively Considerable Net Increase of any Criteria Pollutant for which the Project Region is Non-attainment under an Applicable Federal or State Ambient Air Quality Standard?

4.3.1 Evaluation Criteria

A project would be cumulatively significant if it were determined to be significant by itself or cumulatively significant in consideration of regional plans. In this section, the Project is evaluated to determine if it would be significant by itself based on mass emissions and ambient air quality significance thresholds or cumulatively significant based on regional plans.

4.3.1.1 Mass Emissions

The SJVAPCD's thresholds of significance for criteria pollutant emissions and their application are presented in Table 4-1.

Table 4-1: Air Quality Thresholds of Significance

Pollutant/ Precursor	Thresholds of Significance		
	Construction Emissions	Operational Emissions	
		Permitted Equipment and Activities	Non-Permitted Equipment and Activities
	Emissions (TPY)	Emissions (TPY)	Emissions (TPY)
CO	100	100	100
NO_x	10	10	10
VOC	10	10	10
SO_x	27	27	27
PM_{10}	15	15	15
$PM_{2.5}$	15	15	15

4.3.1.2 Ambient Air Quality

When assessing the significance of project-related impacts on air quality, the SJVAPCD GAMAQI recommends that an AAQA be performed when on-site emissions increases from construction activities or operational activities exceed the 100 pounds per day screening level for any criteria pollutant after implementation of all enforceable mitigation measures.

4.3.1.3 Cumulative Impacts

When assessing whether there would be a new significant cumulative effect, the Lead Agency shall consider whether the incremental effects of the project would be cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project would be significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects [14 CCR Section 15064(h)(1)].

Per CEQA Guidelines Section 15064(h)(3), a Lead Agency may determine that a project's incremental contribution to a cumulative effect would not be cumulatively considerable if the project would comply with the requirements in a previously approved plan or mitigation program, including but not limited to an air quality attainment or maintenance plan that provides specific requirements that would avoid or substantially lessen the cumulative problem within the geographic area in which the project is located [14 CCR Section 15064(h)(3)].

4.3.2 Discussion

4.3.2.1 Mass Emissions

Annual Project emissions are compared to the SJVAPCD mass annual CEQA significant thresholds in Table 4-2. As shown, the construction emissions, permitted operational emissions, and non-permitted operational emissions would not exceed the applicable significance thresholds for any criteria pollutant. Furthermore, the total net permitted plus non-permitted source emissions for the Project show an overall decrease in PM_{10}, and a less than significant increase in the other pollutants.

Table 4-2: Project Emissions Compared to Annual CEQA Emissions Thresholds

Category	NO_x (TPY)	VOC (TPY)	CO (TPY)	SO_x (TPY)	PM_{10} (TPY)	$PM_{2.5}$ (TPY)
Project Construction Emissions	1.25	0.13	1.36	0.00	0.95	0.17
CEQA Construction Threshold	10	10	100	27	15	15
Exceed Threshold?	*No*	*No*	*No*	*No*	*No*	*No*
Project Permitted Source Emissions	0.00	24.53	0.00	0.00	0.38	0.07
Contemporaneous Reductions (Baseline)	0.00	22.61	0.00	0.00	0.08	0.02
Net emissions increase	0.00	1.91	0.00	0.00	0.30	0.05
Emission Reduction Credits Applied	NR	NR	NR	NR	NR	NR
CEQA Permitted Source Threshold	10	10	100	27	15	15
Exceed Threshold?	*No*	*No*	*No*	*No*	*No*	*No*
Project Non-Permitted Source Emissions	2.85	0.56	9.98	0.03	1.59	0.27
Contemporaneous Reductions (Baseline)	1.10	0.34	5.91	0.01	2.80	0.32
Net emissions increase or decrease	1.74	0.22	4.06	0.02	(1.21)	(0.05)
CEQA Non-Permitted Source Threshold	10	10	100	27	15	15
Exceed Threshold?	*No*	*No*	*No*	*No*	*No*	*No*
Total Net Project Permitted + Non-Permitted Source Emissions	1.74	2.13	4.06	0.02	(0.91)	0.00

Notes:
NR: Not required (below SJVAPCD NSR offset thresholds)

4.3.2.2 Ambient Air Quality

As noted in Section 4.3.1.2, daily emissions are compared to the 100 pound-per-day screening level to determine if ambient air quality modeling is required for the proposed Project. Project permitted and non-permitted source emissions were compared to the SJVAPCD daily AAQA screening thresholds in Table 4-3. As shown in the table, construction emissions would not exceed the significance criteria for any pollutant. The mass daily operating emissions for permitted and non-permitted sources would not exceed the 100-pound-per-day threshold for any pollutant. Therefore, the proposed Project would be less than significant with respect to these criteria, and ambient air quality modeling is not required for construction or operations emissions.

Table 4-3: Project Emissions Compared to Daily AAQA Screening Level

Category	NO_x (lb/day)	VOC (lb/day)	CO (lb/day)	SO_x (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
Project Construction Emissions	36.09	3.74	33.99	0.05	15.08	4.13
AAQA Construction Screening Level	100	100	100	100	100	100
Exceed Screening Level?	*No*	*No*	*No*	*No*	*No*	*No*
Project Permitted Source Emissions	0.00	134.38	0.00	0.00	2.39	0.44
Contemporaneous Reductions (Baseline)	0.00	123.92	0.00	0.00	0.48	0.12
Net permitted emissions increase	0.00	10.47	0.00	0.00	1.91	0.33
AAQA Permitted Source Screening Level	100	100	100	100	100	100
Exceed Screening Level?	*No*	*No*	*No*	*No*	*No*	*No*
Project Non-Permitted Source Emissions	18.25	3.59	63.94	0.21	10.22	1.73
Contemporaneous Reductions (Baseline)	7.08	2.16	37.90	0.09	14.21	1.69
Net non-permitted emissions increase or decrease	11.18	1.42	26.05	0.12	(3.98)	0.04
AAQA Non-Permitted Source Screening Level	100	100	100	100	100	100
Exceed Screening Level?	*No*	*No*	*No*	*No*	*No*	*No*

4.3.2.3 Cumulative Impacts

CEQA defines cumulative impacts as two or more individual effects which, when considered together, would be either significant or "cumulatively considerable," meaning they would add considerably to a significant environmental impact. A cumulative impact analysis considers a project over time and in conjunction with other past, present, and reasonably foreseeable future projects whose impacts might compound those of the project being assessed.

By its very nature, air pollution is largely a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development. Future attainment of CAAQS and NAAQS in the SJVAB will be a function of successful implementation of the SJVAPCD's attainment plans. Consequently, the SJVAPCD's application of thresholds of significance for criteria pollutants is relevant to the determination of whether a project's individual emissions would have a cumulatively significant impact on air quality.

Per CEQA Guidelines §15064(h)(3), a Lead Agency may determine that a project's incremental contribution to a cumulative effect would not be cumulatively considerable if the project would comply with the requirements in a previously approved plan or mitigation program, including, but not limited to, an air quality attainment or maintenance plan that provides specific requirements that would avoid or substantially lessen the cumulative impacts within the geographic area in which the project is located [CCR §15064(h)(3)].

Per the GAMAQI (page 108), the District's attainment plans demonstrate that project-specific net emissions increases below NSR offset requirements would not prevent the SJVAPCD from achieving attainment. Consequently, emission impacts from the proposed composting facility's sources, permitted pursuant to NSR requirements, would not be individually significant.

4.3.3 Level of Significance

As discussed herein, Project construction emissions, permitted stationary source emissions, and non-permitted (mobile source) emissions would be less than significant for all criteria pollutants on a mass basis.

Project construction emissions, permitted stationary source emissions, and non-permitted (mobile source) emissions would not exceed the screening threshold for ambient air quality modeling; thus, the proposed Project would not be expected to cause a violation of the NAAQS or CAAQS or contribute substantially to an existing air quality violation.

The proposed Project would not have cumulative impacts during construction, as there are no known projects within 2 miles of the Project site that would be constructed or operated concurrent with Project construction. The Project would reduce PM_{10} emissions from the site because the proposed CASP composting technology is superior to the windrow composting operation that it will replace. Further, because the CASP composting facility would operate as a permitted stationary source, the SJVAPCD's NSR program ensures that the emissions of the other criteria pollutants would not be cumulatively significant, per SJVAPCD guidance.

Based on the analyses conducted, the proposed Project is not expected to result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in nonattainment under an applicable NAAQS or CAAQS. Therefore, the Project would have a less than significant cumulative impact on air quality.

4.3.4 Proposed Mitigation

The proposed Project would have less than significant impacts; mitigation is not required.

4.4 Impact AQ-3: Would the Project Expose Sensitive Receptors to Substantial Pollutant Concentrations?

4.4.1 Evaluation Criteria

The SJVAPCD's significance thresholds for TAC emissions from the operation of both permitted and non-permitted sources are presented in Table 4-4.

Carcinogenic (cancer) risk is expressed as excess cancer cases per one million exposed persons. Non-carcinogenic (acute and chronic) hazard indices (HIs) are expressed as a ratio of expected exposure levels to acceptable (reference) exposure levels.

Table 4-4: Air Quality Thresholds of Significance – Toxic Air Contaminants

Category	Significance Threshold
Carcinogens	Maximally Exposed Individual risk equals or exceeds 10 in one million
Non-Carcinogens	Acute: HI equals or exceeds 1 for the Maximally Exposed Individual
	Chronic: HI equals or exceeds 1 for the Maximally Exposed Individual

The CAPCOA guidelines outline a technique for calculating a PS that helps air districts identify priority facilities for risk assessment, which involves consideration of potency, toxicity, quantity of emissions, and proximity to sensitive receptors such as hospitals, daycare centers, schools, worksites, and residences. If the PS exceeds the high risk level or intermediate risk level after consideration of additional factors, a refined HRA is recommended to determine if the Project's potential health risks are significant. The PS hierarchy is explained below:

- Low Score: Projects having a PS of less than 1 are low risk and are not likely to have an adverse health risk.
- Intermediate Score: Projects having a PS of at least 1 and less than 10 are characterized as intermediate risk, and additional factors should be evaluated to determine if the project's TAC emissions would have significant health risk impacts.
- High Score: Projects having a PS equal to or over 10 may have high risk. A refined HRA may be necessary to demonstrate if a project's TAC emissions would have significant health risk impacts.

4.4.2 Discussion

To assess the potential acute, chronic, and carcinogenic health risks from a project, a two-step process can be followed, where initially a screening risk prioritization is conducted. If the potential for high health risks is found, then an HRA may be required.

A risk prioritization analysis is presented in Appendix F and summarized in Table 4-5. The potential health risk from the proposed Project was assessed by calculating a PS at the nearest residential and business receptors. This assessment is based on the total facility TAC emissions. This approach ensures that health risk impacts are not underestimated. The PS was determined to be a low risk. Since the closest residential receptor is approximately 1 mile south of the facility, and there is a low population density in the vicinity of the Project, the proposed Project's TAC emissions would have a less than significant health risk impact.

Table 4-5: Project Prioritization Score Determination

Project Phase	Acute	Chronic	Cancer	Prioritization Score
Construction	0.00	4.1E-04	0.276	Low
Operations	5.10E-03	5.61E-03	0.50	Low

4.4.3 Level of Significance

Based on the low PS, the absence of any nearby sensitive receptors, and low population density in the vicinity of the Project, it is reasonable to conclude that the construction and operation of the proposed Project would not expose sensitive receptors to substantial pollutant concentrations or health risks. Therefore, the Project would have a less than significant impact.

4.4.4 Proposed Mitigation

None required.

4.5 Impact AQ-4: Would the Project Result in Other Emissions (Such as Those Leading to Odors) Adversely Affecting a Substantial Number of People?

4.5.1 Evaluation Criteria

The Project was evaluated to determine the likelihood that the Project would result in nuisance odors. Any project with the potential to frequently expose members of the public to objectionable odors should be deemed to have a significant impact. Nuisance odors may be assessed qualitatively, considering the design elements and proximity to off-site receptors that potentially would be exposed to objectionable odors.

Due to the subjective nature of odor impacts, the number of variables that can influence the potential for an odor impact, and the variety of odor sources, there are no quantitative or formulaic methodologies to determine if potential odors would have a significant impact. Rather, projects must be assessed on a case-by-case basis.

The SJVAPCD GAMAQI establishes the screening level for potential odor sources as a 1-mile setback for composting facilities. The GAMAQI also recommends reviewing the odor complaint history for the facility.

4.5.2 Discussion

The proposed Project would potentially include new sources of odors. The new CASP composting operations would be constructed on the site of an existing windrow composting operation. The existing windrow operation has received no odor complaints in the last 5 years. The nearest sensitive receptor to the Project site is a residence approximately 1 mile to the south of the compost facility.

VOCs and ammonia are the primary malodorous compounds emitted from composting activities. The CASP with a biofilter layer is expected to reduce VOC and NH_3 emissions from the composting activity by at least 81% and 45%, respectively, compared to uncontrolled decomposition (e.g., in the existing windrow operation) (SJVAPCD 2013); thus, emissions of malodorous compounds are expected to decrease upon implementation of the CASP, even with an increase in throughput.

In 2013, the SJVAPCD sponsored a study that compared CASP composting to windrow composting (SJVAPCD 2013). The study noted that odor is most commonly associated with receiving and mechanical turning (in windrows) of relatively fresh feedstock and may be made worse when food waste is composted, as food waste putrefies rapidly, often creating intense odors. The study concluded that composting methods which reduce handling activities during the active phase would likely reduce odor issues. The CASP technology proposed for the Project eliminates the need to turn the compost during processing. The study further reported that odors were not detected from the CASP composting system during the study period.

The composting facility would prepare and maintain a site-specific OIMP as required by 14 CCR Section 17863.4 to reduce potential odors. The OIMP would be designed to provide guidance to on-site operations personnel by describing, at a minimum, the following items:

- An odor monitoring and data collection protocol for on-site odor sources, which describes the proximity of possible odor receptors and a method for assessing odor impacts at the locations of the possible odor receptors;
- A description of meteorological conditions affecting migration of odors and/or transport of odor-causing material off-site, including seasonal variations that affect wind velocity and direction;
- A complaint response and recordkeeping protocol;
- A description of design considerations and/or projected ranges of optimal operation to be employed in minimizing odor, including method and degree of aeration, moisture content of materials, feedstock characteristics, airborne emission production, process water distribution, pad and site drainage and permeability, equipment reliability, personnel training, weather event impacts, utility service interruptions, and site-specific concerns as applicable; and
- A description of operating procedures for minimizing odor, including aeration, moisture management, feedstock quality, drainage controls, pad maintenance, wastewater pond controls, storage practices (e.g., storage time and pile geometry), contingency plans (i.e., equipment, water, power, and personnel), biofiltration, and tarping, as applicable.

Based on the design features that would be implemented at the compost facility (i.e., aeration, biofilter layer, implementation of the OIMP, limited storage duration for unprocessed materials), the distance to sensitive receptors, and the low population density in the vicinity of the Project, the proposed composting facility is not expected to create objectionable odors affecting a substantial number of people.

4.5.3 Level of Significance

The proposed Project would reduce odorous emissions from the landfill (by diverting the organic waste from landfill) and emissions of malodorous compounds compared to the existing windrow composting operation. Based on the odor minimization design features that would be implemented at the compost facility and the distance to sensitive receptors, the Project is not expected to create objectionable odors affecting a substantial number of people. Therefore, the proposed Project would have a less than significant impact related to emissions which cause odors.

4.5.4 Proposed Mitigation

The OIMP is required by regulation, and mitigation beyond the OIMP is not needed.

5.0 GREENHOUSE GAS ANALYSIS

An analysis of GHG emissions from the proposed Project and the consistency of the Project with relevant plans and programs that are applicable to the Project are presented in this section. The impact assessment is based upon a review of relevant literature and technical reports that include, but are not limited to, information and guidelines from Merced County, CARB, EPA, and SJVAPCD, as well as the applicable provisions of CEQA.

5.1 Environmental Setting

GHG emissions and climate change are cumulative global issues. CARB and the U.S. EPA regulate GHG emissions within the State of California and the United States, respectively. While CARB has the primary regulatory responsibility within California for GHG emissions, local agencies also adopt policies for GHG emissions reduction.

Global climate change is a change in the average weather of the Earth, measured by wind patterns, storms, precipitation, and temperature. Although historical records show that dramatic fluctuations in temperature have occurred in the past, some data indicate that the current temperature record differs from previous climate changes in both rate and magnitude.

The California legislature concluded that global climate change poses significant adverse effects to the environment (AB 32, the California Global Warming Solutions Act of 2006). In addition, the global scientific community has expressed a high confidence that recent observed climate change is predominately human-caused and that climate change could lead to adverse changes around the globe (IPCC 2007). Consequently, the following sections analyze potential GHG emissions that may occur as a result of implementing the proposed Project.

5.1.1 Greenhouse Gases

Many chemical compounds found in the Earth's atmosphere act as GHGs. GHGs allow sunlight to enter the atmosphere freely. When sunlight strikes the Earth's surface, some of it is reflected back towards space as infrared radiation (heat). GHGs absorb this infrared radiation, trapping the heat in the atmosphere. In the absence of GHGs, the amount of energy sent from the sun to the Earth's surface would be about the same as the amount of energy radiated back into space, leaving the temperature of the Earth's surface roughly constant. With GHGs, the amount of heat retained in the atmosphere increases.

Many gases exhibit these "greenhouse" properties. Some of them occur in nature [e.g., water vapor, carbon dioxide (CO_2), methane (CH_4), and N_2O], while others are exclusively human-made (like gases used as aerosol propellants). The regulated GHGs are CO_2, CH_4, N_2O, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

The principal GHGs resulting from human activity that enter and accumulate in the atmosphere are described below:

- <u>Carbon dioxide (CO_2)</u> is an odorless, colorless gas. CO_2 has a 100-year global warming potential (GWP)[8] of 1. Natural sources include decomposition of organic

[8] GWP is a relative measure, compared to CO_2, of a compound's residence time in the atmosphere and ability to warm the planet. Mass emissions of GHGs are converted into carbon dioxide equivalent (CO_2e) emissions for ease of

matter; respiration of bacteria, plants, animals, and fungus; desorption from oceans; and volcanoes. Human-caused sources of CO_2 include burning fuels, such as coal, oil, natural gas, and wood. In 2007, the concentration of CO_2 in the atmosphere was approximately 379 ppm; some say that concentrations may increase to 1,130 ppm CO_2e by 2100 as a direct result of human-caused sources (IPCC 2007). Some predict that this will result in an average global temperature rise of at least 7.2°F by 2100 (IPCC 2007).

- Methane (CH_4) is the main component of natural gas and has a GWP of approximately 21.[9] Decaying organic matter in forests and oceans is a natural source of methane. Sources of methane resulting from human activities include landfills, fermentation of manure, and the raising of livestock (primarily cattle). Geological deposits known as natural gas fields contain methane, which is extracted for fuel but is also emitted as fugitive emissions from leaking piping components (e.g., valves, flanges, compressor seals).
- Nitrous oxide (N_2O) is a colorless gas with a GWP of approximately 310. N_2O is produced by microbial processes in soil and water, including reactions that occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (e.g., nylon production, nitric acid production) emit N_2O. Nitrous oxide is used in rocket engines, as an aerosol spray propellant, and in racing cars. During combustion, NO_x [nitric oxide (NO) and NO_2] is produced as a criteria pollutant; however, very small quantities of N_2O may be formed by the reaction of nitrogen and oxygen.
- Chlorofluorocarbons (CFCs) and HFCs are synthetic compounds formed by replacing all or some hydrogen atoms in methane or ethane with chlorine or fluorine atoms. HFCs have a GWP between 140 and 11,700, with HFC-152a at the low end and HFC-23 at the higher end. CFCs are non-toxic, non-flammable, insoluble in water, and chemically non-reactive in the troposphere (the level of air at the Earth's surface). CFCs are used as refrigerants, aerosol propellants, and cleaning solvents. However, CFCs destroy stratospheric ozone, and the Montreal Protocol stopped their production in the 1990s.
- Sulfur hexafluoride (SF_6) is an inorganic, odorless, colorless, non-toxic, non-flammable gas. Its GWP of 23,900 is the highest of any gas. SF_6 is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

comparison. CO_2e is a quantity that describes, for a given mixture and amount of GHGs, the amount of CO_2 that would have the same GWP when measured over a specified timescale (generally 100 years). It is also a measure for comparing CO_2 with other GHGs (which generally have a higher GWP) based on the amount of those other gases multiplied by the appropriate GWP factor, commonly expressed as metric tons of CO_2e (MT CO_2e). CO_2e is calculated by multiplying the MT of each GHG by the appropriate GWP.

[9] As a further complication, the GWP values have been revised as further scientific data are collected. The values presented here are from the IPCC Second Annual Report (SAR). GWP values were updated in the Fourth Annual Report and again in the Fifth Annual Report. Although GWPs have been updated by the IPCC, the SAR values are used herein to be consistent with CARB's mandatory GHG reporting protocol, which still uses the SAR values.

5.1.2 GHG Emissions Inventories

GHG emissions are generally classified as either direct or indirect. Direct emissions are associated with the production of GHG emissions at the project site. These include the combustion of fuel in equipment and vehicles and fugitive emissions from landfills. Indirect emissions include the emissions from vehicles delivering materials and equipment to the site and the use of electricity. Electricity contributes to GHG emissions because fossil fuel combustion is used to generate electricity.

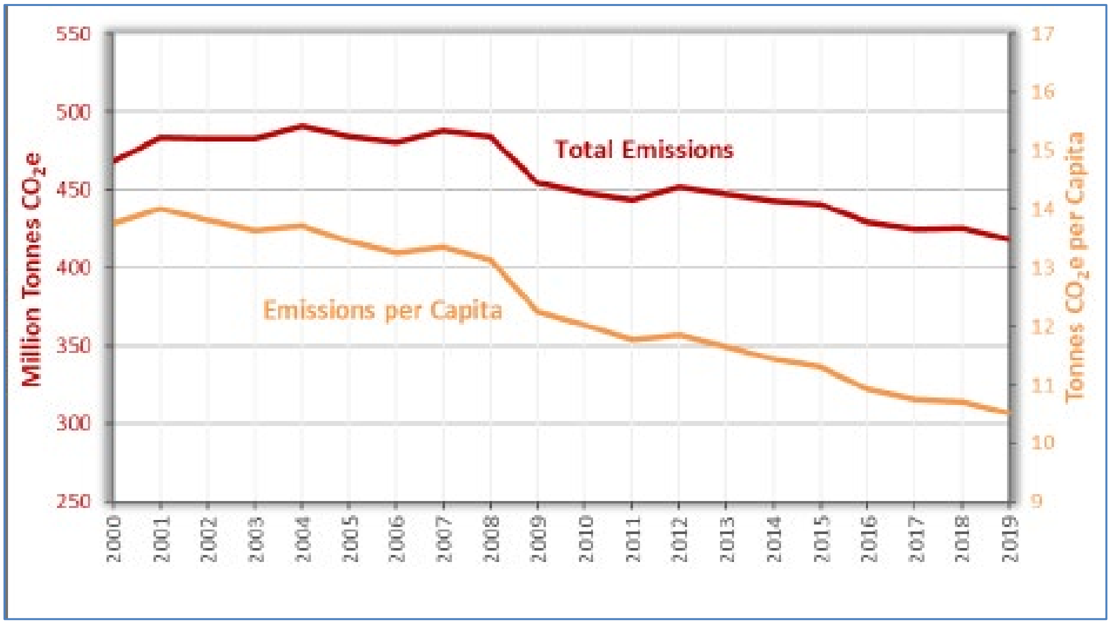
5.1.2.1 National Greenhouse Gas Emissions Inventory

In 2021, total gross U.S. GHG emissions were 6,340.2 million MT CO_2e. Total U.S. emissions have decreased by 2.3% from 1990 to 2021, down from a high of 15.8% above 1990 levels in 2007. Emissions increased from 2020 to 2021 by 5.2% (314.3 million MT CO_2e). Net emissions (including sinks) were 5,586.0 million MT CO_2e in 2021. Overall, net emissions increased 6.4% from 2020 to 2021 and decreased 16.6% from 2005 levels. From 2019 to 2020, there was a sharp decline in emissions largely due to the impacts of the coronavirus (COVID-19) pandemic on travel and other economic activity. Between 2020 and 2021, the increase in total GHG emissions was driven largely by an increase in CO_2 emissions from fossil fuel combustion due to economic activity rebounding after the height of the COVID-19 pandemic. In 2021, CO_2 emissions from fossil fuel combustion increased by 6.8% relative to the previous year. CO_2 emissions from natural gas use increased by 8.6 million MT CO_2e, a 0.5% increase from 2020. In a shift from recent trends, CO_2 emissions from coal consumption increased by 121.7 million MT CO_2e, a 14.6% increase from 2020. The increase in natural gas consumption and emissions in 2021 is observed across all sectors except the Electric Power sector and U.S. Territories, while the coal increase is primarily in the Electric Power sector. Emissions from petroleum use also increased by 163.9 million MT CO_2e (8.6%) from 2020 to 2021. In 2021, CO_2 emissions from fossil fuel combustion were 4,639.1 million MT CO_2e, or 1.9% below emissions in 1990 (EPA 2023).

5.1.2.2 Statewide Greenhouse Gas Emissions

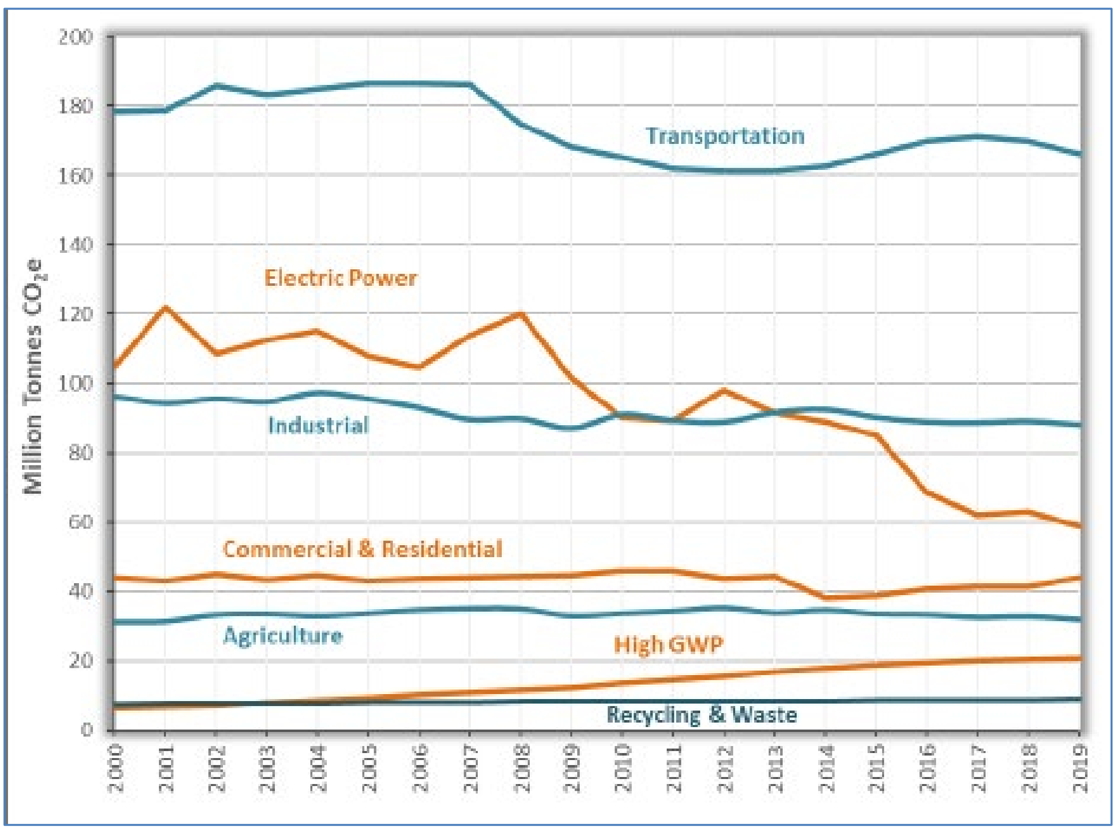
In 2019, GHG emissions from statewide emitting activities were 418.2 million MT CO_2e(million tonnes CO_2e), 7.1 million MT CO_2e lower than 2018 levels and almost 13 million MT CO_2e below the 2020 GHG limit of 431 million MT CO_2e. Since the peak level in 2004, California's GHG emissions have generally followed a decreasing trend. In 2016, statewide GHG emissions dropped below the 2020 GHG limit and have remained below the limit since that time. Per capita GHG emissions in California have dropped from a 2001 peak of 14.0 MT per person to 10.5 MT per person in 2019, a 25% decrease. Overall trends in the inventory also continue to demonstrate that the carbon intensity of California's economy [the amount of carbon pollution per million dollars of gross domestic product (GDP)] is declining. From 2000 to 2019, the carbon intensity of California's economy decreased by 45%, while the GDP increased by 63%. In 2019, GDP grew 2.6%, while the emissions per GDP declined by 4.1% compared to 2018 (CARB 2021). Figure 5-1 illustrates California's trend in GHG emissions and the GHG emissions per capita. Figure 5-2 illustrates California's GHG emissions and trends by sector.

Figure 5-1: California Statewide GHG Emission Trends



Reference: CARB 2021.

Figure 5-2: California GHG Emissions by Sector



Reference: CARB 2021.

5.1.3 Impacts of GHG Emissions

In the Findings and Declarations for AB 32, the legislature found that: "The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in 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 the marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other health-related problems."

Warming of the climate is evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level. The linear warming trend over the 50 years from 1956 to 2005 (0.13°C per decade) is nearly twice that for the 100 years from 1906 to 2005. Global average sea level rose at an average rate of 1.8 millimeters per year from 1961 to 2003 and at an average rate of about 3.1 millimeters per year from 1993 to 2003 (IPCC 2007).

The Intergovernmental Panel on Climate Change (IPCC) studies (2007) indicate that "In order to stabilize the concentration of GHGs in the atmosphere, emissions would need to peak and decline thereafter. The lower the stabilization level, the more quickly this peak and decline would need to occur." The studies also found that stabilization of atmospheric CO_2 concentrations at less than 450 ppm would limit temperature rise to less than 3.6°F by the year 2100 and would require global anthropogenic CO_2 emissions to drop below the year 1990 levels within a few decades (by 2020). If GHG emissions and atmospheric CO_2 levels were kept to this "Category I" level (producing increases in global average temperature of less than 1.8-5.4°F above 1980-1999 levels), impacts to GDP are projected to "produce market benefits in some places and sectors while, at the same time, imposing costs in other places and sectors" (IPCC 2007). Levels of CO_2 above 700 ppm with corresponding temperature increases of 7°F could cause a reduction in global GDP of more than 5%, with regional losses substantially higher. Therefore, stabilizing GHG emission levels at 1990 levels over the next two decades would reduce the impacts of climate change to less than significant levels that would produce nominal changes in global average GDP.

Observed and anticipated effects associated with climate change in California, as reported by the California Climate Change Center (CCCC 2012), include the following:

- Average statewide temperatures increased by about 1.7°F from 1895 to 2011, with the greatest warming in the Sierra Nevada. By 2050, average statewide temperatures are expected to increase by 2.7°F above 2000 averages – a three-fold increase in the warming rate over the past century. By 2100, statewide average temperatures could increase by 4.1 to 8.6°F, depending on emission levels.
- Earlier snowmelt, higher temperatures, and longer dry periods over a protracted fire season will directly increase wildfire risk. There is an expected long-term increase in fire occurrence associated with a higher GHG emissions scenario, ranging from 58 to 128% above historical levels by 2085. Under the same higher GHG emissions scenario, the estimated burned areas will increase between 57 and 169%, depending on location.

- Increased wildfire occurrence and burned areas, with associated increases in particulate pollution, could offset improvements in particulate and ozone concentrations.
- California's water management challenges could be exacerbated by increasing demand from a growing population, rising temperatures, earlier snowmelt and runoff, and faster-than-historical sea level rise threatening aging coastal water infrastructure and levees in the Sacramento-San Joaquin Delta. One study shows that by the latter half of the 21st century, "critically dry" water years could occur 8% more frequently in the Sacramento Valley and 32% more often in the San Joaquin Valley, as compared to the period from 1951 to 2000. During such critically dry years, it may be nearly impossible to satisfy the State's water needs, including those for agricultural and environmental purposes.
- Increased statewide average temperatures and more frequent extreme heat events, combined with new residential development, will drive up electricity demand for cooling during the summertime. About 15% of electrical demand is satisfied by hydropower, which is a premium asset during peak demand summer months. Hydropower generation is already declining and is expected to decrease more substantially because of reduced snowpack, earlier runoff, and higher evaporation rates due to climate change.
- Electrical transmission lines lose 7 to 8% of transmitting capacity as temperatures rise. Therefore, more electricity will need to be generated to offset the increased electrical transmission line losses. Furthermore, key electrical transmission corridors are vulnerable to increased frequency and severity of wildfires associated with climate change. One study shows a 40% increase in the probability of wildfire exposure for some major transmission lines, including lines bringing hydropower from the Pacific Northwest into California during peak demand periods.
- The sea level along California's coastline rose about 7 inches during the last century, and this rate is expected to accelerate considerably in the future. Assuming that California's sea level changes continue to track global trends, sea levels along the State's coastlines could increase by 10 to 18 inches by 2050 and by 31 to 55 inches by the end of the 21st century (as compared to 2000 levels). This will greatly increase the potential for loss of life and property during periodic storm and flood events. Moreover, critical infrastructure (schools, roads, hospitals, emergency facilities, wastewater treatment plants, airports, ports, and energy facilities) located along the coastline will also be at increased risk of damage.
- Findings from one study show that climate conditions are changing so rapidly that some vegetation cannot keep pace. Some climates that currently exist (e.g., alpine climates) could disappear entirely, while other regional climates (e.g., desert climates) could expand considerably. This would result in some species losing their habitats and other species significantly expanding theirs.
- Climate change is expected to exacerbate stresses on California's agricultural sector. Direct effects, such as changes in temperature and water availability, will affect crop yield and availability, making the sector highly sensitive to climate

change. Indirect effects will also take a toll, such as possible further declines in pollinators and increases in pests and disease.

Global warming and climate change have received substantial public attention for more than 30 years. The United States Global Change Research Program was established by the Global Change Research Act of 1990 to enhance the understanding of natural and human-induced changes in the Earth's global environmental system; to monitor, understand, and predict global change; and to provide a sound scientific basis for national and international decision-making. Even so, analytical tools have not been developed to determine the effect on worldwide global warming from a particular increase in GHG emissions, or the resulting effects on climate change in a particular locale. The scientific tools needed to evaluate the impacts that a specific project may have on the environment have also not been developed.

5.2 Regulatory Setting

5.2.1 Federal Regulations

The U.S. EPA has found that six GHGs, taken in combination, endanger the public health and welfare of current and future generations. The U.S. EPA also found that the combined emissions of these GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that endangers public health and welfare under CAA Section 202(a). These findings were based on careful consideration of the full weight of scientific evidence and a thorough review of numerous public comments received.

Specific GHG regulations that the U.S. EPA has adopted to date are discussed below.

5.2.1.1 40 CFR Parts 86 and 600, Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards

On January 20, 2021, President Biden issued Executive Order 13990 "Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis" directing the U.S. EPA to consider whether to propose suspending, revising, or rescinding the standards previously revised under "The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks," promulgated in April 2020. In response, the U.S. EPA finalized federal GHG emissions standards for passenger cars and light trucks by setting ambitious but achievable requirements for emissions reductions for model years 2023 through 2026. The standards would achieve significant GHG emissions reductions, along with reductions in other air pollutants. This rule will result in substantial public health and welfare benefits, while providing fuel savings to consumers. This rule will set the U.S. on a course to achieve ambitious GHG emissions reductions from transportation over the long term. The final rule provides a foundation for building on rapidly developing trends toward zero-emission technologies and the substantial reductions in air pollution they will make possible [Federal Register / Vol. 86, No. 248, December 2021] (EPA 2021a, EPA 2021b).

5.2.1.2 40 CFR Part 98, Mandatory Reporting of Greenhouse Gases Rule

Part 98 requires mandatory reporting of GHG emissions for facilities that emit more than 25,000 MT CO_2e per year. The CO_2 emissions from landfills and composting are considered biogenic and are not counted toward facility GHG emissions according to accepted protocol; however, the combustion of methane in the landfill flare system will generate CO_2 that must be quantified toward the GHG reporting threshold.

5.2.2 California Regulations

California has made the reduction of GHG emissions a priority, and reducing GHG emissions in California has been a focus of the State government for approximately two decades.

5.2.2.1 Assembly Bill 32

The California Global Warming Solutions Act of 2006, also known as AB 32, was established in 2006 to mandate the quantification and reduction of GHGs to 1990 levels by 2020. The law establishes periodic targets for reductions and requires certain facilities to report emissions of GHGs annually. The bill also reserves the ability to reduce emissions targets for certain sectors that contribute the most to emissions of GHGs, including the transportation sector.

AB 32 requires the preparation of a Scoping Plan that outlines the main strategies California will implement to achieve the legislated GHG emission targets. California's 2017 Climate Change Scoping Plan, prepared by CARB, identifies the reductions needed by key sectors (e.g., transportation, industry, electricity generation, agriculture, waste management, and water). Waste management is listed as one of six Key Sectors contributing to the State's total GHG emissions, mainly from methane generation in landfills.

Reporting of GHG emissions by large sources is required by AB 32. The GHG Mandatory Reporting Regulation (MRR) applies to electricity generators, industrial facilities, fuel suppliers, and electricity importers. A summary of GHG emissions data reported under the MRR is made public each year, and these data are used by the Cap-and-Trade program and included in the California Greenhouse Gas Inventory.

All GHG emissions data reports must comply with the regulatory requirements and be submitted via the California electronic greenhouse gas reporting tool (e-GGRT). Reporting guidance documents and training materials are provided to clarify rule applicability and assist reporters in complying with the regulation. CARB implements and oversees a third-party verification program to support mandatory GHG reporting. All GHG reports subject to the Cap-and-Trade program must be independently verified by CARB-accredited verification bodies and verifiers.

5.2.2.2 Cap-and-Trade Program (17 CCR Sections 95800 to 96022)

On October 20, 2011, CARB approved the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms Regulation (Cap-and-Trade Program) as part of the AB 32 implementation measures.

Cap-and-Trade is a market-based regulation that is designed to reduce GHGs from multiple sources. It is viewed as an environmentally effective and economically efficient response to climate change. Cap-and-Trade sets a firm limit, or "cap," on GHG emissions from all sources in the Cap-and-Trade program and minimizes the compliance costs of achieving AB 32 goals. The initial cap was established in 2013 for the electricity generating sector and any large industrial source emitting more than 25,000 MT CO_2e per year. Beginning in 2015, the cap was expanded to include GHG emissions from the combustion of transportation fuels and natural gas. The cap declines approximately 3% each year through 2020. Revisions to the regulation require the cap to decline approximately 5% starting in 2021 through 2030. In the market, a price on carbon is established for GHGs. Trading and market forces create incentives to reduce GHGs below allowable levels through investments in technological innovation and clean technologies.

5.2.2.3 Assembly Bill 1493

On July 22, 2002, Governor Gray Davis signed AB 1493, also known as the Pavley Regulations or the Clean Car Standards. AB 1493 required the State to develop and adopt regulations that achieve the maximum feasible and cost-effective reduction of GHG emissions emitted by passenger vehicles and light-duty trucks. Subsequent regulations were adopted by CARB in September 2004.

The regulations were threatened by automaker lawsuits and were stalled by the U.S. EPA's initial denial to allow California to implement GHG standards for passenger vehicles. The U.S. EPA later granted California the authority to implement GHG emission reduction standards for new passenger cars, pickup trucks, and sport utility vehicles on June 30, 2009. On September 24, 2009, CARB adopted amendments to the Pavley regulations that reduce GHG emissions in new passenger vehicles from 2009 through 2016.

5.2.2.4 Assembly Bill 341

AB 341 (Chesbro, Chapter 476, Statutes of 2011) sets forth the requirements of the statewide mandatory commercial recycling program. The legislation requires that a business (including public entities) that generates 4 cubic yards or more of commercial solid waste per week or is a multifamily residential dwelling of five units or more must arrange for recycling services. Businesses can take one or any combination of the following in order to reuse, recycle, compost, or otherwise divert solid waste from disposal: self-haul, subscribe to a hauler, arrange for the pickup of recyclable materials, or subscribe to a recycling service that may include mixed waste processing that yields diversion results comparable to source separation. The implementing regulation was adopted at CalRecycle's January 17, 2012, Monthly Public Meeting. The regulation reflects the statutory provisions of AB 341 and provides additional procedural clarifications. The regulation was approved by the Office of Administrative Law on May 7, 2012, and became effective immediately. On June 27, 2012, the Governor signed Senate Bill 1018, which included an amendment that requires a business that generates 4 cubic yards or more of commercial solid waste per week to arrange for recycling services.

5.2.2.5 Senate Bill 605, Senate Bill 1383, and Assembly Bill 1826

SB 605 (Chapter 523, Statutes of 2014) requires CARB to develop a plan to reduce emissions of short-lived climate pollutants, such as methane. AB 1826 (Chapter 727, Statutes of 2014) requires businesses to recycle their organic waste beginning in 2016. SB 1383 (Chapter 249, Statutes of 2016) requires CARB to approve and implement a plan by January 2018 to achieve these reductions. SB 1383 also sets a target for reduction of methane emissions to 40% below 2013 levels by 2030. Pursuant to SB 605 and SB 1383, CARB subsequently developed the Short-lived Climate Pollutant Reduction Strategy, adopted in March 2017. As part of this strategy, CalRecycle, in consultation with CARB, is developing regulations to reduce the level of statewide disposal of organic waste to 50% of 2014 levels by 2020 and 75% of 2014 levels by 2025. In addition, by 2025, no less than 20% of currently disposed edible food must be recovered for human consumption. CalRecycle adopted these regulations in 2019 to take effect on or after January 1, 2022. The mandated diversion of recyclables and organic material from landfills will require improvements to existing infrastructure to handle these materials. The diversion mandates will result in an increase in compost production and anaerobic digestion of organic material throughout California.

The proposed Project would provide composting capacity needed to achieve the mandatory diversion goals.

5.2.2.6 Senate Bill 32 of 2016

In September 2016, Governor Brown signed SB 32, which mandated a GHG emissions reduction target of 40% below 1990 emission levels by 2030. This effectively extended the efforts already in effect associated with AB 32 implementation.

5.2.2.7 Assembly Bills 398 and 617

Approved on July 25, 2017, AB 398 extended the Cap-and-Trade program through 2030 to support SB 32 mandated GHG emissions reduction of 40% by 2030. In conjunction with AB 398, AB 617 was approved, which makes GHG and TAC emissions data available to the public via the internet, along with plans to improve monitoring of criteria air pollutants and TACs.

5.2.2.8 Executive Order B-55-18

On September 10, 2018, Governor Brown signed Executive Order (EO) B-55-18, which establishes a statewide goal to "achieve carbon neutrality as soon as possible, and no later than 2045, and maintain and achieve negative emissions thereafter." EOs are not legally binding and depend on legislative approval for implementation. EO B-55-18 establishes the intent to extend the efforts already in effect associated with AB 32 implementation, as documented in the 2017 Climate Change Scoping Plan, which has a timeline for GHG reductions spanning to 2050.

5.2.2.9 SB 253, The Climate Corporate Data Accountability Act and SB 261, Greenhouse Gases: Climate-Related Financial Risk

Governor Gavin Newsom signed two climate disclosure bills into law on October 7, 2023. They will impose significant reporting obligations on thousands of companies doing business in California. SB 253, the Climate Corporate Data Accountability Act, will require companies to annually disclose direct, indirect, and supply chain-related GHG emissions. SB 261, Greenhouse Gases: Climate-Related Financial Risk, will require biennial disclosure of a company's financial risk caused by climate change.

These two laws go further than any other state or federal climate disclosure legislation in the U.S., including the long anticipated (but yet to be adopted) climate disclosure rule being considered by the U.S. Securities and Exchange Commission. Notably, the new California laws apply to both private and public companies with qualifying revenue that do business in California and require the disclosure of GHG emissions.

5.2.3 Local Plans and Requirements

5.2.3.1 Senate Bill 375

In addition to regulations that address tailpipe emissions and transportation fuels, the State legislature has passed regulations to address the amount of driving by on-road vehicles. Since the passage of SB 375 in 2008, CARB has required metropolitan planning organizations (MPOs) to adopt plans showing a reduction in GHG emissions from passenger cars and light-duty trucks in their respective regions for 2020 and 2035. These plans link land use and housing allocation to transportation planning and related mobile source emissions.

Merced County's role is to take actions that support the State's strategy, such as ensuring that new development is consistent with the County's Sustainable Communities Strategy implementing SB 375 and facilitating new renewable energy projects. The County's strategy is consistent with General Plan policies that encourage new development in existing communities and commercial corridors at higher than historical densities.

5.2.3.2 SJVACPCD Climate Change Action Plan

In August 2008, the SJVAPCD adopted its Climate Change Action Plan (CCAP). The CCAP directs the District to develop guidance to assist CEQA lead agencies, project proponents, permit applicants, and interested parties in assessing and reducing the impacts of project GHG emissions on global climate change (SJVAPCD 2008). In December 2009, the SJVAPCD Board approved two guidance documents:

- Guidance for Valley Land-Use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA ("Land Use GHG Guidance") (SJVAPCD 2009a); and
- District Policy: Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency (SJVAPCD 2009b).

These policies provide that "Projects complying with an approved GHG emission reduction plan or GHG mitigation program which avoids or substantially reduces GHG emissions within the geographic area in which the Project is located would be determined to have a less than significant individual and cumulative impact for GHG emissions" (SJVAPCD 2009b). Under the guidance, projects implementing BPS would have less than significant impacts for GHG emissions, as would projects that reduce or mitigate their GHG emissions by at least 29% as compared to business as usual (BAU).

On June 25, 2014, the SJVAPCD issued a guidance document titled "CEQA Determinations of Significance for Projects Subject to CARB's GHG Cap-and-Trade Regulation" (Policy APR-2025; "CEQA Cap-and-Trade Policy") (SJVAPCD 2014). This policy is to be followed when the District is "providing technical guidance to lead agencies and the public regarding significance of project specific GHG emissions." The policy states the District's conclusion that "GHG emission increases subject to CARB's Cap-and-Trade regulation would have a less than significant individual and cumulative impact on global climate change." Noting that GHG emissions from combustion of transportation fuels are covered under the Cap-and-Trade program beginning in 2015, the policy also states that "GHG emission increases caused by fuel use (other than jet fuels) are determined to have a less than significant impact on global climate change under CEQA."

Under the District's 2014 policy for stationary source impacts, "the District's determination of significance of project-specific GHG emissions is founded on the principal that projects with GHG emission reductions consistent with AB 32 emission reduction targets are considered to have a less than significant impact on global climate change" (SJVAPCD 2014). This policy employs a tiered approach to determining the CEQA significance of a project's GHG emissions. The first level is compliance with an approved GHG emission reduction plan that is specified in law and supported by a CEQA-compliant environmental review document. The SJVAPCD has determined that GHG emissions covered under the Cap-and-Trade program cannot constitute significant increases under CEQA for two reasons. First, the Cap-and-Trade program is an approved GHG mitigation plan that meets the requirements set forth in the District's policy on stationary source GHG emissions impacts (SJVAPCD 2014, pages 4-5). Second, any increase in GHG emissions from affected sectors must be accounted for under the statewide GHG emissions cap in the Cap-and-Trade program, and that cap decreases over time. As a result, the Cap-and-Trade program will fully mitigate any project emissions increases for emissions included under the cap (SJVAPCD 2014).

Where an approved GHG emission reduction program is not in place, or the project will not comply with it, the guidance documents recommend the use of performance-based standards, otherwise known as BPS, as a basis for assessing the significance of Project GHG emissions on global climate change under CEQA. BPS consist of established specifications or project design elements that are used as a method of determining the significance of project-specific GHG emissions impacts. BPS are defined as the most effective achieved-in-practice means of reducing or limiting GHG emissions from a GHG emissions source. BPS for stationary source projects include equipment type, equipment design, and operational and maintenance practices for the identified service, operation, or emissions unit class or category (SJVAPCD 2009b).

The District recommends the use of BPS for assessing climate change impacts to streamline the process of determining significance under CEQA. BPS are not intended as a required emission reduction measure. Under SJVAPCD guidance, projects implementing BPS would be determined to have a less than significant impact on global climate change on a cumulative basis.

Projects that do not comply with an approved GHG emission reduction plan or use BPS must demonstrate a 29% reduction in GHG emissions from BAU in order to be determined to have a less than cumulatively significant impact on global climate change. BAU is determined by multiplying 2002-2004 emission factors by the activity expected to occur in 2020. The guidance does not limit a Lead Agency's authority to establish its own process and guidance for determining the significance of project-related impacts on global climate change (SJVAPCD 2009a).

5.3 GHG Emissions

GHG emissions have a global impact because emissions from one location could affect the entire planet, and they are not limited to local impacts. Therefore, total Project GHG emissions are included in this analysis (i.e., on-site plus off-site).

5.3.1 Construction GHG Emissions

The construction GHG emissions analysis was prepared using CalEEMod version 2022.1.1.20 (CAPCOA 2023), the official statewide land use computer model designed to provide a uniform platform for estimating potential criteria pollutant and GHG emissions associated with construction of land use projects. The model quantifies direct emissions from construction (including vehicle use), as well as indirect emissions, such as GHG emissions from energy use, solid waste disposal, vegetation planting and/or removal, and water use. The mobile source emission factors used in the model include the Pavley standards and Low Carbon Fuel Standards. The model also identifies project design features, regulatory measures, and mitigation measures to reduce GHG emissions, along with calculating the benefits achieved from the selected measures.

Construction GHG emissions are summarized in Table 5-1. A complete discussion and emission calculations are provided in Appendix A.

Table 5-1: Construction Greenhouse Gas Emissions Summary

Period	CO_2 (MT/yr)	CH_4 (MT/yr)	N_2O (MT/yr)	CO_2e (MT/yr)
CY2024	232.9	0.01	0.01	235
CY2025	28.8	0	0	29
Total	261.7	0.01	0.01	264

5.3.2 Operational Mobile Source Emissions

GHG emissions from composting are biogenic in nature (i.e., part of the natural carbon cycle) and are not counted towards the facility's GHG inventory.

Emissions estimates have been prepared for the mobile sources required to operate the proposed CASP composting facility. The mobile sources include trucks used to transport organic waste to the facility, vehicles used for employee travel to and from the facility, support vehicles, heavy equipment operation needed to move feedstock into and out of the processing units, and finished compost delivery vehicles. Operational mobile source emissions are summarized in Table 5-2. A complete discussion and emission calculations are provided in Appendix B.

Table 5-2: Summary of Mobile Source GHG Emissions

Activity	CO_2 (MT/yr)	CH_4 (MT/yr)	N_2O (MT/yr)	CO_2e (MT/yr)
On-Road Vehicle Exhaust	1,451	0.0	0.2	1,518
Off-Road Equipment Exhaust	1,736	70	14	1,742
Total	3,187	70	14	3,260

5.3.3 Landfill Diversion Emissions

The diversion of organic waste from the landfill to composting will reduce the quantity of organic matter disposed of in the landfill. Organic matter decomposing in landfills produces GHG emissions; thus, a reduction in organic waste disposal will avoid the emissions of these pollutants.

GHG emissions associated with the diversion of organic material from landfill to composting are estimated using the U.S. EPA's Waste Reduction Model (WARM); the results are summarized in Table 5-3. The throughput used in this analysis of 64,670 TPY reflects the post-project throughput of 75,000 TPY less the 2-year average throughput (2021-2022) of 11,330 TPY.[10]

BAU emissions from the landfill are negative, i.e., a reduction in GHG emissions, which may be counterintuitive, as landfill diversion is a recognized GHG reduction strategy. This can be attributed to two factors. First, most landfills in the State, including the Highway 59 Landfill, operate a landfill gas (LFG) collection system with a flare, which converts about 75%[11] of the LFG produced to CO_2. Because the GHGs generated in the landfill derive from the decomposition of organic matter, CO_2 is considered biogenic and is not counted. It is only the 25% of the methane produced that is not collected by the LFG collection system that is counted towards the landfill GHG emissions inventory. Second, a portion of the organic waste disposed in a landfill does not decompose and is sequestered. Comparing the quantity of carbon sequestered to the quantity of carbon released as methane yields a small negative number. By comparison, diverting organic waste to composting yields a larger negative number – a net reduction in GHG emissions compared to landfilling of 2,532 MT CO_2e per year. A complete discussion and emission calculations are provided in Appendix E.

Table 5-3: Landfill Diversion GHG Emissions

Parameter	Baseline	Proposed Project
Disposal Quantity	11,330 TPY to windrow 63,670 TPY to landfill (75,000 TPY total)	75,000 TPY to CASP
GHG Emissions	(1,944.32 MT/yr)	(6,113.06 MT/yr)
Net Benefit	4,168.74 MT/yr	

5.3.4 Baseline Emissions

The proposed Project is a 75,000 TPY CASP composting operation that would replace a 25,000 TPY windrow composting operation that has been operating at less than the permitted capacity.

GHG emissions from the windrow composting are biogenic in nature (i.e., part of the natural carbon cycle) and are not counted towards the facility's GHG inventory.

Baseline emissions estimates have been prepared for the mobile sources required to operate the existing windrow composting facility. The mobile sources include trucks used to transport organic waste to the facility, vehicles used for employee travel to and from the facility, support vehicles, heavy equipment operation needed to move feedstock into and out of the processing units, and finished compost delivery vehicles. Operational mobile

[10] This approach is consistent with the approach used for criteria pollutants where the post-Project potential to emit is compared to the historic 2-year average emissions to determine the Project impacts.
[11] A properly designed LFG collection system typically collects 75% of the methane produced in the landfill.

source emissions are summarized in Table 5-4. Emission calculation worksheets are provided in Appendix D; the methodology used to calculate the baseline mobile source emissions is discussed in Appendix B.

Table 5-4: Summary of Baseline Mobile Source GHG Emissions

Activity	CO_2 (MT/yr)	CH_4 (MT/yr)	N_2O (MT/yr)	CO_2e (MT/yr)
On-road Vehicle Exhaust	369	0.0	0.1	386
Off-road Equipment Exhaust	1,027	41	8	1,030
Total	1,395	41	8	1,416

5.3.5 Summary of GHG Emissions

GHG emissions are summarized in Table 5-5. As shown, the proposed Project results in a net decrease in GHG emissions of more than 2,300 MT CO_2e per year.

Table 5-5: Project GHG Emissions Summary

Activity	CO_2 (MT/yr)	CH_4 (MT/yr)	N_2O (MT/yr)	CO_2e (MT/yr)
Construction (amortized over 30 years)	9	0.00	0.00	9
Project Mobile Sources	3,187	70	14	3,260
Landfill Diversion	-	-	-	(4,169)
Baseline Mobile Sources	(1,395)	(41)	(8.10)	(1,416)
Net GHG Emission Change	-	-	-	(2,315)

5.4 Project Impacts

Climate change impacts are inherently global and cumulative, and not project-specific. The SJVAPCD's GAMAQI observes:

> *"It is widely recognized that no single project could generate sufficient GHG emissions to noticeably change global climate temperature. However, the combination of GHG emissions from past, present, and future projects could contribute substantially to global climate change. Thus, project specific GHG emissions should be evaluated in terms of whether or not they would result in a cumulatively significant impact on global climate change".*

5.4.1 GHG Emissions Significance Criteria

The SJVAPCD's GAMAQI states: "[I]n the absence of scientific evidence supporting establishment of a numerical threshold, the District policy applies performance based standards to assess project-specific GHG emission impacts on global climate change. The determination is founded on the principal that projects whose emissions have been reduced or mitigated consistent with the California Global Warming Solutions Act of 2006, commonly referred to as 'AB 32', should be considered to have a less than significant impact on global climate change."

The SJVAPCD has adopted guidance documents for assessing and mitigating GHG impacts on global climate change. Rather than establishing specific numeric thresholds of significance (as in the case of criteria pollutant emissions), the SJVAPCD guidance utilizes a tiered approach to assess cumulative impacts on global climate change. The GAMAQI recommends a three-tier approach:

- Projects complying with an approved GHG emission reduction plan or GHG mitigation program that avoids or substantially reduces GHG emissions within the geographic area in which the project is located would be determined to have a less than significant individual and cumulative impact for GHG emissions. Such plans or programs must be specified in law or approved by the Lead Agency with jurisdiction over the affected resource and supported by a CEQA-compliant environmental review document adopted by the Lead Agency. Projects complying with an approved GHG emission reduction plan or GHG mitigation program would not be required to implement BPS.
- Projects implementing BPS would not require quantification of project-specific GHG emissions. Consistent with CEQA Guidelines, such projects would be determined to have a less than significant individual and cumulative impact for GHG emissions.
- Projects not implementing BPS would require quantification of project-specific GHG emissions and demonstration that project-specific GHG emissions would be reduced or mitigated by at least 29% compared to BAU, including GHG emission reductions achieved since the 2002-2004 baseline period, consistent with GHG emission reduction targets established in CARB's AB 32 Scoping Plan. Projects achieving at least a 29% GHG emission reduction compared to BAU would be determined to have a less than significant individual and cumulative impact for GHG emissions.

5.4.2 Impact GHG-1: Would the Project Generate Greenhouse Gas Emissions, Either Directly or Indirectly, that May Have a Significant Impact on the Environment?

5.4.2.1 Discussion

As shown in Table 5-5, the estimated annual GHG emissions associated with the proposed Project result in a net GHG reduction of over 2,300 MT CO_2e per year compared to historical waste management activities (i.e., BAU).

GHG emissions would occur during construction activities associated with the proposed Project. Construction emissions are amortized over a 30-year life of the Project, consistent with agency guidance.

The CASP compost facility is not expected to be subject to the Cap-and-Trade program. However, while Project emissions would not create a compliance obligation for the operators of the CASP composting facility under Cap-and-Trade, some emissions associated with the Project would be covered by the Cap-and-Trade program, such as emissions generated during electricity generation and emissions associated with the combustion of vehicle fuels.[12]

The SJVAPCD's CEQA Cap-and-Trade Policy also recommends that projects that are required to comply with CARB's GHG Cap-and-Trade program be determined to have a less than cumulatively significant impact on global climate change. This policy is included in the SJVAPCD's December 2009 CEQA GHG policies (described above in Section 5.2.3.2) and 2015 GAMAQI, which states that a project whose emissions have been reduced or mitigated consistent with AB 32 should be considered to have a less than significant impact on global climate change (SJVAPCD 2015).

This approach would include both CARB's GHG Cap-and-Trade program and other adopted GHG-reducing regulations (such as AB 341 and SB 605) as adopted GHG emission reduction plans. Under the SJVAPCD's tiered approach in assessing the significance of project-specific GHG emissions increases, projects complying with an approved GHG emission reduction plan or GHG mitigation program that avoids or substantially reduces GHG emissions within the geographic area in which the Project is located would be determined to have a less than significant individual and cumulative impact for GHG emissions (SJVAPCD 2015).

In 2013, the SJVAPCD sponsored a study that compared CASP composting to windrow composting (SJVAPCD 2013). The study found that compared to windrow composting, CASP composting would:

- Save a minimum of 1 million gallons of water annually for a 100,000-ton-per-year facility;
- Reduce GHG emissions associated with pumping water by 4.5 MT CO_2e per 100,000 tons of feedstock;
- Result in an 87% reduction in diesel fuel use per ton of production, and a corresponding reduction in the amount of GHGs from equipment use; and
- Achieve overall GHG emissions reductions of 70%.

5.4.2.2 Level of Significance

The proposed Project would yield a net reduction in GHG emissions of over 2,300 MT per year. Some of the reductions would be achieved through landfill diversion, a key element of the State's GHG reduction strategy. Additional reductions would be achieved by

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[12] CARB's Cap-and-Trade Regulation establishes a set of rules that limit GHG emissions from the State's largest sources of GHGs by applying a statewide aggregate GHG allowance budget to covered entities (17 CCR Sections 95800 to 96023). The Cap-and-Trade Program imposes an enforceable statewide cap on GHG emissions at covered facilities, including refineries, electric power providers, cement production facilities, oil and gas production facilities, and fuel suppliers, that steadily declines over time.
To the extent that fuels are supplied from fuel suppliers that are not subject to the Cap-and-Trade Regulation because emissions from the quantities of fuel supplied would not exceed the Cap-and-Trade applicability threshold, the SJVAPCD's CEQA Cap-and-Trade Policy states:

> *"As did the CARB when excluding such sources from the Cap-and-Trade Regulation, the District considers GHG emissions resulting from the combustion of all fuels supplied by those fuel suppliers not subject to the Cap-and-Trade Regulation to be insignificant. Therefore, it is reasonable to apply this policy to GHG emissions resulting from the combustion of all fuels in the State of California."*

converting the composting technology from windrow to CASP. These reductions far exceed the 29% reduction targeted by AB 32 and established by the SJVAPCD as a significance threshold. Further, AB 32's Cap-and-Trade program would provide mitigation for the Project's fuel use in vehicles (feedstock delivery, compost shipment, employee commute, off-road equipment) and electricity usage, consistent with SJVAPCD guidance.

The proposed Project is needed to meet California's waste diversion mandates under SB 1383 and other regulations. Since the proposed Project is consistent with AB 32, would provide a net decrease in GHG emissions, and the emissions that do occur (e.g., electricity usage, fuel combustion in vehicles) would be covered by the Cap-and-Trade program, the proposed Project would not have significant adverse impacts related to GHG emissions and instead would provide a net benefit.

5.4.2.3 Mitigation Measures

None required. However, emissions covered under the Cap-and-Trade program (e.g., electricity usage, fuel combustion in vehicles) would be considered mitigated emissions.

5.4.3 Impact GHG-2: Would the Project Conflict with any Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing the Emissions of Greenhouse Gases?

5.4.3.1 Discussion

Californians dispose of about 30 million tons of solid waste in landfills each year. Organic wastes decompose in landfills to produce methane, a powerful GHG. While landfills are an effective and relatively safe way to manage some waste, disposal-centric activities squander valuable resources and generate LFG, as well as other risks. A large fraction of the organics in the waste stream can be diverted from landfills to composting or digestion facilities to produce beneficial products.

In March 2017, CARB adopted the Short-Lived Climate Pollutant (SLCP) Reduction Strategy, establishing a path to decrease GHG emissions and displace fossil-based natural gas use. Strategies include avoiding landfill methane emissions by reducing the disposal of organics through edible food recovery, composting, in-vessel digestion, and other processes; and recovering methane from wastewater treatment facilities and manure at dairies and using the recovered methane as a renewable source of natural gas to fuel vehicles or generate electricity. The proposed Project would support the goals of the SLCP Reduction Strategy by providing composting as an alternative to landfilling of organic wastes in Merced County.

The proposed Project would support compliance with SB 1383 (Lara, Chapter 395, Statutes of 2016). SB 1383 targets short-lived climate pollutants, including methane emissions due to organic waste disposal in landfills. SB 1383 requires the reduction of methane emissions at landfills by reducing landfill disposal of organic waste to 75% below 2014 levels by 2025, including establishing energy infrastructure development and procurement policies needed to encourage in-vessel digestion projects and increase the production and use of renewable gas. The proposed Project will support the goals of SB 1383 by providing composting as an alternative to landfilling of organic wastes in Merced County.

To further reduce landfilled solid waste, the legislature adopted AB 341 to achieve more significant waste reductions by setting a goal that 75% of solid waste generated be reduced, recycled, or composted by 2020, and by mandating commercial recycling. AB 1826 (Chesboro, Chapter 727, Statutes of 2014) added requirements regarding mandatory commercial organics recycling. The proposed Project would support the goals of AB 341 and AB 1826 by providing composting as an alternative to landfilling of organic wastes in Merced County.

5.4.3.2 Level of Significance after Mitigation

By providing composting as an alternative to landfilling of organic wastes in Merced County, the proposed Project would be consistent with applicable plans, policies, and regulations adopted for the purpose of reducing GHG emissions. Therefore, the proposed Project would have a less than significant impact with respect to GHG emissions.

5.4.3.3 Mitigation Measures

None required.

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APPENDIX A – CONSTRUCTION EMISSIONS

Appendix A: Construction Emissions

Air Quality and GHG Technical Report

Prepared for:

Agromin Corporation
7040 N. Highway 59
Merced, CA 95348

February 2024

Table of Contents

List of Tables

Attachments

List of Acronyms and Abbreviations

BMP	Best Management Practice
CalEEMod	California Emissions Estimator Model
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CASP	Covered Aerated Static Pile
CEQA	California Environmental Quality Act
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
DPM	Diesel Particulate Matter
GHG	Greenhouse Gas
lb	Pound
MT	Metric Ton
N_2O	Nitrous Oxide
NO_x	Nitrogen Oxides
PM_{10}	Particulate Matter with an Aerodynamic Diameter of 10 Microns
$PM_{2.5}$	Particulate Matter with an Aerodynamic Diameter of 2.5 Microns
SO_x	Sulfur Oxides
sq. ft.	Square Foot
TAC	Toxic Air Contaminant
TPY	Ton per year
VOC	Volatile Organic Compound

Appendix A: Construction Emissions

1.0 INTRODUCTION

The construction emissions analysis was performed using the California Emissions Estimator Model® (CalEEMod) version 2022.1.1.20 (CAPCOA 2023), the official statewide land use computer model designed to provide a uniform platform for estimating potential criteria pollutant[1] and greenhouse gas (GHG)[2] emissions associated with construction of a land use project. The model quantifies direct emissions from construction (including vehicle use), as well as indirect emissions, such as GHG emissions from energy use, solid waste disposal, vegetation planting and/or removal, and water use. The mobile source emission factors used in the model include the Pavley standards and Low Carbon Fuel Standards. The model allows the user to incorporate project design features, regulatory measures, and mitigation measures to reduce criteria pollutant and GHG emissions and calculates the benefits achieved from selected measures. CalEEMod was developed by the California Air Pollution Control Officers Association (CAPCOA) in collaboration with the South Coast Air Quality Management District, Bay Area Air Quality Management District, San Joaquin Valley Air Pollution Control District, and other California air districts. Default land use data (e.g., emission factors, trip lengths, meteorology, source inventory, etc.) were provided by the various California air districts to account for local requirements and conditions. As the official assessment methodology for land use projects in California, CalEEMod is relied upon for construction emissions quantification for this project.

A project's construction phase produces many types of emissions, but PM_{10} (including $PM_{2.5}$) in fugitive dust and diesel engine exhaust are the pollutants of greatest concern. Fugitive dust emissions can result from a variety of construction activities, including excavation, grading, demolition, vehicle travel on paved and unpaved surfaces, and vehicle exhaust. Construction-related emissions can cause substantial increases in localized concentrations of PM_{10}, as well as affecting PM_{10} compliance with ambient air quality standards on a regional basis. Particulate emissions from construction activities can lead to adverse health effects and nuisance concerns such as reduced visibility and soiling of exposed surfaces. The use of diesel-powered construction equipment emits ozone precursors NO_x and VOC, as well as diesel particulate matter (DPM), the latter being a composite of toxic air contaminants (TACs). Use of architectural coatings and other materials associated with finishing buildings may also emit VOG and TACs.

[1] Criteria pollutants include nitrogen oxides (NO_x), sulfur oxides (SO_x), carbon monoxide (CO), volatile organic compounds (VOC), and particulate matter (PM_{10} and $PM_{2.5}$).
[2] GHGs include, but are not limited to, carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O).

2.0 CONSTRUCTION EMISSIONS ESTIMATES

2.1 CalEEMod Model Input Data and Assumptions

The information used to develop the emissions estimates for the proposed Project is presented in this section. Not all CalEEMod defaults used are listed, but the default assumptions that have a particularly important impact on the project emissions are listed.

- Defined in Project Description of Highway 59 Landfill Compost Project:
    - Basic project design features, including project vicinity, site plan, building sizes, constructions phasing, etc. (see Attachment A-1);
    - Facility is designed for 75,000 ton per year (TPY) capacity, and includes:
        - Paved access roads, and
        - A lined pond to collect contact water;
    - Approximate start of June 2024 and approximate duration of 9 months; and
    - No grading required, as the site is already graded based on previous land use.
- Assumptions:
    - Compost concrete pad paving thickness is 8 inches;
    - Cement trucks can carry 10 cubic yards of cement per trip;
    - Ready-mix cement will be brought to the facility from the nearest ready-mix vendor, Martin Marietta Ready Mix in Merced, CA, located 7.0 miles from the facility;
    - Cement trucks will deliver ready-mix cement for 100 days in order to supply the required amount of cement for the project;
    - 14 one-way cement truck trips per day will be required to supply the required amount of cement for the project;
    - Off-road equipment used in construction includes cranes, forklifts, generator sets, graders, rubber-tired dozers, tractors, loaders, backhoes, and welders; and
    - During construction, exposed soil will be watered three times a day.
- CalEEMod defaults were used for:
    - Construction equipment load factor, usage hours, and average age;
    - Architectural coating areas;
    - Vehicle emission profiles and all calculations related to traffic and mobile source emissions aside from trip rates and trip lengths; and
    - All other calculations not specifically listed as an assumption.

PM_{10} emitted during construction can vary greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, weather conditions, and other factors, making quantification difficult. Despite this variability in emissions, experience has shown that there are several feasible control measures that can be reasonably implemented to significantly reduce fugitive dust emissions from construction. For larger projects, a fugitive dust control would be implemented, including Best Management Practices (BMPs) such as frequent water application to exposed surfaces. A dust control plan is usually sufficient mitigation to reduce PM_{10} impacts to a level considered less than significant. For these emissions estimates, standard (i.e., CalEEMod default) construction mitigation measures are assumed.

CalEEMod inputs for facility construction included data from the project description, the assumptions listed above, and the land use information listed in Table 2-1. Additional data inputs are provided in Attachment A-2.

Table 2-1: Highway 59 Compost Facility Land Use Data

Project Element	Land Use Type	Land Use Subtype	Unit Amount (1,000 sq. ft.)	Lot Size (acres)	Estimated Area (sq. ft.)
Composting, Windrow Curing, and Other Compost Processing Buildings	Industrial	General Light Industry	276.9	6.357	276,900
Paved Roads	Parking	Other Asphalt Surfaces	71.96	1.652	71,969
Project Site				10.9	474,800

2.2 Project Construction Emissions

Construction emissions were calculated using CalEEMod for the proposed composting facility. Construction activities for the composting facility will consist primarily of constructing concrete pads and walls for the compost bunkers. Additional work will be required to install blowers for the covered aerated static pile (CASP) composting systems. Emissions associated with construction will occur from the equipment used for construction, trucks delivering equipment and supplies (e.g., concrete), and workers commuting. Construction activities are estimated to take approximately 9 months beginning in mid-2024.

Mitigated maximum daily and total annual construction criteria pollutant emissions are summarized in Table 2-2. CalEEMod output reports are provided in Attachment B-3.

Table 2-2: Mitigated Construction Emissions Summary

Criteria Pollutant	Maximum Daily Emissions (lb/day)	Annual Emissions (tons)
VOC	3.74	0.13
NO_x	36.09	1.25
CO	33.99	1.36
SO_x	0.05	0.0023
PM_{10}	15.08	0.95
$PM_{2.5}$	4.13	0.17

GHGs – collectively reported as carbon dioxide equivalents (CO_2e) – are directly emitted from mobile sources such as on-road vehicles and off-road construction equipment burning fuels such as gasoline, diesel, biodiesel, propane, or natural gas (compressed or liquefied). Mitigated GHG emissions in metric tons (MT) were estimated for construction of the composting facility using CalEEMod; the results are shown in Table 2-3. CalEEMod output reports are provided in Attachment A-3.

Table 2-3: Construction Greenhouse Gas Emissions Summary

GHG	Emissions (MT)
CO_2	232.9
CH_4	0.01
N_2O	0.01
CO_2e	234.7

3.0 REFERENCES

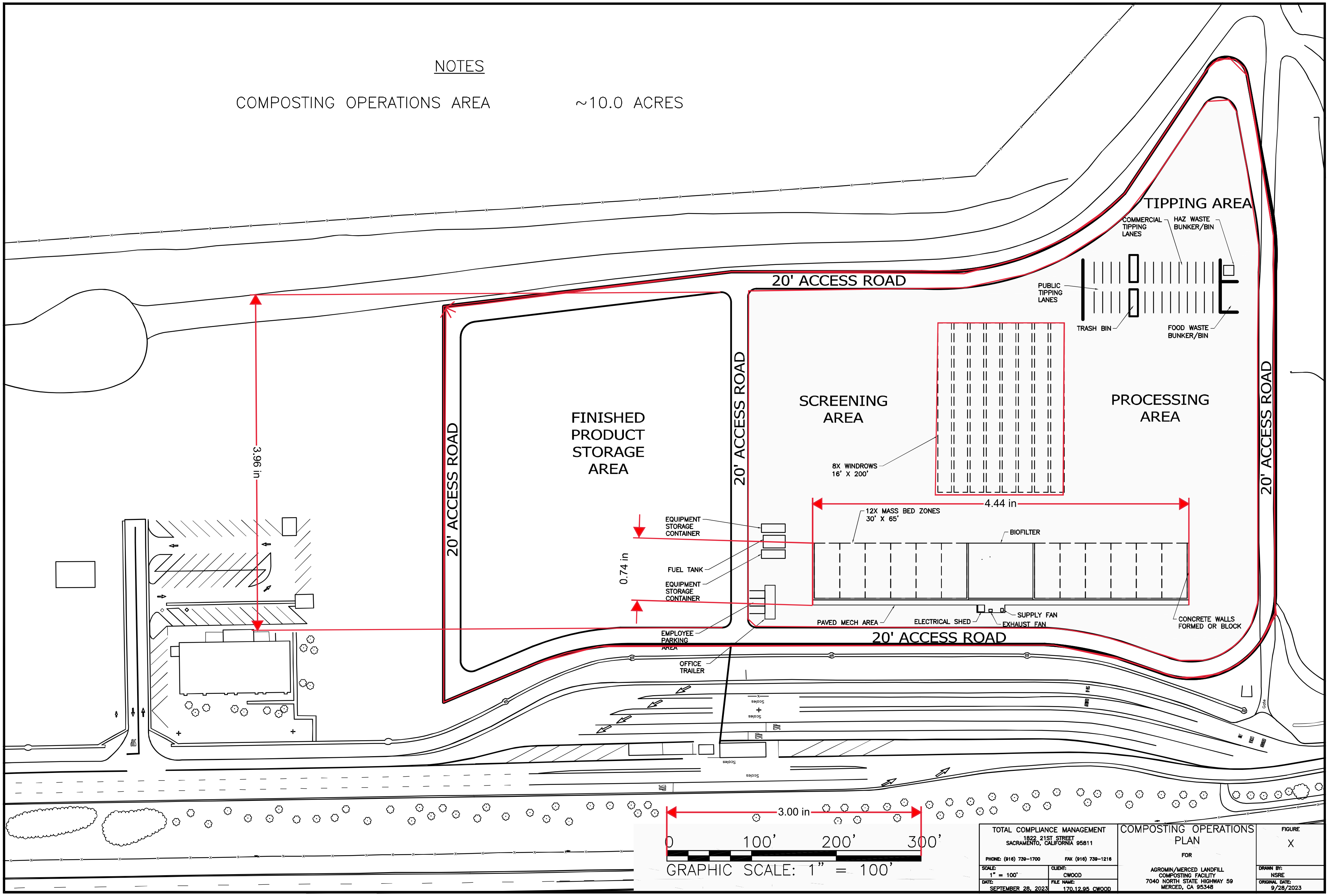
CalRecycle 2016. California Department of Resources Recycling and Recovery Solid Waste Cleanup Program Weights and Volumes for Project Estimates. Accessed via website: (https://www.calrecycle.ca.gov/swfacilities/cdi/Tools/Calculations), January 29, 2021.

CAPCOA 2023. California Emissions Estimation Model® (CalEEMod), Version 2022.1.1.20, Accessed via website: (http://www.caleemod.com/), November 7, 2023.

CARB 2017. California Air Resources Board. California's 2017 Climate Change Scoping Plan. Accessed via website: (https://ww3.arb.ca.gov/cc/scopingplan/scopingplan.htm), January 29, 2021.

CEC 2019. California Energy Commission Building Energy Efficiency Program. Accessed via website: (https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards), January 29, 2021.

ATTACHMENT A-1 – FACILITY PLOT PLAN



NOTES
COMPOSTING OPERATIONS AREA ~10.0 ACRES
TIPPING AREA
COMMERCIAL TIPPING LANES
HAZ WASTE BUNKER/BIN
PUBLIC TIPPING LANES
TRASH BIN
FOOD WASTE BUNKER/BIN
20' ACCESS ROAD
20' ACCESS ROAD
20' ACCESS ROAD
20' ACCESS ROAD
20' ACCESS ROAD
FINISHED PRODUCT STORAGE AREA
SCREENING AREA
PROCESSING AREA
8X WINDROWS 16' X 200'
3.96 in
4.44 in
12X MASS BED ZONES 30' X 65'
BIOFILTER
0.74 in
EQUIPMENT STORAGE CONTAINER
FUEL TANK
EQUIPMENT STORAGE CONTAINER
EMPLOYEE PARKING AREA
OFFICE TRAILER
PAVED MECH AREA
ELECTRICAL SHED
SUPPLY FAN
EXHAUST FAN
CONCRETE WALLS FORMED OR BLOCK
3.00 in
0 100' 200' 300'
GRAPHIC SCALE: 1" = 100'
TOTAL COMPLIANCE MANAGEMENT
1822 21ST STREET
SACRAMENTO, CALIFORNIA 95811
PHONE: (916) 739-1700
FAX (916) 739-1216
SCALE: 1" = 100'
CLIENT: CWOOD
DATE: SEPTEMBER 28, 2023
FILE NAME: 170.12.95 CWOOD
COMPOSTING OPERATIONS PLAN
FOR
AGROMIN/MERCED LANDFILL
COMPOSTING FACILITY
7040 NORTH STATE HIGHWAY 59
MERCED, CA 95348
FIGURE
X
DRAWN BY: NSRE
ORIGINAL DATE: 9/28/2023

ATTACHMENT A-2 – CALEEMOD INPUT DATA

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Table 1: Land Use Data for CalEEMod Input - Compost Facility						
Project Element	**Land Use Type**	**Land Use Subtype**	**Unit Amount**	**Size Metric**	**Lot Acreage (footprint)**	**Square Feet (est.)**
Composting, Windrow Curing, and Other Compost Processing Buildings	Industrial	General Heavy Industry	276.900	1,000 sq. ft.	6.357	**276,900**
Asphalt Paved Areas/Paved Roads	Parking	Other Asphalt Surfaces	71.960	1,000 sq. ft.	1.652	**71,960**
Project Site					**10.90**	**474,800**

Source: Applicant 2023, CalEEMod version 2016.3.2

Value	Units	Comments
43560.000	sqft/acre	Constant
1.000	in/100 ft	from Site Plan PDF
0.010	in/ft	from Site Plan PDF
47.480	sqin	Total Compost facility Area
27.690	sqin	Compost Facility Concrete Paved Area
3.040	sqin	Windrow Curing Area
0.236	sqin	Paved Roads
10.900	acre	Total Compost Facility Area
6.357	acre	Compost Facility Concrete Paved Area - Worst Case Assumption
0.698	acre	Total Windrow Curing Area
0.054	acre	Paved Roads
4	in	Approximate total length of paved mass bed zone back wall
0.74		Mass bed zones side wall lengths
14		Number of mass bed zone side walls
14.8		Total length of mass bed zone walls
1,480	ft	Approximate total length of paved mech area/mass bed zone walls
6	ft	Assumed height of mass bed zone walls
8	in	Assumed thickness of walls
5,920	cuft	Cubic Feet of Concrete for mass bed zone walls
36	in	Total length of access road
3,598	ft	Total length of access road
20	ft	Width of access road
71,960	sqft	Total paved area of access road

13. **Site Preparation:** The 10-acre proposed site is located where the existing green waste composting facility and food waste transfer is operating. The proposed facility will be designed to accommodate up to 50,000 tons per year using CASP technology. Construction at the site would last approximately five to six months and would include installing processing and composting equipment for a 50,000 TPY CASP module, a 10-acre compacted soil and concrete compost pad, and a lined pond to collect contact water.

    Temporary construction equipment would include a grader, tractor, loader, backhoe, and rubber-tired bulldozer. The existing access to the landfill would be utilized to gain access to the compost facility. Typical operations and site equipment are described in the Operational Plan.

    Site improvements would be required by the RWQCB as part of the approval process for this project. The landfill property currently has a site-specific WDR permit for water quality protection. This permit would need to be revised to reflect operational changes associated with the proposed compost facility and additional regulatory requirements imposed by the RWQCB for compacted compost pads and lined wastewater storage ponds. Alternatively, the compost facility may be placed under the General Order instead of revised site-specific WDRs. Regardless, site improvements include constructing a new lined wastewater storage pond, as well as making additional on-site drainage improvements to continue to direct stormwater and process water runoff into the detention pond, and improvements to working surfaces such as paving active composting and/or processing areas or amending/compacting the soil to meet the RWQCB's specifications.

Table 4: Truck Trips from Ready Mix Facility

Materials	Estimated Footprint (sf)	Volume of Cement Required (CY Cement)	Volume of Cement Conversion Factor (CY/Truck)	No. of Truck Trips (10 CY/load)	Total Truck VMT	Truck One Way Trips Per Day for Ready Mix	Trip Rate (Trips per Size Metric per Day)
Concrete Slab Paving	276,900	6,837	10	684	9,576	14	0.01412
Tilt-up Concrete Pouring	--	219	10	22	308		

Conversion Factors		
Value	**Units**	**Comments**
12	in/ft	constant
3	ft/yd	constant
0.037037037	CY/cubic ft	constant
1000	square feet, CalEEMOD Size Metric	constant
10	CY Cement/Truck	Assumption
8	inches Paving Thickness	Assumption
7	Facility to Ready Mix Site (miles)	Approximate, from site to Martin Marietta Ready Mix
100	Days of Concrete Pouring	Assumption

Table 6: Dust from Material Movement

Activity	Amount Import (CY)	Amount Export (CY)	Density (lb/CY)	Mass of Import (tons)	Mass of Export (tons)	Import/Export Phased?	No. of Haul Trips (8 CY/load)
Site Preparation	0	0.0	2100	0	0.0	No	0
Grading	0.0	0	2100	0.0	0	No	0

Note: Site prep and grading has already been completed, per Project Description.

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Table 7: Solid Waste Cleanup Program Weights and Volumes for Project Estimates

Description of Materials	Approximate Pounds/Cubic Yard	Remarks
Burn Dump Debris/Ash	800-1000	Dry Loose
	1500-1800	Wet for Dust Suppression
	2300	Wet mixed with soil
Construction Debris, Asphalt or Concrete: Loose	2400	
Construction Debris, Wood ; Uncompacted	400	Increase up to 100% if compacted using heavy equipment
Earth	2100	Loose/Dry. Plus 30% when compacted.
	3000	Excavated/Wet
Gravel or Crushed Stone Loose/Dry	2600	Increase 20% if wet
Household Trash	800	
Liquid Waste	1600	202 gal./cubic yard ~ 7 Lbs./Gal.
		E.g. Antifreeze, Waste Oil, Solvent
Metals, Un-compacted	600	e.g. Appliances, Metal Siding
Sand, Loose/Dry	2400	Increase 20% if damp and 30% if wet/compacted
Stone, Graded 8" max. Loose	2700	e.g. Gabion Construction. Increase 10% consolidated in place
Tire Burn Ash	500-800	
Tires, Auto and Pickup	220	Average 10 tires per cubic yard
Tires, OTR	See Remarks	Average 500 pounds per tire
Tires, Truck	480	Average 4 tires per cubic yard
Vehicles, Auto and Pickup	See Remarks	Use 3000 Pounds/Vehicle
Wood Chips, Shredded/Dry	300	
Wood Chips/Bark w/30% Soil	800	
Yard Waste (Vegetation) Loose	600	

Source: Cal Recycle 2016

http://www.calrecycle.ca.gov/swfacilities/cdi/Tools/Calculations.htm

Table 8: Mitigation Measures Assumptions Summary

Source	Mitigation Measure	Amount/Reduction
Construction	Water Application	3x daily

Table 9: Other Non Default CalEEMod Settings / Assumptions

mitigation construction	clean paved roads 0.5
mitigation construction	Water Exposed Area 3x a day

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Table 4: Mitigated Annual Construction Emissions	
Criteria Pollutants	**Annual Emissions (TPY)**
ROG (VOC)	0.13
NO_X	1.25
CO	1.36
SO_X	0.0023
Total PM_{10}	2.16
Total $PM_{2.5}$	0.38

Table 5: Mitigated Maximum Daily Construction Emissions	
Criteria Pollutants	**Maximum Daily Emissions (lb/day)**
ROG (VOC)	3.74
NO_X	36.09
CO	33.99
SO_X	0.05
Total PM_{10}	15.08
Total $PM_{2.5}$	4.13

Table 6: Construction Greenhouse Gas Emissions Summary	
Greenhouse Gases	**Annual Emissions (MT/Yr)**
CO_2	232.9
CH_4	0.0090
N_2O	0.0053
CO_2e	234.7

ATTACHMENT A-3 – CALEEMOD OUTPUT REPORTS

Highway 59 Composting Facility Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Highway 59 Composting Facility
Construction Start Date	6/1/2024
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.80
Precipitation (days)	23.4
Location	7040 Snelling Hwy, Merced, CA 95348, USA
County	Merced
City	Unincorporated
Air District	San Joaquin Valley APCD
Air Basin	San Joaquin Valley
TAZ	2300
EDFZ	5
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.20

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
General Heavy Industry	277	1000sqft	10.9	0.00	0.00	—	—	—

Other Asphalt Surfaces	72.0	1000sqft	1.65	0.00	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-10-A	Water Exposed Surfaces
Construction	C-10-C	Water Unpaved Construction Roads
Construction	C-12	Sweep Paved Roads

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

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

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	4.44	3.74	36.1	34.0	0.05	1.60	32.1	32.6	1.47	10.1	11.6	—	5,479	5,479	0.22	0.08	5,502
Mit.	4.44	3.74	36.1	34.0	0.05	1.60	14.6	15.1	1.47	2.66	4.13	—	5,479	5,479	0.22	0.08	5,502
% Reduced	—	—	—	—	—	—	55%	54%	—	74%	64%	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.55	1.30	11.9	14.1	0.03	0.50	32.1	32.6	0.46	3.24	3.70	—	2,908	2,908	0.11	0.08	2,936
Mit.	1.55	1.30	11.9	14.1	0.03	0.50	14.6	15.1	0.46	1.49	1.95	—	2,908	2,908	0.11	0.08	2,936
% Reduced	—	—	—	—	—	—	55%	54%	—	54%	47%	—	—	—	—	—	—

Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.87	0.73	6.87	7.43	0.01	0.30	11.5	11.8	0.27	1.83	2.10	—	1,407	1,407	0.05	0.03	1,418
Mit.	0.87	0.73	6.87	7.43	0.01	0.30	4.92	5.22	0.27	0.68	0.95	—	1,407	1,407	0.05	0.03	1,418
% Reduced	—	—	—	—	—	—	57%	56%	—	63%	55%	—	—	—	—	—	—
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.16	0.13	1.25	1.36	< 0.005	0.05	2.10	2.16	0.05	0.33	0.38	—	233	233	0.01	0.01	235
Mit.	0.16	0.13	1.25	1.36	< 0.005	0.05	0.90	0.95	0.05	0.12	0.17	—	233	233	0.01	0.01	235
% Reduced	—	—	—	—	—	—	57%	56%	—	63%	55%	—	—	—	—	—	—

2.2. Construction Emissions by Year, Unmitigated

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

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	4.44	3.74	36.1	34.0	0.05	1.60	32.1	32.6	1.47	10.1	11.6	—	5,479	5,479	0.22	0.08	5,502
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	1.55	1.30	11.9	14.1	0.03	0.50	32.1	32.6	0.46	3.24	3.70	—	2,908	2,908	0.11	0.08	2,936
2025	1.05	1.13	8.00	10.9	0.02	0.35	32.1	32.5	0.33	3.23	3.56	—	1,962	1,962	0.07	0.07	1,984
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.87	0.73	6.87	7.43	0.01	0.30	11.5	11.8	0.27	1.83	2.10	—	1,407	1,407	0.05	0.03	1,418
2025	0.10	0.15	0.71	0.96	< 0.005	0.03	3.29	3.32	0.03	0.33	0.36	—	174	174	0.01	0.01	176
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

2024	0.16	0.13	1.25	1.36	< 0.005	0.05	2.10	2.16	0.05	0.33	0.38	—	233	233	0.01	0.01	235
2025	0.02	0.03	0.13	0.18	< 0.005	0.01	0.60	0.61	0.01	0.06	0.07	—	28.8	28.8	< 0.005	< 0.005	29.1

2.3. Construction Emissions by Year, Mitigated

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

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	4.44	3.74	36.1	34.0	0.05	1.60	14.6	15.1	1.47	2.66	4.13	—	5,479	5,479	0.22	0.08	5,502
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	1.55	1.30	11.9	14.1	0.03	0.50	14.6	15.1	0.46	1.49	1.95	—	2,908	2,908	0.11	0.08	2,936
2025	1.05	1.13	8.00	10.9	0.02	0.35	14.6	14.9	0.33	1.48	1.81	—	1,962	1,962	0.07	0.07	1,984
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.87	0.73	6.87	7.43	0.01	0.30	4.92	5.22	0.27	0.68	0.95	—	1,407	1,407	0.05	0.03	1,418
2025	0.10	0.15	0.71	0.96	< 0.005	0.03	1.49	1.52	0.03	0.15	0.18	—	174	174	0.01	0.01	176
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.16	0.13	1.25	1.36	< 0.005	0.05	0.90	0.95	0.05	0.12	0.17	—	233	233	0.01	0.01	235
2025	0.02	0.03	0.13	0.18	< 0.005	0.01	0.27	0.28	0.01	0.03	0.03	—	28.8	28.8	< 0.005	< 0.005	29.1

3. Construction Emissions Details

3.1. Site Preparation (2024) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	4.34	3.65	36.0	32.9	0.05	1.60	—	1.60	1.47	—	1.47	—	5,296	5,296	0.21	0.04	5,314
Dust From Material Movement	—	—	—	—	—	—	19.7	19.7	—	10.1	10.1	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.36	0.30	2.96	2.71	< 0.005	0.13	—	0.13	0.12	—	0.12	—	435	435	0.02	< 0.005	437
Dust From Material Movement	—	—	—	—	—	—	1.62	1.62	—	0.83	0.83	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.05	0.54	0.49	< 0.005	0.02	—	0.02	0.02	—	0.02	—	72.1	72.1	< 0.005	< 0.005	72.3
Dust From Material Movement	—	—	—	—	—	—	0.29	0.29	—	0.15	0.15	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.06	1.04	0.00	0.00	0.11	0.11	0.00	0.03	0.03	—	131	131	0.01	< 0.005	133
Vendor	< 0.005	< 0.005	0.07	0.03	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	52.8	52.8	< 0.005	0.01	55.3
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.07	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.87	9.87	< 0.005	< 0.005	10.0
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	4.35	4.35	< 0.005	< 0.005	4.54
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.63	1.63	< 0.005	< 0.005	1.66
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.72	0.72	< 0.005	< 0.005	0.75
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00

3.2. Site Preparation (2024) - Mitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	4.34	3.65	36.0	32.9	0.05	1.60	—	1.60	1.47	—	1.47	—	5,296	5,296	0.21	0.04	5,314

Dust From Material Movement	—	—	—	—	—	—	5.11	5.11	—	2.63	2.63	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.36	0.30	2.96	2.71	< 0.005	0.13	—	0.13	0.12	—	0.12	—	435	435	0.02	< 0.005	437
Dust From Material Movement	—	—	—	—	—	—	0.42	0.42	—	0.22	0.22	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.05	0.54	0.49	< 0.005	0.02	—	0.02	0.02	—	0.02	—	72.1	72.1	< 0.005	< 0.005	72.3
Dust From Material Movement	—	—	—	—	—	—	0.08	0.08	—	0.04	0.04	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.06	1.04	0.00	0.00	0.11	0.11	0.00	0.03	0.03	—	131	131	0.01	< 0.005	133
Vendor	< 0.005	< 0.005	0.07	0.03	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	52.8	52.8	< 0.005	0.01	55.3
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.07	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.87	9.87	< 0.005	< 0.005	10.0
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	4.35	4.35	< 0.005	< 0.005	4.54
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.63	1.63	< 0.005	< 0.005	1.66
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.72	0.72	< 0.005	< 0.005	0.75
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00

3.3. Building Construction (2024) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.44	1.20	11.2	13.1	0.02	0.50	—	0.50	0.46	—	0.46	—	2,398	2,398	0.10	0.02	2,406
Onsite truck	< 0.005	< 0.005	0.11	0.03	< 0.005	< 0.005	31.9	31.9	< 0.005	3.19	3.19	—	78.1	78.1	< 0.005	0.01	82.0
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.44	1.20	11.2	13.1	0.02	0.50	—	0.50	0.46	—	0.46	—	2,398	2,398	0.10	0.02	2,406
Onsite truck	< 0.005	< 0.005	0.11	0.03	< 0.005	< 0.005	31.9	31.9	< 0.005	3.19	3.19	—	78.2	78.2	< 0.005	0.01	81.9

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.47	0.40	3.69	4.31	0.01	0.16	—	0.16	0.15	—	0.15	—	788	788	0.03	0.01	791
Onsite truck	< 0.005	< 0.005	0.04	0.01	< 0.005	< 0.005	9.83	9.83	< 0.005	0.98	0.98	—	25.7	25.7	< 0.005	< 0.005	26.9
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.07	0.67	0.79	< 0.005	0.03	—	0.03	0.03	—	0.03	—	131	131	0.01	< 0.005	131
Onsite truck	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	1.79	1.79	< 0.005	0.18	0.18	—	4.25	4.25	< 0.005	< 0.005	4.46
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.06	1.04	0.00	0.00	0.11	0.11	0.00	0.03	0.03	—	131	131	0.01	< 0.005	133
Vendor	0.02	0.02	0.45	0.19	< 0.005	< 0.005	0.08	0.09	< 0.005	0.02	0.03	—	316	316	< 0.005	0.05	330
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.08	0.79	0.00	0.00	0.11	0.11	0.00	0.03	0.03	—	116	116	0.01	0.01	118
Vendor	0.02	0.01	0.48	0.19	< 0.005	< 0.005	0.08	0.09	< 0.005	0.02	0.03	—	316	316	< 0.005	0.05	330
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.02	0.27	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	39.5	39.5	< 0.005	< 0.005	40.1
Vendor	0.01	< 0.005	0.15	0.06	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	104	104	< 0.005	0.02	108
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	6.54	6.54	< 0.005	< 0.005	6.64

Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	—	17.2	17.2	< 0.005	< 0.005	18.0
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00

3.4. Building Construction (2024) - Mitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.44	1.20	11.2	13.1	0.02	0.50	—	0.50	0.46	—	0.46	—	2,398	2,398	0.10	0.02	2,406
Onsite truck	< 0.005	< 0.005	0.11	0.03	< 0.005	< 0.005	14.4	14.4	< 0.005	1.44	1.44	—	78.1	78.1	< 0.005	0.01	82.0
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.44	1.20	11.2	13.1	0.02	0.50	—	0.50	0.46	—	0.46	—	2,398	2,398	0.10	0.02	2,406
Onsite truck	< 0.005	< 0.005	0.11	0.03	< 0.005	< 0.005	14.4	14.4	< 0.005	1.44	1.44	—	78.2	78.2	< 0.005	0.01	81.9
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.47	0.40	3.69	4.31	0.01	0.16	—	0.16	0.15	—	0.15	—	788	788	0.03	0.01	791
Onsite truck	< 0.005	< 0.005	0.04	0.01	< 0.005	< 0.005	4.42	4.42	< 0.005	0.44	0.44	—	25.7	25.7	< 0.005	< 0.005	26.9
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.07	0.67	0.79	< 0.005	0.03	—	0.03	0.03	—	0.03	—	131	131	0.01	< 0.005	131
Onsite truck	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	0.81	0.81	< 0.005	0.08	0.08	—	4.25	4.25	< 0.005	< 0.005	4.46

Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.06	1.04	0.00	0.00	0.11	0.11	0.00	0.03	0.03	—	131	131	0.01	< 0.005	133
Vendor	0.02	0.02	0.45	0.19	< 0.005	< 0.005	0.08	0.09	< 0.005	0.02	0.03	—	316	316	< 0.005	0.05	330
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.08	0.79	0.00	0.00	0.11	0.11	0.00	0.03	0.03	—	116	116	0.01	0.01	118
Vendor	0.02	0.01	0.48	0.19	< 0.005	< 0.005	0.08	0.09	< 0.005	0.02	0.03	—	316	316	< 0.005	0.05	330
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.02	0.27	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	39.5	39.5	< 0.005	< 0.005	40.1
Vendor	0.01	< 0.005	0.15	0.06	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	104	104	< 0.005	0.02	108
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	6.54	6.54	< 0.005	< 0.005	6.64
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	—	17.2	17.2	< 0.005	< 0.005	18.0
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00

3.5. Paving (2025) - Unmitigated

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

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

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.95	0.80	7.45	9.98	0.01	0.35	—	0.35	0.32	—	0.32	—	1,511	1,511	0.06	0.01	1,517
Paving	—	0.14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.11	0.03	< 0.005	< 0.005	31.9	31.9	< 0.005	3.19	3.19	—	76.7	76.7	< 0.005	0.01	80.3
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.07	0.61	0.82	< 0.005	0.03	—	0.03	0.03	—	0.03	—	124	124	0.01	< 0.005	125
Paving	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	2.46	2.46	< 0.005	0.25	0.25	—	6.30	6.30	< 0.005	< 0.005	6.60
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.11	0.15	< 0.005	0.01	—	0.01	< 0.005	—	< 0.005	—	20.6	20.6	< 0.005	< 0.005	20.6
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.45	0.45	< 0.005	0.04	0.04	—	1.04	1.04	< 0.005	< 0.005	1.09
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	0.72	0.00	0.00	0.11	0.11	0.00	0.03	0.03	—	114	114	0.01	< 0.005	116
Vendor	0.01	0.01	0.37	0.13	< 0.005	< 0.005	0.07	0.07	< 0.005	0.02	0.02	—	260	260	< 0.005	0.04	272
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.01	0.01	0.01	0.06	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.67	9.67	< 0.005	< 0.005	9.82
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	21.4	21.4	< 0.005	< 0.005	22.3
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.60	1.60	< 0.005	< 0.005	1.63
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.54	3.54	< 0.005	< 0.005	3.70
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00

3.6. Paving (2025) - Mitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.95	0.80	7.45	9.98	0.01	0.35	—	0.35	0.32	—	0.32	—	1,511	1,511	0.06	0.01	1,517
Paving	—	0.14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.11	0.03	< 0.005	< 0.005	14.4	14.4	< 0.005	1.44	1.44	—	76.7	76.7	< 0.005	0.01	80.3
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.07	0.61	0.82	< 0.005	0.03	—	0.03	0.03	—	0.03	—	124	124	0.01	< 0.005	125
Paving	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	1.11	1.11	< 0.005	0.11	0.11	—	6.30	6.30	< 0.005	< 0.005	6.60

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.11	0.15	< 0.005	0.01	—	0.01	< 0.005	—	< 0.005	—	20.6	20.6	< 0.005	< 0.005	20.6
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.20	0.20	< 0.005	0.02	0.02	—	1.04	1.04	< 0.005	< 0.005	1.09
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	0.72	0.00	0.00	0.11	0.11	0.00	0.03	0.03	—	114	114	0.01	< 0.005	116
Vendor	0.01	0.01	0.37	0.13	< 0.005	< 0.005	0.07	0.07	< 0.005	0.02	0.02	—	260	260	< 0.005	0.04	272
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.06	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.67	9.67	< 0.005	< 0.005	9.82
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	21.4	21.4	< 0.005	< 0.005	22.3
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.60	1.60	< 0.005	< 0.005	1.63
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.54	3.54	< 0.005	< 0.005	3.70
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00

3.7. Architectural Coating (2025) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.13	0.88	1.14	< 0.005	0.03	—	0.03	0.03	—	0.03	—	134	134	0.01	< 0.005	134
Architectural Coatings	—	1.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.06	0.02	< 0.005	< 0.005	16.0	16.0	< 0.005	1.59	1.60	—	38.4	38.4	< 0.005	0.01	40.2
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.05	0.06	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	7.32	7.32	< 0.005	< 0.005	7.34
Architectural Coatings	—	0.05	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.82	0.82	< 0.005	0.08	0.08	—	2.10	2.10	< 0.005	< 0.005	2.20
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.21	1.21	< 0.005	< 0.005	1.22
Architectural Coatings	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.15	0.15	< 0.005	0.01	0.01	—	0.35	0.35	< 0.005	< 0.005	0.36
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	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
Vendor	< 0.005	< 0.005	0.07	0.03	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	52.0	52.0	< 0.005	0.01	54.3
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	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
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.85	2.85	< 0.005	< 0.005	2.98
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	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
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.47	0.47	< 0.005	< 0.005	0.49
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00

3.8. Architectural Coating (2025) - Mitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.13	0.88	1.14	< 0.005	0.03	—	0.03	0.03	—	0.03	—	134	134	0.01	< 0.005	134
Architectural Coatings	—	1.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	< 0.005	< 0.005	0.06	0.02	< 0.005	< 0.005	7.19	7.19	< 0.005	0.72	0.72	—	38.4	38.4	< 0.005	0.01	40.2
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.05	0.06	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	7.32	7.32	< 0.005	< 0.005	7.34
Architectural Coatings	—	0.05	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.37	0.37	< 0.005	0.04	0.04	—	2.10	2.10	< 0.005	< 0.005	2.20
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.21	1.21	< 0.005	< 0.005	1.22
Architectural Coatings	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.07	0.07	< 0.005	0.01	0.01	—	0.35	0.35	< 0.005	< 0.005	0.36
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	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
Vendor	< 0.005	< 0.005	0.07	0.03	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	52.0	52.0	< 0.005	0.01	54.3
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	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
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.85	2.85	< 0.005	< 0.005	2.98

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	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
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.47	0.47	< 0.005	< 0.005	0.49
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

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

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

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

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

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

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

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

Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

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

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

4.10.5. Above and Belowground Carbon Accumulation by Land Use Type - Mitigated

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

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

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

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

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

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Site Preparation	Site Preparation	6/1/2024	7/14/2024	5.00	30.0	—
Building Construction	Building Construction	7/16/2024	12/30/2024	5.00	120	—
Paving	Paving	1/7/2025	2/17/2025	5.00	30.0	—

Architectural Coating	Architectural Coating	2/18/2025	3/17/2025	5.00	20.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Preparation	Rubber Tired Dozers	Diesel	Average	3.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	4.00	8.00	84.0	0.37
Building Construction	Forklifts	Diesel	Average	3.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Cranes	Diesel	Average	1.00	7.00	367	0.29
Building Construction	Welders	Diesel	Average	1.00	8.00	46.0	0.45
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00	7.00	84.0	0.37
Paving	Pavers	Diesel	Average	2.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

5.2.2. Mitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Preparation	Rubber Tired Dozers	Diesel	Average	3.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	4.00	8.00	84.0	0.37
Building Construction	Forklifts	Diesel	Average	3.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Cranes	Diesel	Average	1.00	7.00	367	0.29

Building Construction	Welders	Diesel	Average	1.00	8.00	46.0	0.45
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00	7.00	84.0	0.37
Paving	Pavers	Diesel	Average	2.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Preparation	—	—	—	—
Site Preparation	Worker	15.0	10.9	LDA,LDT1,LDT2
Site Preparation	Vendor	2.00	8.27	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	15.0	10.9	LDA,LDT1,LDT2
Building Construction	Vendor	14.0	7.00	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	2.00	10.9	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	10.9	LDA,LDT1,LDT2
Paving	Vendor	10.0	8.27	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	2.00	10.9	HHDT
Architectural Coating	—	—	—	—

Architectural Coating	Worker	0.00	10.9	LDA,LDT1,LDT2
Architectural Coating	Vendor	2.00	8.27	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	1.00	10.9	HHDT

5.3.2. Mitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Preparation	—	—	—	—
Site Preparation	Worker	15.0	10.9	LDA,LDT1,LDT2
Site Preparation	Vendor	2.00	8.27	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	15.0	10.9	LDA,LDT1,LDT2
Building Construction	Vendor	14.0	7.00	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	2.00	10.9	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	10.9	LDA,LDT1,LDT2
Paving	Vendor	10.0	8.27	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	2.00	10.9	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	0.00	10.9	LDA,LDT1,LDT2
Architectural Coating	Vendor	2.00	8.27	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	1.00	10.9	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	0.00	0.00	0.00	0.00	4,318

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Site Preparation	—	—	45.0	0.00	—
Paving	0.00	0.00	0.00	0.00	1.65

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
General Heavy Industry	0.00	0%
Other Asphalt Surfaces	1.65	100%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O

2024	0.00	204	0.03	< 0.005
2025	0.00	204	0.03	< 0.005

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

5.18.2.2. Mitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	27.4	annual days of extreme heat
Extreme Precipitation	1.45	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	0.00	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	3	0	0	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	0	0	0	N/A

Drought	0	0	0	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	3	1	1	3
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	1	1	1	2
Drought	1	1	1	2
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	1	1	1	2

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	74.1
AQ-PM	55.6
AQ-DPM	6.60
Drinking Water	76.1
Lead Risk Housing	38.4
Pesticides	86.3
Toxic Releases	12.4
Traffic	1.45
Effect Indicators	—
CleanUp Sites	31.2
Groundwater	95.0
Haz Waste Facilities/Generators	16.6
Impaired Water Bodies	90.1
Solid Waste	95.0
Sensitive Population	—
Asthma	79.9
Cardio-vascular	84.3
Low Birth Weights	60.1
Socioeconomic Factor Indicators	—
Education	76.8
Housing	17.9
Linguistic	64.8
Poverty	66.1
Unemployment	79.7

7.2. Healthy Places Index Scores

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

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	43.7957141
Employed	11.27935327
Median HI	38.98370332
Education	—
Bachelor's or higher	37.08456307
High school enrollment	100
Preschool enrollment	88.64365456
Transportation	—
Auto Access	34.87745413
Active commuting	13.92275119
Social	—
2-parent households	77.01783652
Voting	60.87514436
Neighborhood	—
Alcohol availability	88.0790453
Park access	6.172205826
Retail density	0.949570127
Supermarket access	2.399589375
Tree canopy	64.8659053
Housing	—
Homeownership	71.07660721
Housing habitability	82.38162453
Low-inc homeowner severe housing cost burden	41.78108559

Low-inc renter severe housing cost burden	76.6072116
Uncrowded housing	85.268831
Health Outcomes	—
Insured adults	34.33850892
Arthritis	0.0
Asthma ER Admissions	22.3
High Blood Pressure	0.0
Cancer (excluding skin)	0.0
Asthma	0.0
Coronary Heart Disease	0.0
Chronic Obstructive Pulmonary Disease	0.0
Diagnosed Diabetes	0.0
Life Expectancy at Birth	40.7
Cognitively Disabled	11.9
Physically Disabled	5.0
Heart Attack ER Admissions	8.9
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0
Pedestrian Injuries	19.6
Physical Health Not Good	0.0
Stroke	0.0
Health Risk Behaviors	—
Binge Drinking	0.0
Current Smoker	0.0
No Leisure Time for Physical Activity	0.0
Climate Change Exposures	—

Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	90.9
Elderly	18.5
English Speaking	53.3
Foreign-born	28.1
Outdoor Workers	9.6
Climate Change Adaptive Capacity	—
Impervious Surface Cover	98.1
Traffic Density	0.5
Traffic Access	0.0
Other Indices	—
Hardship	58.6
Other Decision Support	—
2016 Voting	78.5

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	81.0
Healthy Places Index Score for Project Location (b)	41.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	Yes
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

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

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Land Use	Project site is approximately 10.9 acres.
Construction: Construction Phases	Site is generally level, likely no grading required. Assuming approximately 100 to 120 days required for concrete pouring and tilt up construction.
Construction: Off-Road Equipment	—
Construction: Trips and VMT	Adding trips for obtaining ready-mix.

APPENDIX B – MOBILE SOURCE EMISSIONS

Appendix B:
Mobile Source Emissions

Air Quality and GHG
Technical Report

Prepared for:

Agromin Corporation
Highway 59 Composting Facility
7040 N. Highway 59
Merced, CA 95348

February 2024

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Attachments

List of Acronyms and Abbreviations

BHp	Brake Horsepower
BSFC	Brake Specific Fuel Consumption
CARB	California Air Resources Board
CAS No.	Chemical Abstract Service Number
Cf	Rain Correction Factor
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
DPM	Diesel Particulate Matter
EF	Emission Factor
EPA	[United States] Environmental Protection Agency
g	Gram
gal	Gallon
GHG	Greenhouse Gas
GWP	Global Warming Potential
hr	Hour
IPCC	Intergovernmental Panel on Climate Change
k	Particle Size Multiplier
kg	Kilogram
lb	Pound
LDT1	Light Duty Truck (EMFAC Category 1)
LDT2	Light Duty Truck (EMFAC Category 2)
m^2	Square Meter
MPH	Miles per Hour
MT	Metric Ton
N_2O	Nitrous Oxide
No.	Number
NO_x	Nitrogen Oxides
$PM_{2.5}$	Fine Particulate Mater
PM_{10}	Respirable Particulate Matter
SCAQMD	South Coast Air Quality Management District
SJVAPCD	San Joaquin Valley Air Pollution Control District
sL	Silt Load
SO_x	Sulfur Oxides
TAC	Toxic Air Contaminant
TPD	Tons per Day
TPY	Tons per Year
VMT	Vehicle Miles Traveled

VOC	Volatile Organic Compounds
W	Average Roadway Fleet Weight (Tons)
wt.	Weight
yr	Year

Appendix C: Mobile Source Emissions

1.0 INTRODUCTION

1.1 Overview

Emissions estimates have been prepared for the mobile sources required to operate the proposed composting operations at the Highway 59 Composting Facility in Merced County, California. Emissions estimates have been prepared for the following source categories:

- Vehicle and Equipment Exhaust Emissions:
    - Onroad Vehicle Exhaust Emissions; and
    - Offroad Equipment Exhaust Emissions;
- Dust/Particulate Emissions:
    - Fugitive Dust from Travel on Paved Roads; and
    - Fugitive Dust from Travel on Unpaved Areas;
- Toxic Air Contaminant (TAC) Emissions:
    - Vehicle and Equipment Exhaust TAC Emissions:
        - Diesel Exhaust Emissions; and
        - Gasoline Exhaust Emissions;
    - Dust and Particulate TAC Emissions:
        - Paved Road Dust TAC Emissions, and
        - Unpaved Road Dust TAC Emissions.

For each category of emissions, the calculation methodology is explained and the data and assumptions used in the calculations are provided. Emissions are summarized by category in each section. A comprehensive summary of mobile source criteria pollutant emissions is provided in Section 4.0. Emission calculation worksheets are provided in Attachment B-1.

1.2 Facility Throughput

The operational emissions were estimated based on the proposed facility process rate of 75,000 TPY. There is mass loss during various phases of processing due to decomposition of the organic matter and screening to remove non-compostable materials. The process throughput used in this analysis is summarized in Table 1-1.

Peak daily throughput for the compost facility may be as high as 300 TPD. However, because these emission calculations are intended to support the CEQA evaluation of the project, annual average daily throughput is used in the calculations.

Table 1-1: Process Throughput

Material	Compost Facility	
	TPY	TPD
Feedstock	75,000	240
Finished Compost	45,000	144

2.0 VEHICLE AND EQUIPMENT EXHAUST EMISSIONS

2.1 Onroad Vehicle Exhaust Emissions

Employee travel, routine business travel, and the transport of raw materials to the facility and finished product from the facility result in onroad vehicle exhaust emissions.

2.1.1 Methodology

Emissions from motor vehicles are estimated using factors that relate emissions of a given air contaminant to vehicle miles traveled (VMT) and the number of engine starts expected to occur. Emissions from motor vehicles are typically determined using emission factors that are representative of a given vehicle category (e.g., passenger car, light-duty truck) and fuel type that reflect the characteristics of the population of the vehicle type in a given vehicle fleet. The fleet emission factors reflect the characteristics of the vehicles in the fleet, such as the type of vehicle, the age of the vehicle, the weight of the vehicle, fuel efficiency, etc. The factors also reflect the demographics of the region(s) in which the vehicles are operated and the regulatory requirements applicable to the types of vehicles which comprise the fleet.

The emission factors change on an annual basis as older vehicles are replaced by new vehicles and as regulatory requirements that mandate lower standards become effective. Consequently, the models used to generate these factors are complex. In California, the recommended model for calculating emissions from onroad mobile sources is EMFAC2021 (CARB 2021), developed and maintained by the California Air Resources Board (CARB). The EMFAC2021 model was used to generate the emission factors used for estimating the onroad emissions from the vehicle fleet required for operation of the proposed composting facility.

The fleet consists of the vehicles used to transport raw material, personnel, and supplies to the facility, conduct routine business activities, and deliver finished compost product to end users. Feedstock to the compost facilities assumes that all feedstock materials are supplied from within Merced County, and the maximum driving distance from the compost facility to the most distant agricultural area of 50 miles is used in the emission calculations.

Onroad emissions include running exhaust, idling exhaust, and startup exhaust. Fugitive particulate emissions include tire wear and brake wear. Fugitive hydrocarbon emissions include running loss, hot soak, and diurnal emissions. The off-site mileage and the on-site mileage are used to calculate fugitive dust emissions from travel on paved and unpaved roads.

Emissions are calculated for each vehicle category and fuel type using the total VMT (or other information, depending on the EMFAC2021 component being calculated) for 2025, the first year of operation anticipated for the CASP. Calculation procedures are summarized in Table 2-1.

Table 2-1: EMFAC2021 Components Included in Onroad Vehicle Emission Calculations

EMFAC2021 Component		Calculation Procedure
g/VMT	Running Exhaust	Calculated using annual VMT
	Tire & Brake Wear	Calculated using annual VMT
g/Trip	Startup	Calculated from number of trips
	Hot Soak	Calculated from number of trips
	Running Loss	Calculated from number of trips
g/Vehicle-Day	Idle Exhaust	Emission Factor (EF) converted to g/trip and emissions calculated from number of trips
	Resting Loss	EF converted to g/trip and emissions calculated from number of trips
	Diurnal Loss	EF converted to g/trip and emissions calculated from number of trips

2.1.2 Vehicle Activity

The daily operation of the composting facility will require the use of onroad mobile sources for transport personnel, conducting routine business, the transport of feedstock, and the transport of finished product. Operational activities are listed in Table 2-2.

Table 2-2: Operational Activities

Activity	Required Vehicles
Employee commute	Light-duty cars or trucks for employee commute
Misc. business activity	Light-duty truck for routine business (third party)
Laboratory services	Light-duty trucks for field sampling of compost
Delivery of office supplies	Step van for delivery of office supplies
Deliver feedstock	Heavy-Heavy-Duty Diesel Truck (20 cubic yard capacity)
Transport product	Heavy-Heavy-Duty Diesel Truck (20 cubic yard capacity)

The EMFAC2021 model was run to derive emission factors for the LDT1, LDT2, and T7 vehicles. The EMFAC2021 factors used for calculating emissions from the onroad mobile sources are listed in Table 3 in Attachment B-1.

On-site mileage for feedstock delivery was based on the distance from the facility access gate to the furthest point of the proposed compost facility, approximately 0.6 miles. On-site mileage for product delivery trucks is based on the distance from the processing area to the facility access gate, also assumed to be 0.6 miles. Off-site mileage for the raw material delivery trucks and finished product delivery trucks assumes the distance from the facility to the most distant agricultural area in the County, a distance of approximately 50 miles. Off-site mileage for the workers assumes that workers live in Merced, approximately 7 miles from the facility. Table 2-3 summarizes the information used with the EMFAC emission factors to calculate the onroad mobile source emissions at the maximum requested processing rate for the CASP compost facility of 75,000 TPY.

Table 2-3: Onroad Mobile Source Activity for Composting Facility

Vehicle Type[1]	Vehicle Use	Oper. Days	Veh/ Day	One-Way Trips per Vehicle	One-Way Trips per Year	One-Way On-Site Trip Mileage	One-Way Off-Site Trip Mileage	Annual Travel (VMT/yr)
LDT1	Supervisor	312	1	2	624	0.60	7	4,742
LDT1	Technical Staff	312	1	2	624	0.60	7	4,742
LDT1	Mechanic	312	1	2	624	0.60	7	4,742
LDT1	Equipment Operators	312	12	2	7,488	0.60	7	56,909
LDT1	Personnel for Facility	312	1	2	624	0.60	7	4,742
LDT1	Miscellaneous Business	104	1	2	208	0.60	7	1,581
LDT1	Laboratory Services	104	1	2	208	0.60	7	1,581
LHD2	Delivery of Office Supplies	104	1	2	208	0.60	7	1,581
T7 Tractor	Ship Raw Material to Compost	312	21	2	13,104	0.60	50	663,062
T7 Tractor	Ship Finished Compost	312	8	2	4,992	0.60	50	252,595

Notes:

1. LDT1 (Light Duty Truck), LHD2 (Light-Heavy-Duty), and T7 Tractor (diesel) refer to vehicle categories in EMFAC2021. LDT1 is gasoline fueled; LHD2 and T7 are diesel fueled.

2.1.3 Onroad Vehicle Exhaust Emissions

The annual emissions were calculated for 2025. The emission estimates are summarized in Tables 2-4 and 2-5 for criteria pollutants and GHG, respectively.

Table 2-4: Criteria Pollutant Emissions from Onroad Operations Vehicles

Type	NO_x (lb/yr)	VOC (lb/yr)	CO (lb/yr)	SO_x (lb/yr)	PM_{10} (lb/yr)	$PM_{2.5}$ (lb/yr)
Exhaust	3,493.40	64.53	872.41	30.28	47.19	45.13
Fugitive	---	26.89	---	---	233.84	74.44
Total (lb/yr)	3,493.40	91.42	872.41	30.28	281.04	119.58
Total (TPY)	1.75	0.05	0.44	0.02	0.14	0.06

Table 2-5: GHG Emissions from Onroad Mobile Source Activity

CO_2 (MT/yr)	CH_4 (kg/yr)	N_2O (kg/yr)	Total CO_2e (MT/yr)
1,451	3.15	225.84	1,518

2.2 Offroad Equipment Exhaust Emissions

The exhaust emissions from the use of offroad equipment required for composting facility operation are discussed in this section. Offroad equipment includes the on-site fleet of heavy-duty construction equipment (tractors, excavators, loaders, water trucks and fuel trucks, etc.) used for facility operation.

2.2.1 Methodology

Exhaust emissions from offroad equipment depend on the type of engine used to power the equipment, the size of the engine [i.e., brake horsepower (BHp)], the engine load, and the equipment operating hours. Most of this information is derived from the project description. In cases where information was not available from the project description, the information was obtained from the equipment manufacturer or determined using published factors or data. For offroad equipment, the emissions of a given air contaminant were calculated using Equation 2-1.

$$E\ (lb/yr) = (g/BHp)*(BHp)*(Load)*(hr/yr)*(lb/453.6\ g) \qquad \text{(Eq. 2-1)}$$

Where:

E (lb/yr) is the annual emissions of a given pollutant.

g/BHp is the emission factor for the pollutant for the Environmental Protection Agency (EPA) Tier of the given engine.

BHp is the engine's maximum brake horsepower rating.

Load is the engine load, determined from manufacturers' information or obtained from the literature (CAPCOA 2021).

hr/yr is the operating hours of the facility, assumed to be 9 hours per day for all equipment except the fuel truck, which is assumed to operate 2 hours per day.

The equipment used for processing organic feedstock and finished compost are assumed to be equipped with Tier 4-final engines. The emission calculations use Tier 4-final engine emission factors. The criteria pollutant and greenhouse gas (GHG) emission factors for the offroad equipment are summarized in Tables 2-6 and 2-7, respectively.

Table 2-6: Offroad Equipment Criteria Pollutant Emission Factors[1]

Equipment	NO_x (g/BHp-hr)	VOC (g/BHp-hr)	CO (g/BHp-hr)	SO_x (g/BHp-hr)	PM_{10} (g/BHp-hr)	$PM_{2.5}$ (g/BHp-hr)
Fuel Truck	0.30	0.14	2.60	0.005	0.010	0.010
Tractors	0.30	0.14	2.60	0.005	0.010	0.010
Excavator	0.30	0.14	2.60	0.005	0.010	0.010
Loader	0.30	0.14	2.60	0.005	0.010	0.010
Water Truck	0.30	0.14	2.60	0.005	0.010	0.010
Sweeper Truck	0.30	0.14	2.60	0.005	0.010	0.010

Notes:

1. DieselNet 2021.

Table 2-7: Offroad Equipment GHG Emission Factors and GWP

Fuel/GWP	CO_2 (kg/gal)	CH_4 (g/gal)	N_2O (g/gal)	Reference
Diesel	10.21	0.410	0.080	EPA 2009
GWP	1	25	298	IPCC 2014

2.2.2 Offroad Equipment List and Operating Requirements

The equipment and operating parameters required for the processing of organic feedstock at the compost facility operating at 75,000 TPY are summarized in Table 2-8.

Table 2-8: Offroad Equipment Information

Unit Count	Equipment	Engine Tier	BHp	BSFC (lb/HP-hr	Load[1]	hr/day	hr/yr
1	Fuel Truck	4f	350	0.3602	0.38	2.00	624
2	Tractors	4f	200	0.3602	0.37	9.00	2,808
1	Excavator	4f	201	0.3602	0.38	9.00	2,808
6	Loader	4f	250	0.3602	0.37	9.00	2,808
2	Water Truck	4f	350	0.3602	0.38	9.00	2,808
1	Sweeper Truck	4f	240	0.3602	0.46	9.00	2,808

Notes:

1. CAPCOA 2021, Table 3.3.

2.2.3 Offroad Equipment Exhaust Emissions

The exhaust emissions from the equipment are calculated from the equipment operating hours, horsepower, engine load, and EPA Tier 4 emission factors for the engines. The criteria pollutant emissions resulting from operation of the compost facility are presented by equipment type in Table 2-9. GHG emissions are presented in Table 2-10. Emission calculations are provided in Table 6 in Attachment B-1.

Table 2-9: Offroad Equipment Exhaust Emissions

Equipment	NO_x (lb/yr)	VOC (lb/yr)	CO (lb/yr)	SO_x (lb/yr)	PM_{10} (lb/yr)	$PM_{2.5}$ (lb/yr)
Fuel Truck	54.89	25.61	475.70	0.90	1.83	1.83
Tractors	274.86	128.27	2,382.10	4.49	9.16	9.16
Excavator	141.85	66.20	1,229.35	2.32	4.73	4.73
Loader	1,030.71	481.00	8,932.86	16.84	34.36	34.36
Water Truck	494.00	230.53	4,281.33	8.07	16.47	16.47
Sweeper Truck	205.03	95.68	1,776.91	3.35	6.83	6.83
Lb/yr	2,201.34	1,027.29	19,078.26	35.97	73.38	73.38
TPY	1.10	0.51	9.54	0.02	0.04	0.04

Table 2-10: Offroad Equipment Exhaust GHG Emissions

Equipment	Fuel (Gal/Yr)	CO_2 (MT/Yr)	CH_4 (MT/Yr)	N_2O (MT/Yr)	CO_2e (MT/Yr)
Fuel Truck	4,240	43	2	0	43
Tractors	21,234	217	9	2	218
Excavator	10,959	112	4	1	112
Loader	79,628	813	33	6	816
Water Truck	38,164	390	16	3	391
Sweeper Truck	15,840	162	6	1	162
Total	170,065	1,736	70	14	1,742

3.0 DUST/PARTICULATE EMISSIONS

Operations that involve the movement of material or that expose or disturb erodible surfaces may generate fugitive dust. During composting operations, fugitive dust is generated by a variety of activities, such as the transport of material on paved and unpaved roads, material handling, and wind erosion.

Fugitive dust emissions were calculated using EPA-recommended equations that generate predictive emission factors that are specific to the given activity. The calculations generally take into account the silt and moisture content of the material. The methodologies and detailed emission calculations are presented in the following sections.

3.1 Fugitive Dust from Travel on Paved Roads

3.1.1 Methodology

Particulate emissions may occur whenever a vehicle travels on a paved roadway surface due to the resuspension of silt that accumulates on the roadway surface. Emissions from travel on paved roads are calculated using Equation 3-1, which is reproduced from EPA AP-42, Chapter 13.2.1, Paved Roads (EPA 2011).

$$EF = k \times (sL)^{0.91} \times W^{1.02} \times Cf \qquad \text{(Eq. 3-1)}$$

Where:

EF = Emission factor (grams/VMT)

k = Particle size multiplier (dimensionless)

sL = Roadway silt loading (g/m^2)

W = Average roadway fleet weight (tons)

Cf = Rain correction factor (Cf = 1-P/4N, where P is the number of days with at least 0.01 inch rain and N is the number of days in the period, i.e., 365)

Table 3-1: Paved Road Emission Factor Data

Variable	Value
k (PM_{10})	1.00 g/VMT
k ($PM_{2.5}$)	0.25 g/VMT
Rain Days[1]	49 days/year

Notes:

1. CAPCOA 2021, Table 1.1.

Because daily emissions are relevant to the analysis and it does not rain daily, the rain correction factor is excluded from the calculations. This approach ensures that daily emissions are not underestimated and that the annual emissions are conservative (i.e., are likely overestimated).

It is important to note that Equation 3-1 calls for the average weight of all vehicles traveling on the road. For example, if 99% of traffic on the road consists of 2-ton cars/trucks while the remaining 1% consists of 20-ton trucks, then the mean weight "W" is 2.2 tons.

Equation 3-1 is not intended to be used to calculate a separate emission factor for each vehicle weight class. Instead, only one emission factor should be calculated to represent the "fleet" average weight of all vehicles traveling the road (EPA 2011). According to CARB, the average fleet weight in California is 2.4 tons.

Emissions from paved roads depend on the roadway silt loading, which in turn depends on the volume of traffic experienced by a given type of roadway. The roadway silt content used in the calculations was obtained from the area source methodology used by the San Joaquin Valley Air Pollution Control District (SJVAPCD) for calculating fugitive dust emissions from paved roads. The SJVAPCD-recommended silt loading factors by road type are listed in Table 3-2. The calculated respirable particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$) emission factors for each road type are shown in Table 3-3.

Table 3-2: Paved Road Silt Loading[1]

Freeway (g/m^2)	Major (g/m^2)	Collector (g/m^2)	Local (g/m^2)	Rural[2] (g/m^2)	On-Site[3] (g/m^2)
0.020	0.035	0.035	0.320	1.60	1.60

Notes:

1. SJVAPCD 2005.
2. The rural roadway type is a roadway type specific to the SJVAPCD methodology. It is intended to capture roadways that have higher than normal silt loading to the nature of the vehicular traffic (i.e., agricultural, industrial, oilfield).
3. On-site surfaces are assumed to be paved with asphalt or concrete. Silt loading is assumed to be similar to rural roads.

Table 3-3: Paved Road Particulate Emission Factors

Pollutant	Freeway (lb/VMT)	Major (lb/VMT)	Collector (lb/VMT)	Local (lb/VMT)	Rural (lb/VMT)	On-Site (lb/VMT)
PM_{10}	1.48E-04	2.46E-04	2.46E-04	1.84E-03	7.96E-03	7.96E-03
$PM_{2.5}$	3.69E-05	6.14E-05	6.14E-05	4.60E-04	1.99E-03	1.99E-03

3.1.2 Paved Road VMT

The VMT on a given type of roadway segment was determined by multiplying the total VMT for the activity by the "segment fraction of total travel" on the types of paved roadways in California; the distribution is summarized in Table 3-4. The travel distances broken down by vehicle type and road type are summarized in Table 3-5.

Table 3-4: Distribution of VMT by Roadway Type[1]

Freeway	Major	Collector	Local	Rural	On-Site
33.25%	38.97%	27.59%	0.19%	Note 2	Calculated[3]

Notes:

1. SJVAPCD 2005.
2. Rural is assumed to be 0.25 miles, one way.
3. On-site distances are calculated based on the distance from the access gate to the furthest point of the processing areas for all vehicles and feedstock delivery trucks, and from the access gate to the finished processing area for the product shipping trucks.

Table 3-5: Summary of Onroad VMT by Vehicle and Road Type

Activity	Unit of Measure	Freeway	Major	Collector	Local	Rural	On-Site
Supervisor	VMT/day	4.66	5.46	3.86	0.03	0.50	1.2
	VMT/yr	1,452	1,702	1,205	8.74	156.00	374
Technical Staff	VMT/day	4.66	5.46	3.86	0.03	0.50	1.2
	VMT/yr	1,452	1,702	1,205	8.74	156.00	374
Mechanic	VMT/day	5	5	4	0.03	0.50	1.2
	VMT/yr	1,452	1,702	1,205	8.74	156.00	374
Equipment Operators	VMT/day	56	65	46	0.34	6.00	14.4
	VMT/yr	17,428	20,427	14,462	104.83	1872.00	4,493
Personnel for Facility	VMT/day	5	5	4	0.03	0.50	1.2
	VMT/yr	1,452	1,702	1,205	8.74	156.00	374
Miscellaneous Business	VMT/day	5	5	4	0.03	0.50	1.2
	VMT/yr	484	567	402	2.91	52.00	125
Laboratory Services	VMT/day	5	5	4	0.03	0.50	1.2
	VMT/yr	484	567	402	2.91	52.00	125
Delivery of Office Supplies	VMT/day	5	5	4	0.03	0.50	1.2
	VMT/yr	484	567	402	2.91	52.00	125
Ship Raw Material to Compost	VMT/day	698	818	579	4.20	10.50	2,136
	VMT/Yr	217,854	255,331	180,770	1,310	3,276	663,062
Ship Finished Compost	VMT/day	266	312	221	1.60	4.00	814
	VMT/yr	82,992	97,269	68,865	499	1,248	252,595

3.1.3 Paved Roads Particulate Emissions

The fugitive dust emissions from motor vehicle travel on paved public roads were calculated from the VMT on a given type of roadway segment (Table 3-5) and the emission factor corresponding to the roadway segment type (Table 3-3). The predicted emissions are summarized in Table 3-6. Paved road particulate emission calculations are provided in Table 4 in Attachment B-1.

Table 3-6: Paved Road Particulate Emissions

Pollutant	Freeway	Major	Collector	Local	Rural	On-Site	Total
PM_{10} (lb/day)	0.16	0.30	0.21	0.01	0.19	0.46	1.34
$PM_{2.5}$ (lb/day)	0.04	0.08	0.05	0.00	0.05	0.11	0.33
PM_{10} (lb/yr)	48.14	93.88	66.47	3.61	57.22	137.33	406.65
$PM_{2.5}$ (lb/yr)	12.03	23.47	16.62	0.90	14.31	34.33	101.66

3.2 Fugitive Dust from Equipment Travel on Unpaved Areas

The onsite roads at the proposed compost facility will be paved with concrete or asphalt; therefore, the onroad vehicles are not anticipated to have any travel on unpaved surfaces. However, the active composting areas are expected to have compost residuals on working surfaces, despite regular sweeping and watering for dust suppression. Entrained dust from equipment travel on these paved surfaces is approximated using the methodology for equipment travel on unpaved surfaces. Water truck and sweeper truck travel are assumed to cause no entrained dust due to watering and sweeping.

3.2.1 Methodology

Emissions from unpaved roads were estimated using predictive emission factors derived from EPA-recommended equations. The predictive emission factors are a function of the vehicle weight and the silt content of the roadway surface. The total emissions attributed to travel on unpaved roads were calculated from total VMT and the predictive emission factors. The EPA equation used for determining the appropriate factor was obtained from EPA AP-42 Fifth Edition, Chapter 13, Section 13.2.2, Equation 1a (EPA 2006a), and is reproduced as Equation 3-2.

$$EF = k \times \left(\frac{sL}{12}\right)^a \times \left(\frac{W}{3}\right)^b \times Cf \qquad \text{(Eq. 3-2)}$$

Where:

EF	=	Emission Factor (lb/VMT)
k	=	Particle size multiplier
sL	=	Material silt content (%)
W	=	Mean vehicle fleet weight (tons)
a, b	=	Empirical constants
Cf	=	Rain correction factor (1-N/365)

Table 3-7: Unpaved Road Emission Factor Data

Constant	$PM_{2.5}$	PM_{10}
k	0.15	1.5
a	0.9	0.9
b	0.45	0.45
Rain Days[1]	49 days/yr	

Notes:

1. CAPCOA 2021, Table 1.1.

Because daily emissions are relevant to the analysis and it does not rain daily, the rain correction factor is excluded from the calculations. This approach ensures that daily emissions are not underestimated and that the annual emissions are conservative (i.e., are likely overestimated).

An uncontrolled emission factor was determined for each type of vehicle or equipment traveling on the facility's unpaved roads. The factors were calculated using the average weight (loaded, unloaded) of the vehicle and the roadway silt content. The vehicle weight was determined from the literature or manufacturer specification sheets. The roadway silt loading was obtained from EPA AP-42, Table 13.2.2-1, disposal routes at landfills (EPA 2011). Emission factors are summarized in Table 3-8.

Table 3-8: Unpaved Road Particulate Uncontrolled Emission Factors

Vehicle/Equipment Description	Emission Factor (lb/VMT)	
	PM_{10}	$PM_{2.5}$
Fuel Truck	2.0667	0.2067
Tractors	1.3171	0.1317
Excavator	2.3481	0.2348
Loader	2.1106	0.2111
Water Truck	0.0000	0.0000
Sweeper Truck	0.0000	0.0000

3.2.2 Emission Controls

The operator will use three types of emission controls to reduce emissions from equipment travel: 1) watering, with an expected control efficiency of 55% (SCAQMD 2007), 2) regulating vehicle speed to not more than 25 miles per hour, with an expected control efficiency of 44% (SCAQMD 2007), and 3) operation of a sweeper, with an expected control efficiency of 45% (Chow 2012). These controls are cumulative; the overall control efficiency is 86%.

3.2.3 Vehicle and Equipment Process Information

The use of compost processing equipment (fuel truck, tractors, excavator, loader, water truck, sweeper truck) will result in fugitive dust from travel on unpaved roads and other unpaved areas. The on-site unpaved road mileage for equipment required for composting was calculated from the number of operating hours per day and typical speed of the offroad equipment. Mileage estimates are summarized in Table 3-9.

Table 3-9: Offroad Equipment Unpaved Road Mileage

Equipment Description and Use	Average Vehicle Wt. (tons)	Operating Hours (hr/day)	Average Speed (MPH)[1]	Total Travel (VMT/day)	Total Travel (VMT/yr)
Fuel Truck	21.5	2.0	2.0	4.0	1,248
Tractors	7.9	9.0	0.3	5.4	1,685
Excavator	28.6	9.0	0.3	2.7	842
Loader	22.5	9.0	0.3	16.2	5,054
Water Truck	21.5	9.0	3.0	54.0	16,848
Sweeper Truck	16.5	9.0	3.0	27.0	8,424

Notes:

1. Engineering estimate.

3.2.4 Unpaved Road Particulate Emissions

Emissions were calculated using the unpaved road dust emission factors from Table 3-8, along with the operational data presented in Table 3-9. The results are shown in Table 3-10. Emission calculations are provided in Table 7 in Attachment B-1.

Table 3-10: Offroad Equipment Unpaved Road Particulate Emissions

Description	Controlled Emissions (lb/yr)		Controlled Emissions (lb/day)	
	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
Fuel Truck	357	36	1.15	0.11
Tractors	308	31	0.99	0.10
Excavator	274	27	0.88	0.09
Loader	1,479	148	4.74	0.47
Water Truck	0	0	0.00	0.00
Sweeper Truck	0	0	0.00	0.00
Total (lb/yr)	2,418	242	7.75	0.77
Total (TPY)	1.2	0.1	---	---

4.0 SUMMARY OF CRITERIA POLLUTANT AND GHG EMISSIONS

The predicted emissions from the proposed compost facility are summarized in Tables 4-1, 4-2, and 4-3.

Table 4-1: Summary of Daily Mobile Source Operating Emissions

Activity	NO_x (lb/day)	VOC (lb/day)	CO (lb/day)	SO_x (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
Onroad Vehicle Exhaust	11.20	0.29	2.80	0.10	0.90	0.38
Onroad Vehicle Paved Road Dust	---	---	---	---	1.34	0.33
Onroad Vehicle Unpaved Road Dust	---	---	---	---	0.00	0.00
Offroad Equipment Exhaust	7.06	3.29	61.15	0.12	0.24	0.24
Offroad Equipment Unpaved Dust	---	---	---	---	7.75	0.77
Total	18.25	3.59	63.94	0.21	10.22	1.73

Table 4-2: Summary of Annual Mobile Source Operating Emissions

Activity	NO_x (lb/yr)	VOC (lb/yr)	CO (lb/yr)	SO_x (lb/yr)	PM_{10} (lb/yr)	$PM_{2.5}$ (lb/yr)
Onroad Vehicle Exhaust	3,493	91	872	30	281	120
Onroad Vehicle Paved Road Dust	---	---	---	---	407	102
Onroad Vehicle Unpaved Road Dust	---	---	---	---	0	0
Offroad Equipment Exhaust	2,201	1,027	19,078	36	73	73
Offroad Equipment Unpaved Dust	---	---	---	---	2,418	242
Total (lb/yr)	5,695	1,119	19,951	66	3,179	536
Total (TPY)	2.85	0.56	9.98	0.03	1.59	0.27

Table 4-3: Summary of Mobile Source Operating GHG Emissions

Activity	CO_2 (MT/yr)	CH_4 (MT/yr)	N_2O (MT/yr)	CO_2e (MT/yr)
Onroad Vehicle Exhaust	1,451	0.0	0.2	1,518
Onroad Vehicle Paved Road Dust	---	---	---	---
Onroad Vehicle Unpaved Road Dust	---	---	---	---
Offroad Equipment Exhaust	1,736	70	14	1,742
Offroad Equipment Unpaved Dust	---	---	---	---
Total	3,187	70	14	3,260

5.0 TOXIC AIR CONTAMINANTS EMISSIONS

The emissions of toxic air contaminants (TACs) were calculated either using process information for a given activity and an appropriate emission factor, or by "speciating" the PM_{10} and volatile organic compounds (VOC) emissions using a profile that identifies the weight fraction of the TAC constituent in the parent compound.

5.1 Vehicle and Equipment Exhaust TAC Emissions

5.1.1 Diesel Exhaust Emissions

TAC emissions from diesel combustion are based on PM_{10} emissions, assuming that 100% of the PM_{10} emissions are diesel particulate matter (DPM). The DPM emissions are summarized in Table 5-1 for onsite and near-site travel. Per SJVAPCD guidance, one-quarter mile of near-site travel is included in the TAC inventory for health risk assessment purposes. PM_{10} emissions from diesel combustion are provided in Tables 3 and 6 in Attachment B-1, and DPM emissions are summarized in Table 14 in Attachment B-1.

Table 5-1: Emissions of DPM from Diesel-Fueled Vehicles

Vehicle	PM_{10} Emissions (lb/hr)		PM_{10} Emissions (lb/yr)	
	On-Site Exhaust[1]	Near-Site Exhaust[2]	On-Site Exhaust[1]	Near-Site Exhaust[2]
LHD2	0.000	0.000	0.00	0.001
T7 Tractor	0.017	0.026	0.55	0.163
Fuel Truck[3]	0.001	0.000	1.83	0
Tractors[3]	0.003	0.000	9.16	0
Excavator[3]	0.002	0.000	4.73	0
Loader[3]	0.012	0.000	34.36	0
Water Truck[3]	0.006	0.000	16.47	0
Sweeper Truck[3]	0.002	0.000	6.83	0
Total PM_{10} = DPM	0.043	0.026	73.93	0.163

1. Near-site encompasses 1/4 mile off-site, per SJVAPCD guidance.
2. On-site mileage is 0.60 miles per one-way trip.
3. Offroad equipment operates on-site only.

5.1.2 Gasoline Exhaust Emissions

Gasoline combustion TAC emission factors are sourced from the SJVAPCD's AB 2588 program (SJVAPCD 2017). Fuel consumption is based on an average fuel economy for gasoline-fueled light trucks of 16.2 miles per gallon (Wikipedia 2021). This is a 2002 estimate and is expected to be conservative for a 2025 emissions estimate. Travel distance for the gasoline-powered vehicles includes 0.60 miles per trip (one-way distance) on-site and 0.25 miles per trip off-site (one-way distance). VMT and fuel consumption are summarized in Table 5-2. Gasoline exhaust TAC emissions are summarized in Table 5-3. Gasoline exhaust TAC emission calculations are provided in Table 9 in Attachment B-1.

Table 5-2: Gasoline Vehicle Mileage and Fuel Consumption

Parameter	Onsite	Near-site[1]
VMT/day	20	17
Fuel Consumption (gal/day)	1.23	1.03

1. Near-site encompasses 0.25 mile off-site, per SJVAPCD guidance.

Table 5-3: Gasoline Vehicle Exhaust TAC Emissions

TAC	CAS No.	Emission Factor (lb/1,000 gal)	Hourly Emissions (lb/hr)	Annual Emissions (lb/yr)
1,2,4-Trimethylbenzene	95636	5.89E-01	1.48E-04	4.16E-01
1,3-Butadiene	106990	3.24E-01	8.15E-05	2.29E-01
Acetaldehyde	75070	1.47E-01	3.70E-05	1.04E-01
Acrolein	107028	8.25E-02	2.07E-05	5.83E-02
Benzene	71432	1.57E+00	3.95E-04	1.11E+00
Chlorine	7782505	4.55E-01	1.14E-04	3.21E-01
Copper	7440508	3.30E-03	8.30E-07	2.33E-03
Ethyl benzene	100414	6.42E-01	1.61E-04	4.53E-01
Formaldehyde	50000	1.01E+00	2.54E-04	7.13E-01
Hexane	110543	9.42E-01	2.37E-04	6.65E-01
Manganese	7439965	3.30E-03	8.30E-07	2.33E-03
Methanol	67561	2.42E-01	6.09E-05	1.71E-01
Methyl ethyl ketone	78933	1.18E-02	2.97E-06	8.33E-03
Methyl tert-butyl ether	1634044	1.15E+00	2.89E-04	8.12E-01
m-Xylene	108383	2.17E+00	5.46E-04	1.53E+00
Naphthalene	91203	2.95E-02	7.42E-06	2.08E-02
Nickel	7440020	3.30E-03	8.30E-07	2.33E-03
o-Xylene	95476	7.54E-01	1.90E-04	5.32E-01
Styrene	100425	7.07E-02	1.78E-05	4.99E-02
Toluene	108883	3.50E+00	8.80E-04	2.47E+00

5.2 Dust and Particulate TAC Emissions

Paved and unpaved road dust may contain heavy metals, which are regulated TACs. To estimate TAC emissions from road dust, the PM_{10} emissions are speciated according to a speciation profile that is specific to the road surface.

5.2.1 Paved Road Dust TAC Emissions

TAC emissions from paved road fugitive dust emissions are estimated by speciating the PM_{10} emissions according to the speciation profile provided by CARB per Particulate Speciation Profile #471 (CARB 2021). Paved road PM_{10} emissions are based on on-site and near-site travel; paved road emissions are 0.072 pounds per hour and 194.56 pounds per year. The paved road dust TAC emissions are summarized in Table 5-4. Paved road dust TAC emission calculations are provided in Table 10 in Attachment B-1.

Table 5-4: Paved Road Dust TAC Emissions

TAC	CAS No.	Wt. Fraction	Emissions	
			lb/hr	lb/yr
Arsenic	7440-38-2	0.000013	9.40E-07	2.53E-03
Cadmium	7440-43-9	0.000003	2.17E-07	5.84E-04
Chromium-VI[1]	18540-29-9	0.00000085	6.15E-08	1.65E-04
Cobalt	7440-48-4	0.000023	1.66E-06	4.47E-03
Copper	7440-50-8	0.000148	1.07E-05	2.88E-02
Lead	7439-92-1	0.000124	8.97E-06	2.41E-02
Manganese	7439-96-5	0.0008	5.78E-05	1.56E-01
Nickel	7440-02-0	0.000012	8.68E-07	2.33E-03
Mercury	7439-97-6	0.000009	6.51E-07	1.75E-03
Selenium	7782-49-2	0.000002	1.45E-07	3.89E-04
Vanadium	7440-62-2	0.000071	5.13E-06	1.38E-02

1. Hexavalent chromium is assumed to be 5% of total chromium per SJVAPCD guidance.

5.2.2 Unpaved Road Dust TAC Emissions

TAC emissions from unpaved road dust are calculated by speciating the PM_{10} emissions according to the speciation profile obtained from SJVAPCD for dust from a compost facility (SJVAPCD 2016). The SJVAPCD compost speciation is used because it is assumed that the unpaved road dust will be composed predominately of compost debris. On-site unpaved road PM_{10} emissions are based on PM_{10} emissions of 0.86 pounds per hour and 2,417.76 pounds per year. The unpaved road dust TAC emissions are summarized in Table 5-5. Unpaved road dust TAC emission calculations are provided in Table 11 in Attachment B-1.

Table 5-5: Unpaved Road Dust TAC Emissions

TAC	CAS No.	lb TAC/lb dust	Emissions	
			lb/hr	lb/yr
Arsenic	7440-38-2	6.20E-06	5.34E-06	1.50E-02
Cadmium	7440-43-9	2.00E-06	1.72E-06	4.84E-03
Chromium-VI[1]	18540-29-9	2.45E-06	2.11E-06	5.92E-03
Cobalt	7440-48-4	8.80E-06	7.58E-06	2.13E-02
Copper	7440-50-8	6.90E-05	5.94E-05	1.67E-01
Lead	7439-92-1	2.00E-04	1.72E-04	4.84E-01
Manganese	7439-96-5	4.40E-04	3.79E-04	1.06E+00
Nickel	7440-02-0	9.50E-05	8.18E-05	2.30E-01
Mercury	7439-97-6	1.00E-06	8.61E-07	2.42E-03
Selenium	7782-49-2	1.00E-06	8.61E-07	2.42E-03

1. Hexavalent chromium is assumed to be 5% of total chromium per SJVAPCD guidance.

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ATTACHMENT B-1 – EMISSION CALCULATION WORKSHEETS

Agromin Merced Compost Facility Mobile Source
Emission Calculations

Yorke ENGINEERING, LLC
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Table 1: Process Throughput

Table 1a: Process Throughput Compost Facility

Processing Step	Loss based on Initial Charge	Loss based on Previous Step	Project Throughput (TPY)	Project Throughput (TPD)
Initial Charge	---	---	75,000	240
Loss Upon Composting	20.0%	20%	60,000	192
Initial Charge to Secondary	---	---	60,000	192
Loss Upon Curing	10.0%	13%	52,500	168
Loss Upon Screening	10.0%	14%	45,000	144
Finished Product	---	---	45,000	144

Data and Parameters

Daily Operating Hours	9	hours/day
Raw Material quantity per truck	12	tons/truck
Raw Material truck count	6251	Truck/year
Raw Material Receive Days	312	Day/year
Raw Material truck count	21	Truck/day
Compost quantity per truck	20	tons/truck
Compost delivery truck count	2250	Truck/year
Compost shipment days	312	Day/year
Compost delivery truck count	8	Truck/day

Yorke ENGINEERING, LLC
www.YorkeEngr.com

Table 2: Onroad Mobile Sources - Vehicle Information

Table 2a: Vehicle Information and Mileage Calculation

Vehicle Type	Vehicle Use	Vehicle Weight (lb)			Days	Veh/day	One-way Trips per Vehicle per Day	One-way Trips per Year	One-way Onsite Trip Mileage[1]	One-way Offsite Trip Mileage[2,3]	Total One-way Trip Mileage	Onsite Total VMT/yr	Offsite Total VMT/yr	Total VMT/yr
		Gross	Empty	Average										
LDT1	Supervisor	6,250	6,250	6,250	312	1	2	624	0.60	7	7.60	374	4,368	4,742
LDT1	Technical Staff	6,250	6,250	6,250	312	1	2	624	0.60	7	7.60	374	4,368	4,742
LDT1	Mechanic	6,250	6,250	6,250	312	1	2	624	0.60	7	7.60	374	4,368	4,742
LDT1	Equipment Operators	6,250	6,250	6,250	312	12	2	7,488	0.60	7	7.60	4,493	52,416	56,909
LDT1	Personnel for facility	6,250	6,250	6,250	312	1	2	624	0.60	7	7.60	374	4,368	4,742
LDT1	Miscellaneous Business	6,250	6,250	6,250	104	1	2	208	0.60	7	7.60	125	1,456	1,581
LDT1	Laboratory Services	6,250	6,250	6,250	104	1	2	208	0.60	7	7.60	125	1,456	1,581
LHD2	Delivery of Office Supplies	15,006	8,200	11,603	104	1	2	208	0.60	7	7.60	125	1,456	1,581
T7 Tractor	Ship Raw Material to Compost	47,000	23,000	35,000	312	21	2	13,104	0.60	50	50.60	7,862	655,200	663,062
T7 Tractor	Ship Finished Compost	63,000	23,000	43,000	312	8	2	4,992	0.60	50	50.60	2,995	249,600	252,595

Table 2b: Onsite/Offsite Vehicle Usage Information

Vehicle Type	Fuel	# Veh	Trips per Year	Onsite Total VMT/yr	Offsite Total VMT/yr	Total VMT/yr
LDT1	gasoline	18	10,400	6,240	72,800	79,040
LHD2	diesel	1	208	125	1,456	1,581
T7 Tractor	diesel	29	18,096	10,858	904,800	915,658

Notes:

1. Onsite mileage is the distance from the front gate of the landfill to the furthest point of the compost facility.

2. Mileage for employees based on the distance from **Merced** to the project site.

3. Mileage for raw material and finished compost shipment is the distance from the project site to the most distant of agricultural operatons in the County.

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Table 3: Onroad Mobile Sources Exhaust Emissions

Table 3a: Onroad Mobile Sources - Criteria Pollutant Exhaust Emissions

Pollutant	Vehicle Type	Running Exhaust EF (g/mile)	Idle EF (g/trip)	Start EF (g/trip)	Total Running Exhaust (lb/yr)	Total Idle (lb/yr)	Total Start (lb/yr)	Total Emissions (lb/yr)	Onsite Emissions (lb/yr)	Offsite Emissions (lb/yr)	Total Emissions (lb/day)	Onsite Emissions (lb/day)
NOx	LDT1	0.214	0.000	0.532	37.17	0.00	12.19	49.36	3.90	45.47	0.16	1.25E-02
	LHD2	0.061	0.000	0.000	0.21	0.00	0.00	0.21	0.02	0.20	0.00	5.36E-05
	T7 Tractor	1.575	2.757	3.946	3,176.66	109.88	157.28	3,443.82	40.84	3,402.99	11.04	1.31E-01
VOC	LDT1	0.046	0.000	0.802	7.93	0.00	18.38	26.31	2.08	24.23	0.08	6.66E-03
	LHD2	0.015	0.000	0.000	0.05	0.00	0.00	0.05	0.00	0.05	0.00	1.34E-05
	T7 Tractor	0.014	0.238	0.000	28.70	9.48	0.00	38.17	0.45	37.72	0.12	1.45E-03
CO	LDT1	2.299	0.000	7.604	400.22	0.00	174.18	574.40	45.35	529.05	1.84	1.45E-01
	LHD2	0.135	0.000	0.000	0.47	0.00	0.00	0.47	0.04	0.43	0.00	1.19E-04
	T7 Tractor	0.079	3.484	0.000	158.67	138.87	0.00	297.54	3.53	294.01	0.95	1.13E-02
SOx	LDT1	0.003	0.000	0.001	0.58	0.00	0.02	0.60	0.05	0.55	0.00	1.52E-04
	LHD2	0.003	0.000	0.000	0.01	0.00	0.00	0.01	0.00	0.01	0.00	2.38E-06
	T7 Tractor	0.015	0.005	0.000	29.46	0.21	0.00	29.67	0.35	29.32	0.10	1.13E-03
PM10	LDT1	0.002	0.000	0.004	0.39	0.00	0.09	0.47	0.04	0.44	0.00	1.20E-04
	LHD2	0.007	0.000	0.000	0.02	0.00	0.00	0.02	0.00	0.02	0.00	6.21E-06
	T7 Tractor	0.023	0.001	0.000	46.65	0.04	0.00	46.69	0.55	46.14	0.15	1.77E-03
PM2.5	LDT1	0.002	0.000	0.003	0.36	0.00	0.08	0.44	0.03	0.40	0.00	1.10E-04
	LHD2	0.007	0.000	0.000	0.02	0.00	0.00	0.02	0.00	0.02	0.00	5.94E-06
	T7 Tractor	0.022	0.001	0.000	44.63	0.04	0.00	44.67	0.53	44.14	0.14	1.70E-03

Table 3b: Onroad Mobile Sources - Fugitive VOC Emissions

Pollutant	Vehicle Type	Hot Soak EF (g/trip)	Running Loss EF (g/trip)	Diurnal EF (g/trip)	Total Hot Soak (lb/yr)	Total Running Loss (lb/yr)	Total Diurnal (lb/yr)	Total Emissions (lb/yr)	Onsite Emissions (lb/yr)	Offsite Emissions (lb/yr)	Total Emissions (lb/day)
VOC	LDT1	0.28	0.83	0.07	6.3	19.0	1.5	26.89	2.12	24.77	0.09
	LHD2	-	-	-	-	-	-	-	-	-	-
	T7 Tractor	-	-	-	-	-	-	-	-	-	-

Table 3c: Onroad Mobile Sources - Fugitive PM Emissions

Pollutant	Vehicle Type	Tire Wear (g/mile)	Brake Wear (g/mile)	Total Tire Wear (lb/yr)	Total Brake Wear (lb/yr)	Total Emissions (lb/yr)	Onsite Emissions (lb/yr)	Offsite Emissions (lb/yr)	Total Emissions (lb/day)
PM10	LDT1	0.0080	0.0092	1.39	1.60	2.99	0.24	2.75	0.010
	LHD2	0.0080	0.0084	0.03	0.03	0.06	0.00	0.05	0.000
	T7 Tractor	0.0360	0.0784	72.61	158.19	230.80	2.74	228.06	0.740
PM2.5	LDT1	0.0020	0.0032	0.35	0.56	0.91	0.07	0.84	0.003
	LHD2	0.0020	0.0029	0.01	0.01	0.02	0.00	0.02	0.000
	T7 Tractor	0.0090	0.0275	18.15	55.37	73.52	0.87	72.65	0.236

Table 3d: Summary of Criteria Pollutant Emissions from Onroad Operations Vehicles

Type	NO_x (lb/yr)	VOC (lb/yr)	CO (lb/yr)	SO_x (lb/yr)	PM_{10} (lb/yr)	$PM_{2.5}$ (lb/yr)
Exhaust	3493.40	64.53	872.41	30.28	47.19	45.13
Fugitive	---	26.89	---	---	233.84	74.44
Total (Lb/Yr)	3493.40	91.42	872.41	30.28	281.04	119.58
Total (TPY)	1.75	0.05	0.44	0.02	0.14	0.06

Agromin Merced Compost Facility Mobile Source
Emission Calculations

Table 3e: Onroad Mobile Sources - Greenhouse Gas Exhaust Emissions

Pollutant	Vehicle Type	Running Exhaust EF (g/mile)	Idle EF (g/trip)	Start EF (g/trip)	Total Running Exhaust (MT/yr)	Total Idle (MT/yr)	Total Start (MT/yr)	Total Emissions (MT/yr)
CO2	LDT1	336.786	0.000	93.148	26.6	0.000	1.0	28
	LHD2	285.569	0.000	0.000	0.5	0.000	0.0	0.45
	T7 Tractor	1542.415	569.396	0.000	1,412.3	10.304	0.0	1,423
CH4	LDT1	0.010	0.000	0.148	0.0	0.000	0.00	0.00
	LHD2	0.001	0.000	0.000	0.0	0.000	0.00	0.00
	T7 Tractor	0.001	0.011	0.000	0.0	0.000	0.00	0.00
N2O	LDT1	0.015	0.000	0.046	0.00	0.000	0.00	0.00
	LHD2	0.045	0.000	0.000	0.00	0.000	0.00	0.00
	T7 Tractor	0.243	0.090	0.000	0.22	0.002	0.00	0.22
CO2e	LDT1							28
	LHD2							0
	T7 Tractor							1,489
	Total							**1,518**

Table 3f: GHG Emissions from Onroad Mobile Source Activity

CO_2 (MT/Yr)	CH_4 (Kg/Yr)	N_2O (Kg/Yr)	Total CO_2e (MT/Yr)
1,451	3.15	225.84	1,518

Table 3g: Global Warming Potential

Pollutant	GWP
CO2	1
CH4	25
N2O	298

Notes:

Table 4: Onroad Mobile Source Paved Road Dust

Table 4a: Paved Road PM_{10} Emission Factors[1]

Vehicle	Average Vehicle Weight (ton)	Pollutant	Freeway (lb/VMT)	Major (lb/VMT)	Collector (lb/VMT)	Local (lb/VMT)	Rural/Onsite (lb/VMT)
		sL (g/m^2)[2] -->	0.020	0.035	0.035	0.320	1.600
Fleet Average	2.40	PM10	1.48E-04	2.46E-04	2.46E-04	1.84E-03	7.97E-03
		PM2.5	3.70E-05	6.15E-05	6.15E-05	4.61E-04	1.99E-03

$$E = k\,(sL)^{0.91} \times (W)^{1.02} * C_f$$

Variable	Value	UOM
k (PM10)	1.00	g/VMT
k(PM2.5)	0.25	g/VMT
Rain Days[3]	49	day/yr
C_f	0.966	

Table 4b: Fraction of VMT by Functional Type of Roadway[2]

Freeway	Major	Collector	Local	Rural
33.25%	38.97%	27.59%	0.20%	note 4

Table 4c: Summary of Onroad VMT by Phase and Road Type

EMFAC Vehicle Type	Activity	Unit of Measure	Freeway	Major	Collector	Local	Rural	Total Offsite	Onsite	Total VMT
LDT1	Supervisor	VMT/day	4.66	5.46	3.86	0.03	0.50	15	1.2	16
		VMT/Yr	1,452	1,702	1,205	8.74	156.00	4,368	374	4,742
LDT1	Technical Staff	VMT/day	4.66	5.46	3.86	0.03	0.50	15	1.2	16
		VMT/Yr	1,452	1,702	1,205	8.74	156.00	4,368	374	4,742
LDT1	Mechanic	VMT/day	5	5	4	0.03	0.50	15	1.2	16
		VMT/Yr	1,452	1,702	1,205	8.74	156.00	4,368	374	4,742
LDT1	Equipment Operators	VMT/day	56	65	46	0.34	6.00	174	14.4	188
		VMT/Yr	17,428	20,427	14,462	104.83	1872.00	52,416	4,493	56,909
LDT1	Personnel for facility	VMT/day	5	5	4	0.03	0.50	15	1.2	16
		VMT/Yr	1,452	1,702	1,205	8.74	156.00	4,368	374	4,742
LDT1	Miscellaneous Business	VMT/day	5	5	4	0.03	0.50	15	1.2	16
		VMT/Yr	484	567	402	2.91	52.00	1,456	125	1,581
LDT1	Laboratory Services	VMT/day	5	5	4	0.03	0.50	15	1.2	16
		VMT/Yr	484	567	402	2.91	52.00	1,456	125	1,581
LHD2	Delivery of Office Supplies	VMT/day	5	5	4	0.03	0.50	15	1.2	16
		VMT/Yr	484	567	402	2.91	52.00	1,456	125	1,581
T7 Tractor	Ship Raw Material to Compost	VMT/day	698	818	579	4.20	10.50	2,111	25.2	2,136
		VMT/Yr	217,854	255,331	180,770	1310.40	3276.00	655,200	7,862	663,062
T7 Tractor	Ship Finished Compost	VMT/day	266	312	221	1.60	4.00	804	9.6	814
		VMT/Yr	82,992	97,269	68,865	499	1,248	249,600	2,995	252,595

Table 4d: Entrained Road Dust Emissions from Travel on Paved Roads (lb/day)

EMFAC Vehicle Type	Activity	Pollutant	Freeway	Major	Collector	Local	Rural	Onsite	Total
LDT1	Supervisor	PM10	6.88E-04	1.34E-03	9.50E-04	5.16E-05	3.99E-03	9.57E-03	1.66E-02
		PM2.5	1.72E-04	3.36E-04	2.38E-04	1.29E-05	9.97E-04	2.39E-03	4.15E-03
LDT1	Technical Staff	PM10	6.88E-04	1.34E-03	9.50E-04	5.16E-05	3.99E-03	9.57E-03	1.66E-02
		PM2.5	1.72E-04	3.36E-04	2.38E-04	1.29E-05	9.97E-04	2.39E-03	4.15E-03
LDT1	Mechanic	PM10	6.88E-04	1.34E-03	9.50E-04	5.16E-05	3.99E-03	9.57E-03	1.66E-02
		PM2.5	1.72E-04	3.36E-04	2.38E-04	1.29E-05	9.97E-04	2.39E-03	4.15E-03
LDT1	Equipment Operators	PM10	8.26E-03	1.61E-02	1.14E-02	6.19E-04	4.78E-02	1.15E-01	1.99E-01
		PM2.5	2.06E-03	4.03E-03	2.85E-03	1.55E-04	1.20E-02	2.87E-02	4.98E-02
LDT1	Personnel for facility	PM10	6.88E-04	1.34E-03	9.50E-04	5.16E-05	3.99E-03	9.57E-03	1.66E-02
		PM2.5	1.72E-04	3.36E-04	2.38E-04	1.29E-05	9.97E-04	2.39E-03	4.15E-03
LDT1	Miscellaneous Business	PM10	6.88E-04	1.34E-03	9.50E-04	5.16E-05	3.99E-03	9.57E-03	1.66E-02
		PM2.5	1.72E-04	3.36E-04	2.38E-04	1.29E-05	9.97E-04	2.39E-03	4.15E-03
LDT1	Laboratory Services	PM10	6.88E-04	1.34E-03	9.50E-04	5.16E-05	3.99E-03	9.57E-03	1.66E-02
		PM2.5	1.72E-04	3.36E-04	2.38E-04	1.29E-05	9.97E-04	2.39E-03	4.15E-03
LHD2	Delivery of Office Supplies	PM10	6.88E-04	1.34E-03	9.50E-04	5.16E-05	3.99E-03	9.57E-03	1.66E-02
		PM2.5	1.72E-04	3.36E-04	2.38E-04	1.29E-05	9.97E-04	2.39E-03	4.15E-03
T7 Tractor	Ship Raw Material to Compost	PM10	1.03E-01	2.01E-01	1.43E-01	7.74E-03	8.37E-02	2.01E-01	7.40E-01
		PM2.5	2.58E-02	5.03E-02	3.56E-02	1.94E-03	2.09E-02	5.02E-02	1.85E-01
T7 Tractor	Ship Finished Compost	PM10	3.93E-02	7.67E-02	5.43E-02	2.95E-03	3.19E-02	7.66E-02	2.82E-01
		PM2.5	9.83E-03	1.92E-02	1.36E-02	7.37E-04	7.97E-03	1.91E-02	7.04E-02
Total	All	PM10	0.16	0.30	0.21	0.01	0.19	0.46	1.34
		PM2.5	0.04	0.08	0.05	0.00	0.05	0.11	0.33

Table 4e: Entrained Road Dust Emissions from Travel on Paved Roads (lb/yr)

EMFAC Vehicle Type	Activity	Pollutant	Freeway	Major	Collector	Local	Rural	Onsite	Total
LDT1	Supervisor	PM10	0.21	0.42	0.30	0.02	1.24	2.99	5.18
		PM2.5	0.05	0.10	0.07	0.00	0.31	0.75	1.29
LDT1	Technical Staff	PM10	0.21	0.42	0.30	0.02	1.24	2.99	5.18
		PM2.5	0.05	0.10	0.07	0.00	0.31	0.75	1.29
LDT1	Mechanic	PM10	0.21	0.42	0.30	0.02	1.24	2.99	5.18
		PM2.5	0.05	0.10	0.07	0.00	0.31	0.75	1.29
LDT1	Equipment Operators	PM10	2.58	5.03	3.56	0.19	14.93	35.83	62.11
		PM2.5	0.64	1.26	0.89	0.05	3.73	8.96	15.53
LDT1	Personnel for facility	PM10	0.21	0.42	0.30	0.02	1.24	2.99	5.18
		PM2.5	0.05	0.10	0.07	0.00	0.31	0.75	1.29
LDT1	Miscellaneous Business	PM10	0.07	0.14	0.10	0.01	0.41	1.00	1.73
		PM2.5	0.02	0.03	0.02	0.00	0.10	0.25	0.43
LDT1	Laboratory Services	PM10	0.07	0.14	0.10	0.01	0.41	1.00	1.73
		PM2.5	0.02	0.03	0.02	0.00	0.10	0.25	0.43
LHD2	Delivery of Office Supplies	PM10	0.07	0.14	0.10	0.01	0.41	1.00	1.73
		PM2.5	0.02	0.03	0.02	0.00	0.10	0.25	0.43
T7 Tractor	Ship Raw Material to Compost	PM10	32.21	62.83	44.48	2.42	26.12	62.70	230.75
		PM2.5	8.05	15.71	11.12	0.60	6.53	15.67	57.69
T7 Tractor	Ship Finished Compost	PM10	12.27	23.93	16.94	0.92	9.95	23.88	87.91
		PM2.5	3.07	5.98	4.24	0.23	2.49	5.97	21.98
Total	All	PM10	48.14	93.88	66.47	3.61	57.22	137.33	406.65
		PM2.5	12.03	23.47	16.62	0.90	14.31	34.33	101.66

Notes:

1. Methodology per AP-42, 13.2.1 Paved Roads
2. SJVAPCD, Appendix A: Comments and Responses Rule 9510 and 3180 December 15, 2005

3. http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-d2020-4-0-full-merge.pdf?sfvrsn=6, Table 1.1 has 49 days with precipitation > 0.1 inches for Merced County.
4. Rural is assumed to be 0.25 miles per one-way trip.

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Table 5: Site (Access/Egress) Fugitive Dust From Travel on Unpaved Roads

Table 5a: Unpaved Road Emission Factors[1]

EMFAC Vehicle Type	Activity	PM Emission Factors[2,3] (lb/VMT)	
		PM10	PM2.5
LDT1	Supervisor	0.8677	0.0868
LDT1	Technical Staff	0.8677	0.0868
LDT1	Mechanic	0.8677	0.0868
LDT1	Equipment Operators	0.8677	0.0868
LDT1	Personnel for facility	0.8677	0.0868
LDT1	Miscellaneous Business	0.8677	0.0868
LDT1	Laboratory Services	0.8677	0.0868
LHD2	Delivery of Office Supplies	1.1462	0.1146
T7 Tractor	Ship Raw Material to Compost	1.8839	0.1884
T7 Tractor	Ship Finished Compost	2.0667	0.2067

Variable	Value	UOM
Road Silt Content	6.4	%
Rain Days[4]	49.0	day/year

Table 5b: Vehicle Miles Travelled for Transport of Personnel, Supplies, Materials and Product

EMFAC Vehicle Type	Activity	Vehicle Weight (ton)			No. of days	Veh/day	Trips/Day	Trips/Year	Miles per Trip	Total VMT[5] (mi/day)	Total VMT[5] (mi/yr)
		Gross	Empty	Average							
LDT1	Supervisor	3.13	3.13	3.13	312	1	2	624	0	0	0
LDT1	Technical Staff	3.13	3.13	3.13	312	1	2	624	0	0	0
LDT1	Mechanic	3.13	3.13	3.13	312	1	2	624	0	0	0
LDT1	Equipment Operators	3.13	3.13	3.13	312	12	2	7,488	0	0	0
LDT1	Personnel for facility	3.13	3.13	3.13	312	1	2	624	0	0	0
LDT1	Miscellaneous Business	3.13	3.13	3.13	104	1	2	208	0	0	0
LDT1	Laboratory Services	3.13	3.13	3.13	104	1	2	208	0	0	0
LHD2	Delivery of Office Supplies	7.50	4.10	5.80	104	1	2	208	0	0	0
T7 Tractor	Ship Raw Material to Compost	23.50	11.50	17.50	312	21	2	13,104	0	0	0
T7 Tractor	Ship Finished Compost	31.50	11.50	21.50	312	8	2	4,992	0	0	0

Table 5c: Entrained Road Dust from Unpaved Roads

EMFAC Vehicle Type	Activity	Uncontrolled (lb/day)		Controlled (lb/day)		Uncontrolled (lb/yr)		Controlled (lb/yr)	
		PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
LDT1	Supervisor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LDT1	Technical Staff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LDT1	Mechanic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LDT1	Equipment Operators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LDT1	Personnel for facility	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LDT1	Miscellaneous Business	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LDT1	Laboratory Services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LHD2	Delivery of Office Supplies	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T7 Tractor	Ship Raw Material to Compost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T7 Tractor	Ship Finished Compost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total (ton/yr)						0.0	0.0	0.0	0.0

Control Efficiency for Watering Roadways[6] 55%

Notes:

1. EPA AP-42 5th Edition, Chapter 13, Section 13.2.2, Equation 1a.
2. MISCELLANEOUS PROCESS METHODOLOGY 7.9 Entrained Road Travel, Paved Road Dust (Revised and updated, November 2016), https://ww3.arb.ca.gov/ei/areasrc/fullpdf/full7-9_2016.pdf
3. Because daily emissions are being calculated, and it does not rain daily, the rain correction factor has been omitted from the calculation.
4. http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-d2020-4-0-full-merge.pdf?sfvrsn=6, Table 1.1 has 49 days with precipitation > 0.1 inches for Merced County.
5. The compost facility and access roads will be paved; onroad vehicles will not travel on unpaved surfaces.
6. Assumes twice daily watering; http://www.aqmd.gov/docs/default-source/ceqa/handbook/mitigation-measures-and-control-efficiencies/fugitive-dust/fugitive-dust-table-xi-d.doc?sfvrsn=2

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Table 6: Offroad Equipment - Criteria Pollutant and GHG Emissions

Table 6a: Emission Factors

Unit Count	Offroad Equipment	Typical Model (or Equivalent)	Engine Tier and Information				NOx (g/BHp-hr)	VOC (g/BHp-hr)	CO (g/BHp-hr)	SOx (g/BHp-hr)	PM10 (g/BHp-hr)	PM2.5 (g/BHp-hr)	CO2 (kg/gal)	CH4 (g/gal)	N2O (g/gal)
			Tier	BHp	BSFC (lb/hp-hr)	Op Load[1]									
1	Fuel Truck	Freightliner M2106	4f	350	0.3602	0.38	0.30	0.14	2.60	0.005	0.010	0.010	10.210	0.410	0.080
2	Tractors	Massey Fergusen, 7619	4f	200	0.3602	0.37	0.30	0.14	2.60	0.005	0.010	0.010	10.210	0.410	0.080
1	Excavator	Caterpillar 326	4f	201	0.3602	0.38	0.30	0.14	2.60	0.005	0.010	0.010	10.210	0.410	0.080
6	Loader	Caterpillar, 962K	4f	250	0.3602	0.37	0.30	0.14	2.60	0.005	0.010	0.010	10.210	0.410	0.080
2	Water Truck	International, 7400 6x4	4f	350	0.3602	0.38	0.30	0.14	2.60	0.005	0.010	0.010	10.210	0.410	0.080
1	Sweeper Truck	Freightliner M2	4f	240	0.3602	0.46	0.30	0.14	2.60	0.005	0.010	0.010	10.210	0.410	0.080

Table 6b: Total Criteria Pollutant Emissions from Offroad Equipment

Unit Count	Offroad Equipment	Typical Model (or Equivalent)	Engine Characteristics				Criteria Pollutant Exhaust Emissions (lb/day)					
			BHp	Op Load[1]	Hr/Day	Hr/Yr	NOx	VOC	CO	SOx	PM10	PM2.5
1	Fuel Truck	Freightliner M2106	350	0.38	2.00	624	0.18	0.08	1.52	0.00	0.01	0.01
2	Tractors	Massey Fergusen, 7619	200	0.37	9.00	2,808	0.88	0.41	7.63	0.01	0.03	0.03
1	Excavator	Caterpillar 326	201	0.38	9.00	2,808	0.45	0.21	3.94	0.01	0.02	0.02
6	Loader	Caterpillar, 962K	250	0.37	9.00	2,808	3.30	1.54	28.63	0.05	0.11	0.11
2	Water Truck	International, 7400 6x4	350	0.38	9.00	2,808	1.58	0.74	13.72	0.03	0.05	0.05
1	Sweeper Truck	Freightliner M2	240	0.46	9.00	2,808	0.66	0.31	5.70	0.01	0.02	0.02
Total Emissions from offroad equipment (lb/day)							7.06	3.29	61.15	0.12	0.24	0.24

Table 6c: Total Criteria Pollutant Emissions from Offroad Equipment

Unit Count	Offroad Equipment	Typical Model (or Equivalent)	Engine Characteristics				Criteria Pollutant Exhaust Emissions (lb/yr)					
			BHp	Op Load[1]	Hr/Day	Hr/Yr	NOx	VOC	CO	SOx	PM10	PM2.5
1	Fuel Truck	Freightliner M2106	350	0.38	2.00	624	54.89	25.61	475.70	0.90	1.83	1.83
2	Tractors	Massey Fergusen, 7619	200	0.37	9.00	2,808	274.86	128.27	2,382.10	4.49	9.16	9.16
1	Excavator	Caterpillar 326	201	0.38	9.00	2,808	141.85	66.20	1,229.35	2.32	4.73	4.73
6	Loader	Caterpillar, 962K	250	0.37	9.00	2,808	1,030.71	481.00	8,932.86	16.84	34.36	34.36
2	Water Truck	International, 7400 6x4	350	0.38	9.00	2,808	494.00	230.53	4,281.33	8.07	16.47	16.47
1	Sweeper Truck	Freightliner M2	240	0.46	9.00	2,808	205.03	95.68	1,776.91	3.35	6.83	6.83
Total Emissions from offroad equipment (lb/yr)							2,201.34	1,027.29	19,078.26	35.97	73.38	73.38
Total Emissions from offroad equipment (TPY)							1.10	0.51	9.54	0.02	0.04	0.04

Table 6d: Offroad Equipment - GHG Emissions[2]

Unit Count	Offroad Equipment	Typical Model (or Equivalent)	Engine Information				Fuel (gal/yr)	CO2 (MT/yr)	CH4 (kg/yr)	N2O (kg/yr)	CO2e (MT/Yr)
			Tier	BHp	BSFC (lb/hp-hr)	Op Load[1]					
1	Fuel Truck	Freightliner M2106	4f	350	0.3602	0.38	4,240	43	2	0	43
2	Tractors	Massey Fergusen, 7619	4f	200	0.3602	0.37	21,234	217	9	2	218
1	Excavator	Caterpillar 326	4f	201	0.3602	0.38	10,959	112	4	1	112
6	Loader	Caterpillar, 962K	4f	250	0.3602	0.37	79,628	813	33	6	816
2	Water Truck	International, 7400 6x4	4f	350	0.3602	0.38	38,164	390	16	3	391
1	Sweeper Truck	Freightliner M2	4f	240	0.3602	0.46	15,840	162	6	1	162
Total GHG Exhaust Emissions from Equipment			----	----	----	----	170,065	1,736	70	14	1,742

Table 6e: Brake Specific Fuel Consumption (BSFC) Conversion

Parameter	Value	Unit of Measure	Basis
BSFC	7000	btu/hp-hr	Per EPA AP-42 Table 3,3-1, Footnote a
Heat Content	137,000	btu/gal	SDS
Density	7.05	lb/gal	SDS
Heat Content	19432.62	Btu/lb	calculated
BSFC	0.3602	lb/hp-hr	calculated

Table 6f: Global Warming Potential

Pollutant	GWP
CO2	1
CH4	25
N2O	298

Data and Parameters

Operating Days	312	day/yr

Notes:

1. http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-d2020-4-0-full-merge.pdf?sfvrsn=6, Table 3.3.

2. Solid, gaseous, liquid and biomass fuels: Federal Register (2009) EPA; 40 CFR Parts 86, 87, 89 et al; Mandatory Reporting of Greenhouse Gases; Final Rule , 30Oct09, 261 pp. Tables C-1 and C-2 at FR pp. 56409-56410. Revised emission factors for selected fuels: Federal Register (2010) EPA; 40 CFR Part 98; Mandatory Reporting of Greenhouse Gases; Final Rule, 17Dec10, 81 pp. With Amendments from Memo: Table of Final 2013 Revisions to the Greenhouse Gas Reporting Rule (PDF) to 40 CFR part 98, subpart C: Table C–1 to Subpart C—Default CO2 Emission Factors and High Heat Values for Various Types of Fuel and Table C–2 to Subpart C—Default CH4 and N2O Emission Factors for Various Types of Fuel.

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Table 7: Fugitive Dust From Offroad Equipment Travel on Unpaved Areas and Haul Roads[1]

Table 7a: EPA Predictive Emission Factors for Offroad Equipment[2]

No. of Units	Equipment Description and Use		PM Emission Factors[3] (lb/VMT) PM10	PM2.5
1	Fuel Truck	Freightliner M2106	2.0667	0.2067
2	Tractors	Massey Fergusen, 7619	1.3171	0.1317
1	Excavator	Caterpillar 326	2.3481	0.2348
6	Loader	Caterpillar, 962K	2.1106	0.2111
2	Water Truck[4]	International, 7400 6x4	0.0000	0.0000
1	Sweeper Truck[4]	Freightliner M2	0.0000	0.0000

Variable	Value	UOM
Road Silt Content	6.4	%
Rain Days[5]	49.0	day/year

Table 7b: Onsite Equipment Tonnage, Operating Hours, and VMT

No. of Units	Equipment Description and Use		GVW (tons)	Empty (tons)	Average (tons)	Operating Hours (hr/day)	Operating Hours (hr/yr)	Ave. Speed[4] (MPH)	Total Travel (VMT/day)	Total Travel (VMT/yr)
1	Fuel Truck	Freightliner M2106	31.5	11.5	21.5	2.0	624	2.0	4.0	1,248
2	Tractors	Massey Fergusen, 7619	7.9	7.9	7.9	9.0	2,808	0.3	5.4	1,685
1	Excavator	Caterpillar 326	28.6	28.6	28.6	9.0	2,808	0.3	2.7	842
6	Loader	Caterpillar, 962K	22.5	22.5	22.5	9.0	2,808	0.3	16.2	5,054
2	Water Truck	International, 7400 6x4	31.5	11.5	21.5	9.0	2,808	3.0	54.0	16,848
1	Sweeper Truck	Freightliner M2	16.5	16.5	16.5	9.0	2,808	3.0	27.0	8,424

Table 7c: Offroad Equipment Unpaved Road Dust Emissions

No. of Units	Equipment Description and Use		Uncontrolled (lb/day) PM10	PM2.5	Controlled (lb/day) PM10	PM2.5	Uncontrolled (lb/yr) PM10	PM2.5	Controlled (lb/yr) PM10	PM2.5
1	Fuel Truck	Freightliner M2106	8.27	0.83	1.15	0.11	2579	258	357	36
2	Tractors	Massey Fergusen, 7619	7.11	0.71	0.99	0.10	2219	222	308	31
1	Excavator	Caterpillar 326	6.34	0.63	0.88	0.09	1978	198	274	27
6	Loader	Caterpillar, 962K	34.19	3.42	4.74	0.47	10668	1067	1479	148
2	Water Truck	International, 7400 6x4	0.00	0.00	0.00	0.00	0	0	0	0
1	Sweeper Truck	Freightliner M2	0.00	0.00	0.00	0.00	0	0	0	0
Total Dust from Equip. On Unpaved Areas (Lb/Day or Lb/Year)			55.91	5.59	7.75	0.77	17444	1744	2418	242
Total Dust from Equip. On Unpaved Areas (Ton/Year)			---	---	---	---	8.7	0.9	1.2	0.1

Overall Control Efficiency[6]	86%	
Control for watering	55%	Ref 6
Control for vehicle speed	44%	Ref 6
Control for sweeping	45%	Ref 7

Notes:

1. Although compost surfaces are paved, because the compost processing areas are expected to have compost residuals covering the active surfaces, the unpaved road calculations are used to estimate emissions.
2. EPA AP-42 5th Edition, Chapter 13, Section 13.2.2, Equation 1a.
3. Because daily emissions are being calculated, and it does not rain daily, the rain correction factor has been omitted from the calculation.
4. Entrained road dust is assumed to be negligible for the water truck due to watering and the sweeper truck due to watering and sweeping.
5. http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-d2020-4-0-full-merge.pdf?sfvrsn=6, Table 1.1 has 49 days with precipitation > 0.1 inches for Merced County.
6. Assumes twice daily watering and limiting travel speed to 25 mph; http://www.aqmd.gov/docs/default-source/ceqa/handbook/mitigation-measures-and-control-efficiencies/fugitive-dust/fugitive-dust-table-xi-d.doc?sfvrsn=2.
7. Chow, Judith C., et. al., "Evaluation of Regenerative-air Vacuum Street Sweeping on Geological Contributions to PM10", Journal of the Air & Waste Management Association, published online 06 Mar 2012.

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Table 8: Summary of Emissions

Table 8a: Summary of Daily Criteria Pollutant Emissions

Activity	NOx (lb/day)	VOC (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
3. Onroad Vehicle Exhaust	11.20	0.29	2.80	0.10	0.90	0.38
4. Onroad Vehicle Paved Road Dust	---	---	---	---	1.34	0.33
5. Onroad Vehicle Unpaved Road Dust	---	---	---	---	0.00	0.00
6. Offroad Equipment Exhaust	7.06	3.29	61.15	0.12	0.24	0.24
7. Offroad Equipment Unpaved Dust	---	---	---	---	7.75	0.77
Total	18.25	3.59	63.94	0.21	10.22	1.73

Table 8b: Summary of Annual Criteria Pollutant Emissions

Activity	NOx (lb/yr)	VOC (lb/yr)	CO (lb/yr)	SOx (lb/yr)	PM10 (lb/yr)	PM2.5 (lb/yr)
3. Onroad Vehicle Exhaust	3493	91	872	30	281	120
4. Onroad Vehicle Paved Road Dust	---	---	---	---	407	102
5. Onroad Vehicle Unpaved Road Dust	---	---	---	---	0	0
6. Offroad Equipment Exhaust	2201	1027	19078	36	73	73
7. Offroad Equipment Unpaved Dust	---	---	---	---	2418	242
Total	5695	1119	19951	66	3179	536
Total (TPY)	2.85	0.56	9.98	0.03	1.59	0.27

Table 8c: Summary of Annual GHG Emissions

Activity	CO2 (MT/yr)	CH4 (MT/yr)	N2O (MT/yr)	CO2e (MT/Yr)
3. Onroad Vehicle Exhaust	1451	0.0	0.2	1518
4. Onroad Vehicle Paved Road Dust	---	---	---	---
5. Onroad Vehicle Unpaved Road Dust	---	---	---	---
6. Offroad Equipment Exhaust	1736	70	14	1742
7. Offroad Equipment Unpaved Dust	---	---	---	---
Total	**3187**	**70**	**14**	**3260**

Notes:

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Table 9: Diesel and Gasoline Vehicle TAC Emissions

Table 9a: DPM Emissions

Vehicle	PM10 Emissions (lb/hr)		PM10 Emissions (lb/day)		PM10 Emissions (lb/yr)	
	Onsite Exhaust	Nearsite Exhaust[1,2]	Onsite Exhaust	Nearsite Exhaust[1,2]	Onsite Exhaust	Nearsite Exhaust[1,2]
LHD2	0.000	0.000	0.000	0.000	0.00	0.001
T7 Tractor	0.017	0.026	0.150	0.231	0.55	0.163
Fuel Truck	0.001	0.000	0.006	0.000	1.83	0
Tractors	0.003	0.000	0.029	0.000	9.16	0
Excavator	0.002	0.000	0.015	0.000	4.73	0
Loader	0.012	0.000	0.110	0.000	34.36	0
Water Truck	0.006	0.000	0.053	0.000	16.47	0
Sweeper Truck	0.002	0.000	0.022	0.000	6.83	0
Total PM10 = DPM	0.043	0.026	0.385	0.231	73.93	0.163

Table 9b: Gasoline Vehicle Mileage and Fuel Consumption

Parameter	Onsite	Near-site[3]
VMT/Day	20	17
Fuel Consumption (gal/day)	1.23	1.03

Average Fuel Economy Light Truck[4] 16.20 MPG

Table 9c: TAC Emissions from Onroad Gasoline Vehicles

TAC	CAS#	Emission Factor[5] (lb/1000-gal)	Onsite (lb/day)	Near-site (lb/day)	Onsite (lb/yr)	Near-site (lb/yr)	Total (lb/hr)	Total (lb/day)	Total lb/yr)
1,2,4-Trimethylbenzene	95636	5.89E-01	7.272E-04	6.060E-04	2.269E-01	1.891E-01	1.48E-04	1.33E-03	4.16E-01
1,3-Butadiene	106990	3.24E-01	4.000E-04	3.333E-04	1.248E-01	1.040E-01	8.15E-05	7.33E-04	2.29E-01
Acetaldehyde	75070	1.47E-01	1.815E-04	1.512E-04	5.662E-02	4.719E-02	3.70E-05	3.33E-04	1.04E-01
Acrolein	107028	8.25E-02	1.019E-04	8.488E-05	3.178E-02	2.648E-02	2.07E-05	1.87E-04	5.83E-02
Benzene	71432	1.57E+00	1.938E-03	1.615E-03	6.047E-01	5.040E-01	3.95E-04	3.55E-03	1.11E+00
Chlorine	7782505	4.55E-01	5.617E-04	4.681E-04	1.753E-01	1.460E-01	1.14E-04	1.03E-03	3.21E-01
Copper	7440508	3.30E-03	4.074E-06	3.395E-06	1.271E-03	1.059E-03	8.30E-07	7.47E-06	2.33E-03
Ethyl benzene	100414	6.42E-01	7.926E-04	6.605E-04	2.473E-01	2.061E-01	1.61E-04	1.45E-03	4.53E-01
Formaldehyde	50000	1.01E+00	1.247E-03	1.039E-03	3.890E-01	3.242E-01	2.54E-04	2.29E-03	7.13E-01
Hexane	110543	9.42E-01	1.163E-03	9.691E-04	3.628E-01	3.024E-01	2.37E-04	2.13E-03	6.65E-01
Manganese	7439965	3.30E-03	4.074E-06	3.395E-06	1.271E-03	1.059E-03	8.30E-07	7.47E-06	2.33E-03
Methanol	67561	2.42E-01	2.988E-04	2.490E-04	9.321E-02	7.768E-02	6.09E-05	5.48E-04	1.71E-01
Methyl ethyl ketone {2-Butanor	78933	1.18E-02	1.457E-05	1.214E-05	4.545E-03	3.788E-03	2.97E-06	2.67E-05	8.33E-03
Methyl tert-butyl ether	1634044	1.15E+00	1.420E-03	1.183E-03	4.430E-01	3.691E-01	2.89E-04	2.60E-03	8.12E-01
m-Xylene	108383	2.17E+00	2.679E-03	2.233E-03	8.359E-01	6.965E-01	5.46E-04	4.91E-03	1.53E+00
Naphthalene	91203	2.95E-02	3.642E-05	3.035E-05	1.136E-02	9.469E-03	7.42E-06	6.68E-05	2.08E-02
Nickel	7440020	3.30E-03	4.074E-06	3.395E-06	1.271E-03	1.059E-03	8.30E-07	7.47E-06	2.33E-03
o-Xylene	95476	7.54E-01	9.309E-04	7.757E-04	2.904E-01	2.420E-01	1.90E-04	1.71E-03	5.32E-01
Styrene	100425	7.07E-02	8.728E-05	7.274E-05	2.723E-02	2.269E-02	1.78E-05	1.60E-04	4.99E-02
Toluene	108883	3.50E+00	4.321E-03	3.601E-03	1.348E+00	1.123E+00	8.80E-04	7.92E-03	2.47E+00

Notes:

1. Nearsite mileage is estimated based on the total offsite distance multipiled by a ratio of 0.25 miles divided by the one-way trip length.
2. Offroad equipment operates onsite only.
3. Near site mileage is calculated based on the total number of gasoline vehicle trips per year divided by the operating days per year, multiplied by 0.25 miles (one way) multiplied by 2 (two way trip).
4. https://en.wikipedia.org/wiki/Fuel_efficiency
5. SJVAPCD, AB 2588 “Hot Spots” Air Toxics Profiles, March 27, 2017, District Toxic Profile ID 176, Gasoline-Fired Portable Catalyst ICE

Table 10: TAC from Paved Road Dust

Table 10a: Criteria Pollutant Information

Pollutant	Onsite (lb/hr)	Near-site[1] (lb/hr)	Onsite (lb/day)	Near-site[1] (lb/day)	Onsite (lb/yr)	Near-site[1] (lb/yr)
PM10	0.0510	0.0213	0.46	0.19	137.33	57.22
		0.07230				194.56

Table 10b: TAC from Paved Road Dust

TAC	Wt. Fraction[2]	TAC Emissions	
		lb/hr	lb/yr
Arsenic	0.000013	9.40E-07	2.53E-03
Cadmium	0.000003	2.17E-07	5.84E-04
Chromium[3]	0.00000085	6.15E-08	1.65E-04
Cobalt	0.000023	1.66E-06	4.47E-03
Copper	0.000148	1.07E-05	2.88E-02
Lead	0.000124	8.97E-06	2.41E-02
Manganese	0.0008	5.78E-05	1.56E-01
Nickel	0.000012	8.68E-07	2.33E-03
Mercury	0.000009	6.51E-07	1.75E-03
Selenium	0.000002	1.45E-07	3.89E-04
Vanadium (Fume Or Dust)	0.000071	5.13E-06	1.38E-02

Notes:

1. Nearsite emissions include emissions up to 1/4 mile offsite. Nearsite PM10 emissions are calculated in Table 4 as "Rural" emissions.
2. CARB speciation profile for Paved Roads (#471), accessed: https://ww2.arb.ca.gov/speciation-profiles-used-carb-modeling
3. Hexavalent chromium is assumed to be 5% of total chromium per SJVAPCD guidance.

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Table 11: TAC from Offroad Vehicles Operation on Unpaved Surfaces

Table 11a: Offroad Equipment Entrained Dust Emissions

Source	lb/hr	lb/day	lb/yr
Unpaved Road Dust from Site Access	0.00	0.00	0.00
Unpaved Road Dust Composting	0.86	7.75	2417.76
Total PM10	0.86	7.75	2417.76

Table 11b: TAC from Vehicle/Equipment Travel on Unpaved Surfaces

TAC	Concentration[1,2] (lb/lb Dust)	TAC Emissions (lb/hr)	TAC Emissions (lb/yr)
Arsenic	6.20E-06	5.34E-06	1.50E-02
Cadmium	2.00E-06	1.72E-06	4.84E-03
Hexavalent Chromium	2.45E-06	2.11E-06	5.92E-03
Cobalt	8.80E-06	7.58E-06	2.13E-02
Copper	6.90E-05	5.94E-05	1.67E-01
Lead	2.00E-04	1.72E-04	4.84E-01
Manganese	4.40E-04	3.79E-04	1.06E+00
Nickel	9.50E-05	8.18E-05	2.30E-01
Mercury	1.00E-06	8.61E-07	2.42E-03
Selenium	1.00E-06	8.61E-07	2.42E-03

Notes:

1. Although compost surfaces are paved, because the compost processing areas are expected to have compost residuals covering the active surfaces, the unpaved road calculations are used to estimate emissions, and compost dust speciation is used for TAC..

2. SJVAPCD Toxic Emission Factors for fugitive dust from "PM10 based Emissions from Operations generating Dust from Greenwaste Composting" (June 7, 2016), accessed: https://www.valleyair.org/busind/pto/emission_factors/emission_factors_idx.htm

APPENDIX C – COMPOST EMISSIONS

Appendix C:
Composting Emissions

Air Quality and GHG
Technical Report

Prepared for:

Agromin Corporation
Highway 59 Composting Facility
7040 N. Highway 59
Merced, CA 95348

February 2024

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List of Acronyms and Abbreviations

BAAQMD	Bay Area Air Quality Management District
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CAS No.	Chemical Abstract Service Number
C:N	Carbon to Nitrogen ratio
EF	Emission Factor
EPA	[United States] Environmental Protection Agency
hr	Hour
lb	Pound(s)
MDAQMD	Mojave Desert Air Quality Management District
NRWS	Napa recycling and Waste Services
$PM_{2.5}$	Fine Particulate Matter
PM_{10}	Respirable Particulate Matter
SDAPCD	San Diego County Air Pollution Control District
SJVAPCD	San Joaquin Valley Air Pollution Control District
TAC	Toxic Air Contaminant
TPD	Ton per Day
TPY	Tons per Year
TSP	Total Suspended Particulate
UC	University of California
VOC	Volatile organic compounds
yr	Year

Appendix C: Composting Emissions

1.0 INTRODUCTION

1.1 Overview

Emissions estimates have been prepared for the Covered Aerated Static Pile (CASP) composting operations proposed by Agromin at the Highway 59 Composting Facility in Merced County, California. Emissions estimates have been prepared for the following source categories:

- Dust/Particulate Emissions:
  - Grinding and Screening;
  - Material Handling; and
  - Wind Erosion;
- Composting Operations;
- Toxic Air Contaminant (TAC) Emissions:
  - Dust and Particulate TAC Emissions; and
  - Composting TAC Emissions:
    - Screening, grinding, material handling, wind erosion;
    - Ammonia; and
    - Organic TACs.

For each category of emissions, the methodology is explained and the data and assumptions used in the calculations are provided. Emissions are summarized by category in each section. A comprehensive summary of composting operational criteria pollutant emissions is provided in Section 5.0. Emission calculation worksheets are provided in Attachment C-1.

1.2 Facility Throughput

The operational emissions were estimated based on the proposed facility process rate of 75,000 TPY. There is mass loss during various phases of processing due to decomposition of the organic matter and screening to remove non-compostable materials.

The maximum daily throughput of the compost facility is 300 TPD. However, composting operations emit volatile organic compounds (VOC) over the entire duration of processing, lasting 6 weeks or more. Thus, average daily throughput of 240 TPD better represents the process than maximum daily throughput, with respect to VOC emissions. Maximum daily throughput would impact particulate emission rates for the initial material handling operations (grinding and material transfer) but average daily throughput would better represent subsequent process steps. To simplify the analysis, average daily throughput is used for all daily emission calculations.

The process throughput used in this analysis is summarized in Table 1-1.

Table 1-1: Compost Facility Process Throughput

Processing Step	Proposed Project (TPY)	Proposed Project (TPD)
Initial Charge	75,000	240
Loss Upon Composting	60,000	192
Initial Charge to Curing	60,000	192
Loss Upon Curing	52,500	168
Loss Upon Screening	45,000	144
Finished Product	45,000	144

2.0 DUST/PARTICULATE EMISSIONS

Operations that involve the movement of material or that expose or disturb erodible surfaces may generate fugitive dust. During composting operations, fugitive dust is generated by a variety of activities, such as the transport of material on paved and unpaved roads, material handling, and wind erosion.

Fugitive dust emissions were calculated using Environmental Protection Agency (EPA)-recommended equations that generate "predictive emission factors" that are specific to the given activity. The calculations generally take into account the silt and moisture content of the material. The methodologies and detailed emission calculations are presented in the following sections.

2.1 Grinding and Screening

In preparation for the active composting phase, feedstock materials may be pre-processed by grinding. Grinding of the feedstock reduces the volume of material, increases the surface area to promote biological decomposition, and provides a relatively uniform mixture of material and particle size. Cured compost is screened to remove "overs," which typically consist of composted pieces of woody material or non-organic matter such as plastic or glass. Emissions from grinding and screening are presented in this section.

2.1.1 Methodology

The uncontrolled emission factor for grinding is based on guidance provided in the Bay Area Air Quality Management District (BAAQMD) permit manual for wood grinders (BAAQMD 2018) and is derived from the since de-listed EPA emission factor for "log debarking" (EPA 1985).[1] PM_{10} is assumed to be 60% of total suspended particulate (TSP). The $PM_{2.5}$ emissions are assumed to be 15% of the PM_{10}, consistent with the fine particulate matter ($PM_{2.5}$) to respirable particulate matter (PM_{10}) ratio from EPA AP-42, Chapter 13.2.4 (= 0.053 / 0.35) (EPA 2006b).

$$E_{TSP} = 0.024 \text{ lb TSP/ton processed}$$

$$E_{PM10} = 0.60 \times E_{TSP} = 0.60 \times 0.024 = 0.0144 \text{ lb } PM_{10}\text{/ton processed}$$

$$E_{PM2.5} = 0.0144 \times 0.15 = 0.002 \text{ lb } PM_{2.5}\text{/ton processed}$$

The uncontrolled particulate emission factor for screening is from AP-42 Chapter 10.3, Plywood Veneer and Layout Operations (EPA 1985) for log debarking, assuming 60% of the TSP emissions are PM_{10}. The $PM_{2.5}$ emissions are assumed to be 15% of the PM_{10}, consistent with the $PM_{2.5}$ to PM_{10} ratio from AP-42, Chapter 13.2.4 (= 0.053 / 0.35) (EPA 2006b).

$$E_{PM10} = 0.024 \text{ lb-TSP/ton} \times 0.60 \text{ lb-}PM_{10}\text{/lb-TSP} = 0.0144 \text{ lb/ton}$$

$$E_{PM2.5} = 0.024 \text{ lb-TSP/ton} \times 0.60 \text{ lb-}PM_{10}\text{/lb-TSP} \times 0.15 \text{ lb-}PM_{10}\text{/lb-}PM_{2.5}$$

$$= 0.002 \text{ lb/ton}$$

[1] EPA Chapter 10.9 currently lists debarking as "non-detect"; however, emission factors from previous versions, such as cited in Section 3.1.1.2, are still available in EPA's archive.

2.1.2 Emission Controls

The screens and grinders will be fitted with water sprays to ensure the material is sufficiently wetted to minimize emissions. An emission control efficiency of 75% is applied to derive controlled emissions (MDAQMD 2000).

2.1.3 Process Rate Information

The process rate information for grinding and screening is presented in Table 2-1. It is conservatively assumed that all feedstock would be processed through the grinder, although in practice, not all of the feedstock will require grinding.

Table 2-1: Grinding and Screening Process Throughput

Operation	Annual Throughput (TPY)	Peak Daily Throughput (TPD)
Grinding	75,000	240
Screening	52,500	168

2.1.4 Grinding and Screening Particulate Emissions

Annual grinding and screening emissions are summarized in Table 2-2. Emission calculations, including daily and hourly emissions, are provided in Table 3 in Attachment C-1.

Table 2-2: Grinding and Screening Particulate Emissions

Operation	Annual Emissions (lb/yr)		Daily Emissions (lb/day)	
	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
Grinding	270.00	40.50	0.87	0.13
Screening	189.00	28.35	0.61	0.09
Total (lb/yr)	459.00	68.85	1.47	0.22
Total (TPY)	0.23	0.03	---	---

2.2 Material Handling

2.2.1 Methodology

PM_{10} and $PM_{2.5}$ emissions were estimated using the equation for material transfer from Chapter 13.2.4 of AP-42, Aggregate Handling and Storage Piles (EPA 2006b). $PM_{2.5}$ is assumed to be 15% of PM_{10}, per the particle size multipliers in the equation. The emission factor is calculated according to Equation 2-1.

$$EF\ (lb/ton) = k(0.0032) \times (U/5)^{1.3} / (M/2)^{1.4} \qquad \text{(Eq. 2-1)}$$

Where:

EF = Emission Factor (lb/ton)

k = particle size multiplier (k = 0.35 for PM_{10}, and k = 0.053 for $PM_{2.5}$)

U = mean windspeed (miles per hour)

M = material moisture content

For these emission factor calculations, a windspeed of 4.92 miles per hour is used (CAPCOA 2020, Table 1.1). A moisture content of 4.8% is assumed.[2] Emission factors are summarized in Table 2-3.

Table 2-3: Material Handling PM_{10}/$PM_{2.5}$ Emission Factors

Emission Mechanism	PM_{10} Emission Factor (lb/ton/drop point)	$PM_{2.5}$ Emission Factor (lb/ton/drop point)
Material Transfer	3.22E-04	4.88E-05

2.2.2 Compost Processing Activity Data

The raw material, work in process, and finished compost material handling quantities and the number of drop points associated with each process step are summarized in Table 2-4. There is a loss of mass associated with composting and curing, and the material quantities listed in Table 2-4 reflect those process losses.

Table 2-4: Material Handling Process Information

Process Step	Annual Throughput (TPY)	Peak Daily Throughput (TPD)	No. of Drop Points
Feedstock	75,000	240	1
Grinding	75,000	240	2
Composting	75,000	240	1
Curing	60,000	192	1
Screening	52,500	168	2
Finished Compost Storage	45,000	144	1
Truck Loadout	45,000	144	1

2.2.3 Material Handling Particulate Emissions

The amount of material processed (Table 2-4) was combined with the appropriate emission factors (Table 2-3) to calculate the fugitive dust emissions from material handling. Although not accounted for in the calculations, fugitive dust from material handling will be reduced via wet suppression by at least 50%. Annual operational fugitive dust emissions from material handling are summarized in Table 2-5. Detailed emission calculations, including daily and hourly emissions, are provided in Table 4 in Attachment C-1.

[2] The range of moisture content for which this equation is valid is 0.25% to 4.8%. Because that portion of MSW that will be directed to composting typically has moisture content greater than 50%, the use of 4.8% in the emission calculations is expected to be extremely conservative (i.e., will overestimate emissions).

Table 2-5: Material Handling Particulate Emissions

Process Step	Controlled Emissions (lb/yr)		Controlled Emissions (lb/day)	
	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
Feedstock	24.15	3.66	0.08	0.01
Grinding	48.30	7.31	0.15	0.02
Composting	24.15	3.66	0.08	0.01
Curing	19.32	2.93	0.06	0.01
Screening	33.81	5.12	0.11	0.02
Finished Compost Storage	14.49	2.19	0.05	0.01
Truck Loadout	14.49	2.19	0.05	0.01
Total (lb/yr)	178.69	27.06	0.57	0.09
Total (TPY)	0.09	0.01	---	---

2.3 Wind Erosion

2.3.1 Methodology

The uncontrolled wind erosion PM_{10} emission factor is calculated based on Equation 2-2 (MDAQMD 2000).

$$E_f = J \; x \; 1.7 \; x \; \frac{sL}{1.5} \; x \; \frac{(365-P)}{235} \; x \; \frac{I}{15} \qquad \text{(Eq. 2-2)}$$

Where:

Ef = Emission factor in tons per acre per day

J = Particulate aerodynamic factor (=0.5 for PM10 and 0.2 for PM2.5)

sL = Average silt loading of storage pile in percent (%) (assumed to be 0.5%)

P = Average number of days during the year with at least 0.01 inches of precipitation (= 49 in Merced County)

I = Percentage of time with unobstructed wind speed >12 mph in percent (%) (= 5.41% in the project area)

Table 2-6: Wind Erosion PM_{10}/$PM_{2.5}$ Emission Factors

Emission Mechanism	Uncontrolled PM_{10} Emission Factor (lb/acre-day)	Uncontrolled $PM_{2.5}$ Emission Factor (lb/acre-day)
Wind Erosion	1.37E-01	5.50E-02

2.3.2 Emission Control

The compost and curing piles will be fitted with water sprays to ensure the material is sufficiently wetted to minimize emissions. Storage piles would be wetted using a water truck as necessary to minimize emissions. An emission control efficiency of 75% is applied to derive controlled emissions (MDAQMD 2000).

2.3.3 Wind Erosion – Process Information

Wind erosion varies according to the acreage involved; acreage was determined using the project drawings and design specifications. Process areas for each operational activity are summarized in Table 2-7.

Table 2-7: Wind Erosion Process Information

Area	Acres
Feedstock Storage	2
Composting	4
Curing	2
Finished Compost Storage	2

2.3.4 Wind Erosion Particulate Emissions

Annual wind erosion particulate emissions are summarized in Table 2-8. Detailed emission calculations are provided in Table 5 in Attachment C-1.

Table 2-8: Wind Erosion Particulate Emissions

Area	Annual Emissions (lb/yr)		Daily Emissions (lb/day)	
	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
Feedstock Storage	25.08	10.03	0.07	0.03
Composting	50.16	20.06	0.14	0.05
Curing	25.08	10.03	0.07	0.03
Finished Compost Storage	25.08	10.03	0.07	0.03
Total	125.39	50.16	0.34	0.14
Total (TPY)	0.06	0.03	---	---

3.0 COMPOSTING OPERATIONS

The proposed composting operations will emit volatile organic compounds (VOC) due to the decomposition of the organic materials during the composting and curing operations. VOC is the only criteria pollutant that would be emitted directly from the decomposition of organic matter in the composting process.

3.1 Methodology

Emissions of VOC were estimated using emission factors recommended by the San Joaquin Valley Air Pollution Control District (SJVAPCD), BAAQMD, or California Air Resources Board (CARB), derived from reports published by these agencies or from source test data from similar facilities elsewhere in California.

The VOC emission factor for feedstock storage is taken from Table 7 of the SJVAPCD Compost Emission Factor Report (2023). The VOC emission factor for composting was derived based on recent source testing conducted at a BAAQMD-permitted CASP composting facility, which yielded a VOC emission factor of 0.22 pounds per wet ton. The source test was performed on a positively aerated static pile with a cured compost biolayer for VOC emissions control.

The curing process is thought to emit approximately 10% of the emissions that the compost process emits (SJVAPCD 2010). Using this assumption, the curing step would emit 0.022 pounds per ton of material.

Cured compost storage VOC emissions were estimated using an emission factor of 0.02 pounds of VOC per ton of material stored based on a SJVAPCD report (SJVAPCD 2010). VOC emission factors are summarized in Table 3-1.

Table 3-1: Summary of Composting VOC Emission Factors

Source	Controlled Emission Factor	Reference
Feedstock Storage	0.2 lb/wet ton/day	SVJAPCD 2023,Table 7
Composting	0.22 lb/ton	NRWS 2020
Curing	0.022 lb/ton	SJVAPCD 2010, Table 4
Storage	0.02 lb/ton	SJVAPCD 2010, Table 4.3

3.2 Process Throughput Information

Feedstock would either be delivered directly to the compost pile, or would be pre-processed [e.g., blended to reduce moisture content, blended to optimize the carbon to nitrogen (C:N) ratio, ground]. To ensure that emissions from feedstock storage are not underestimated, the amount of material directed to the feedstock storage is assumed to be 100%. Feedstock storage is assumed to last no more than 2 days. Curing VOC emissions are based on the initial feed to the composting facility, not the actual feed to the curing operation (that is simply how the emission factor is defined). VOC emissions were based on the throughput information provided in Table 3-2.

Table 3-2: Composting Throughput

Source	Annual Throughput (TPY)	Daily Throughput (TPD)
Feedstock Storage	75,000	240
Composting	75,000	240
Curing	75,000	160
Storage	45,000	144

3.3 Composting Process Emissions

VOC emissions from the raw material stockpile, composting, curing, and the finished compost stockpile are summarized in Table 3-3. Emission calculation worksheets for VOC emissions from composting operations are provided in Table 6 in Attachment C-1.

Table 3-3: Summary of Proposed Composting VOC Emissions

Source	Annual Emissions (lb/yr)	Daily Emissions (lb/day)	Hourly Emissions (lb/hr)
Feedstock Storage	30,000	82.19	3.42
Composting	16,500	45.21	1.88
Curing	1,650	4.52	0.19
Finished Compost Storage	900	2.47	0.10
Total	49,050	134.38	5.60
Total (TPY)	24.525	-	-

4.0 SUMMARY OF CRITERIA POLLUTANT EMISSIONS

The predicted emissions from the proposed composting facility are summarized in Tables 4-1 and 4-2.

Table 4-1: Summary of Proposed Daily Composting Emissions

Activity	NO_x (lb/day)	VOC (lb/day)	CO (lb/day)	SO_x (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
Composting/ Curing	---	134.38	---	---	---	---
Grind and Screen	---	---	---	---	1.47	0.22
Material Handling	---	---	---	---	0.57	0.09
Wind Erosion	---	---	---	---	0.34	0.14
Total	0.00	134.38	0.00	0.00	2.39	0.44

Table 4-2: Summary of Proposed Annual Composting Emissions

Activity	NO_x (lb/yr)	VOC (lb/yr)	CO (lb/yr)	SO_x (lb/yr)	PM_{10} (lb/yr)	$PM_{2.5}$ (lb/yr)
Composting/Curing	---	49,050	---	---	---	---
Grind and Screen	---	---	---	---	459.00	68.85
Material Handling	---	---	---	---	178.69	27.06
Wind Erosion	---	---	---	---	125.39	50.16
Total (lb/yr)	0.00	49,050	0.00	0.00	763.08	146.06
Total (TPY)	0.00	24.53	0.00	0.00	0.38	0.07

5.0 TOXIC AIR CONTAMINANT EMISSIONS

The emissions of TACs were calculated either using process information for a given activity and an appropriate emission factor, or by "speciating" the PM_{10} and VOC emissions using a profile that identifies the weight fraction of the TAC constituent in the parent compound.

5.1 Dust and Particulate TAC Emissions

Material handling, screening, grinding, and wind erosion can each result in particulate emissions. The particulate emissions may contain TACs consisting primarily of heavy metals that are present in the biomass feedstock. Particulate emissions are speciated into TAC emissions using a co-composting speciation profile published by the SJVAPCD (SJVAPCD 2015). The total particulate emissions from material handling, screening, grinding, and wind erosion are 0.24 pounds per hour and 763.08 pounds per year. The speciation profile and resulting TAC emissions are provided as Table 5-1. Emission calculations are provided in Table 8 in Attachment C-1.

Table 5-1: Compost Operations Fugitive Dust TAC Emissions

TAC	Concentration (lb/lb dust)	TAC Emissions	
		(lb/hr)	(lb/yr)
Arsenic	6.20E-06	1.50E-06	4.73E-03
Cadmium	2.00E-06	4.83E-07	1.53E-03
Hexavalent Chrome	2.45E-06	5.91E-07	1.87E-03
Cobalt	8.80E-06	2.12E-06	6.72E-03
Copper	6.90E-05	1.67E-05	5.27E-02
Lead	2.00E-04	4.83E-05	1.53E-01
Manganese	4.40E-04	1.06E-04	3.36E-01
Mercury	1.00E-06	2.41E-07	7.63E-04
Nickel	9.50E-05	2.29E-05	7.25E-02
Selenium	1.00E-06	2.41E-07	7.63E-04

5.2 Ammonia

Ammonia may be emitted from organic waste processing operations due to decomposition of nitrogen-bearing compounds present in the feedstock. Ammonia can form if the carbon to nitrogen (C:N) ratio is low or there is insufficient oxygen.

The ammonia emission factor of 0.178 pounds per ton is the average emission factor from a series of five source tests conducted at the Napa Recycling and Waste Services facility in Napa California between January 2020 and May 2022. Ammonia emission factors are summarized in Table 5-2. Ammonia emissions were based on these emission factors and the process throughput and are summarized in Table 5-3. Ammonia emission calculations are provided in Table 9 in Attachment C-1.

Table 5-2: Ammonia Emission Factors

Source Description	Emission Factor (lb/ton)	Reference
Feedstock Storage	0.02 lb/ton/day	SJVAPCD 2010
Composting + Curing	0.178 lb/ton	NRWS 2020
Compost Storage	0.00038 lb/ton	SJVAPCD 2010

Table 5-3: Composting Ammonia Emissions

Process Unit	Annual Throughput (TPY)	Daily Throughput (TPD)	Annual Emissions (lb/yr)	Hourly Emissions (lb/hr)
Feedstock Storage	75,000	240	3,000	0.34
Composting	75,000	240	13,350	1.52
Finished Compost Storage	45,000	144	17	0.00

5.3 Organic TACs

Organic TAC emissions for composting, curing, and finished compost storage were estimated by speciating the VOC emissions using the University of California (UC) Davis composting study results (Kumar 2011). The UC Davis study reports the constituents as a percentage of VOC emissions. The speciation profile is shown in Table 5-4. VOC emissions are summarized in Table 5-5. TAC emissions are summarized in Table 5-6. Organic TAC emission calculations are provided in Table 10 in Attachment C-1.

Table 5-4: TAC Speciation Profile

Pollutant	Speciation (% Wt.)
Isopropyl alcohol	42.31
Methyl alcohol	12.79
Naphthalene	0.50
Propene	0.22
Acetaldehyde	0.14

Table 5-5: Composting VOC Emissions

Feedstock Storage		Composting		Curing		Finished Compost Storage		Total	
lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr
3.42	30000.00	1.88	16,500	0.19	1,650	0.10	900	5.60	49,050

Table 5-6: Composting TAC Emissions

TAC	Feedstock Storage		Composting		Curing		Finished Compost Storage		Total Project	
	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr
Isopropyl alcohol	1.45	12,693	0.80	6,981	0.08	698.12	0.04	380.79	2.37	20,753
Methanol	0.44	3,837	0.24	2,110	0.02	211.04	0.01	115.11	0.72	6,273
Naphthalene	0.02	150	0.01	82.50	0.00	8.25	0.00	4.50	0.03	245.25
Propene	0.01	66	0.00	36.30	0.00	3.63	0.00	1.98	0.01	107.91
Acetaldehyde	0.00	42	0.00	23.10	0.00	2.31	0.00	1.26	0.01	68.67

6.0 REFERENCES

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ATTACHMENT C-1 – EMISSION CALCULATION WORKSHEETS

Agromin Merced
CASP Compost Facility
Emission Calculations

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Table 1: Compost Process Throughput

Table 1: Process Throughput Calculations

Processing Step	Loss based on Initial Charge	Loss based on Previous Step	Proposed Project (TPY)	Proposed Project (TPD)
Initial Charge	---	---	75,000	240
Loss Upon Composting	20.0%	20%	60,000	192
Initial Charge to Secondary	---	---	60,000	192
Loss Upon Curing	10.0%	13%	52,500	168
Loss Upon Screening	10.0%	14%	45,000	144
Finished Product	---	---	45,000	144

Data and Parameters			Notes
Daily Operating Hours	9	hours/day	
Raw Material quantity per truck	12	tons/truck	*Assumption*
Raw Material truck count	6251	Truck/year	
Raw Material Receive Days	312	Day/year	
Raw Material truck count	21	Truck/day	
Compost quantity per truck	20	tons/truck	*Assumption*
Compost delivery truck count	2250	Truck/year	
Compost shipment days	312	Day/year	*Assume shipment of compost product 6 days per week*
Compost delivery truck count	8	Truck/day	

Table 2: Compost Process Emission Factors

Table 2a: Emission Factors

Pollutant	Phase	Emission Factor	Note
VOC	Feedstock Storage	0.2 lb/wet ton/day	1
VOC	Composting	0.22 lb/ton	2
VOC	Curing (=10% of compost factor)	0.022 lb/ton	3
VOC	Storage	0.02 lb/ton	4
NH_2	Feedstock Storage	0.02 lb/ton/day	1
NH_3	Composting + curing	0.1780 lb/ton	5
NH_3	Storage	0.00038 lb/ton	6

Table 2b: Uncontrolled Grinding and Screening PM Emission Factors

Process Operation	Emission Factor		Note
	PM10 (lb/ton)	PM2.5 (lb/ton)	
Grinding	0.0144	0.00216	7
Screening	0.0144	0.00216	8

Table 2c: Material Handling PM Emission Factors

Variable	Emission Factor		Note
	PM10	PM2.5	
Particle Size Multiplier (dimensionless)	0.35	0.053	9
Mean Wind Speed (MPH)	4.92	4.92	10
Material Moisture Content (%)	4.80	4.80	9
Emission Factor (lb/ton/drop point)	0.000322	0.0000488	calculated

Table 2d: Wind Erosion PM Emission Factors[11]

Variable	PM10	PM2.5	Note
Particulate aerodynamic factor	0.50	0.20	11
Average silt loading of storage pile in percent (%),	0.50	0.50	Assumed
Average number of days during the year with at least 0.01 inches of precipitation	49.00	49.00	12
Percentage of time with unobstructed wind speed >12 mph in percent (%)	5.41	5.41	13
Wind Erosion EF (lb/acre/day)	1.37E-01	5.50E-02	Calculated

Table 2e: TAC Speciation

TAC	Speciation (% wt)	Note
Isopropyl alcohol	42.31	14
Methanol	12.79	14
Naphthalene	0.50	14
Propene	0.22	14
Acetylaldehyde	0.14	14

Notes:

1. SJVAPCD Compost Emission Factor Report, Originally Published September 15, 2010, Revised March 21, 2023, Table 7.
2. SOURCE TEST REPORT, 2020 QUARTERLY COMPOST EMISSIONS TESTING - 4TH QUARTER NAPA RECYCLING & WASTE SERVICES, INC. CASP COMPOSTING SYSTEM AMERICAN CANYON, CALIFORNIA
3. San Joaquin Valley Air Pollution Control District, Compost ROG Emission Factors, September 15, 2010, Table 4.
4. Storage EF from SJVAPCD Compost ROG Emission Factors, Sept 15, 2010, App C, Table 4.3 which is based on 15 days storage.
5. Ammonia emission factor is an average of five source test results from Napa Recycling and Waste Services. Tests were conducted between 2020 and 2022 pursuant to a BAAQMD-approved protocol. NRWS operates a CASP system with positive aeration using greenwaste as feedstock.
6. SJVAPCD Compost VOC Emission Factors, Sept 15, 2010, App C, Table 4.3 which is based on 15 days storage.
7. BAAQMD, Title V Permit Evaluation, Guadalupe Rubbish Disposal Co., Site A3294. BAAQMD references AP-42 for log debarking. Assume 15% fraction of PM2.5.
8. AP-42 section 10.3 Plywood Veneer and Layout Operations Table 10.3-1 (4th Edition) for log debarking, assuming 60% of emissions are PM10 with a 15% fraction of PM2.5.
9. AP-42, Chapter 13.2.4 Aggregate Handling and Storage Piles. Moisture content used is the maximum allowed by the method. Actual moisture content will be higher, thus these emission factors are conservative.
10. CalEEMod 2021. http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-d2020-4-0-full-merge.pdf?sfvrsn=6, Table 1.1
11. Mojave Desert Air Quality Management District, "Emissions Inventory Guidance, Mineral Handling and Processing Industries", Section G, Wind Erosion from Storage Piles, April 2000.
12. http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-d2020-4-0-full-merge.pdf?sfvrsn=6, Table 1.1 has 49 days with precipitation > 0.1 inches for Merced County.
13. Average per met data 2007 - 2010.
14. Organic TAC speciation is from: Kumar, Anuj, et. al., "Volatile organic compound emissions from green waste composting: Characterization and ozone formation", Atmospheric Environment, January 2011.

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Table 3: Grinding and Screening PM Emissions

Table 3a: Emission Factors

Process Operation	Value	
	PM10	PM2.5
Grinding	0.0144	0.00216
Screening	0.0144	0.00216

Table 3b: Grinding and Screening PM Emissions

Operation	Annual Throughput (ton/yr)	Peak Daily Throughput (ton/day)	Annual Emissions (lb/yr)		Average Daily Emissions (lb/day)		Average Hourly Emissions (lb/hr)	
			PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Grinding	75000	240	270.00	40.50	0.87	0.13	0.10	0.01
Screening	52500	168	189.00	28.35	0.61	0.09	0.07	0.01
		Total	459.00	68.85	1.47	0.22	0.16	0.02
		Total (TPY)	0.23	0.03				

Data and Parameters

Operating Hours	9	hrs/day
Control Efficiency for Watering	75%	Ref: 1

References:

1. Mojave Desert Air Quality Management District, "Emissions Inventory Guidance, Mineral Handling and Processing Industries", Material Handling Table 5, April 2000.

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Table 4: Material Handling PM Emissions

Table 4: Material Handling PM Emissions

Process Step	Annual Throughput (ton/yr)	Average Daily Throughput (ton/day)	No. of Drop Points	Annual Emissions (lb/yr)		Average Daily Emissions (lb/day)		Average Hourly Emissions (lb/hr)	
				PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Feedstock	75,000	240	1	24.15	3.66	0.08	0.01	0.009	0.001
Grinding	75,000	240	2	48.30	7.31	0.15	0.02	0.017	0.003
Composting	75,000	240	1	24.15	3.66	0.08	0.01	0.009	0.001
Curing	60,000	192	1	19.32	2.93	0.06	0.01	0.007	0.001
Screening	52,500	168	2	33.81	5.12	0.11	0.02	0.012	0.002
Finished Compost Storage	45,000	144	1	14.49	2.19	0.05	0.01	0.005	0.001
Truck Loadout	45,000	144	1	14.49	2.19	0.05	0.01	0.005	0.001
			Total (lb/yr)	178.69	27.06	0.57	0.09	0.06	0.01
			Total (TPY)	0.09	0.01				

Data and Parameters

Operating Schedule	9	hr/day
Days per year	312	day/yr
PM10 EF	3.22E-04	lb/ton/drop
PM2.5 EF	4.88E-05	lb/ton/drop

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Table 5: Wind Erosion PM Emissions

Table 5a: Wind Erosion Dimensions/Area

Area	Acres
Receiving/Greenwaste Storage	2
Composting	4
Curing	2
Finished Compost Storage	2

Table 5b: Wind Erosion PM Emission Factors

Variable	PM10 lb/acre/day	PM2.5 lb/acre/day
Inactive Day Wind Erosion EF	1.37E-01	5.50E-02

Table 5c: Wind Erosion PM Emissions

Area	Acres	Operating Days	Annual Emissions (lb/yr)		Average Daily Emissions (lb/day)		Average Hourly Emissions (lb/hr)	
			PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Feedstock Storage	2.00	365	25.08	10.03	0.07	0.03	0.00	0.00
Composting	4.00	365	50.16	20.06	0.14	0.05	0.01	0.00
Curing	2.00	365	25.08	10.03	0.07	0.03	0.00	0.00
Finished Compost Storage	2.00	365	25.08	10.03	0.07	0.03	0.00	0.00
		Total	125.39	50.16	0.34	0.14	0.01	0.01
		Total (TPY)	0.06	0.03				

Data and Parameters	Value	UOM	Notes:
1. Control by watering per MDAQMD Mineral Guidance	75%		All piles are watered for dust suppression or moisture control, or both.
	52	weeks/yr	Constant
Days per year	365	day/yr	Constant
Constant	24	hr/day	Constant
Conversion	43560	ft^2/acre	Constant

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Table 6: Composting VOC Emissions

Table 6: Composting VOC Emissions

Process Unit	Annual Throughput (ton/yr)	Average Daily Throughput (ton/day)	Emission Factor	Annual Emissions (lb/yr)	Average Daily Emissions (lb/day)	Average Hourly Emissions (lb/hr)
Feedstock Storage	75,000	240	0.2 lb/wet ton/day	30,000	82.19	3.42
Composting	75,000	240	0.22 lb/ton	16,500	45.21	1.88
Curing	75,000	160	0.022 lb/ton	1,650	4.52	0.19
Finished Compost Storage	45,000	144	0.02 lb/ton	900	2.47	0.10
			Total (lb/yr)	49,050	134.38	5.60
			Total (TPY)	24.525		

Data and Parameters			Notes
Daily Hours of Emissions	24	hr/day	Constant
Feedstock Storage Duration	2	days	Project Description
Raw Material Processed in Receiving Storage	100%		Assumption
Days per year	365	days per year	

Table 7: Summary of Emissions

Table 7a: Summary of Daily Criteria Pollutant Emissions

Activity	NOx (lb/day)	VOC (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
3. Composting/Curing	---	134.38	---	---	---	---
4. Grind and Screen	---	---	---	---	1.47	0.22
5. Material Handling	---	---	---	---	0.57	0.09
6. Wind Erosion	---	---	---	---	0.34	0.14
Total	0.00	134.38	0.00	0.00	2.39	0.44

Table 7b: Summary of Annual Criteria Pollutant Emissions

Activity	NOx (lb/yr)	VOC (lb/yr)	CO (lb/yr)	SOx (lb/yr)	PM10 (lb/yr)	PM2.5 (lb/yr)
3. Composting/Curing	---	49050.00	---	---	---	---
4. Grind and Screen	---	---	---	---	459.00	68.85
5. Material Handling	---	---	---	---	178.69	27.06
6. Wind Erosion	---	---	---	---	125.39	50.16
Total	0.00	49050.00	0.00	0.00	763.08	146.06
Total (TPY)	0.00	24.53	0.00	0.00	0.38	0.07

Note:

1. CO_2 emissions from composting are not calculated because the CO_2 is biogenic and, therefore, part of the natural carbon cycle.

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Table 8: TAC from Composting Dust

Table 8a: Material Handling and Wind Erosion Dust Emissions

Source	lb/hr	lb/yr
Grinding and Screening	0.16	459.00
Material Handling	0.06	178.69
Wind Erosion	0.01	125.39
Total PM10	**0.24**	**763.08**

Table 8b: TAC from Material Handling and Wind Erosion

TAC	Concentration (lb/lb Dust)	TAC Emissions (lb/hr)	TAC Emissions (lb/yr)
Arsenic	6.20E-06	1.50E-06	4.73E-03
Cadmium	2.00E-06	4.83E-07	1.53E-03
Hexavalent Chrome	2.45E-06	5.91E-07	1.87E-03
Cobalt	8.80E-06	2.12E-06	6.72E-03
Copper	6.90E-05	1.67E-05	5.27E-02
Lead	2.00E-04	4.83E-05	1.53E-01
Manganese	4.40E-04	1.06E-04	3.36E-01
Mercury	1.00E-06	2.41E-07	7.63E-04
Nickel	9.50E-05	2.29E-05	7.25E-02
Selenium	1.00E-06	2.41E-07	7.63E-04
			0.630

Notes:

1. SJVAPCD Toxic Emission Factors for fugitive dust from "PM10 based Emissions from Operations generating Dust from Greenwaste Composting" (June 7, 2016), accessed: https://www.valleyair.org/busind/pto/emission_factors/emission_factors_idx.htm
2. Hexavalent chromium is assumed to be 5% of total chromium per SJVAPCD guidance.

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Table 9: NH3 Emissions

Table 9: NH3 Emissions

Process Unit	Annual Throughput (ton/yr)	Daily Throughput (ton/day)	Emission Factor (lb/ton)	Annual Emissions (lb/yr)	Hourly Emissions (lb/hr)
Feedstock Storage	75,000	240	0.0200 lb/ton/day	3,000	0.34
Composting	75,000	240	0.1780 lb/ton	13,350	1.52
Finished Compost Storage	45,000	144	0.0004 lb/ton	17	0.00
				16,367	1.87

Data and Parameters

Daily Hours of Emissions	24	hr/day
Days of feedstock storage	2	days
Annual hours of operation	8,760	hr/yr

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Table 10: Organic TAC Emissions

Table 10a: VOC Emissions

Feedstock Storage		Composting		Curing		Finished Compost Storage		Total	
(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)
3.42	30000.00	1.88	16,500	0.19	1,650	0.10	900	5.60	49,050

Table 10b: Organic TAC Emissions

TAC	Speciation[1]	Feedstock Storage		Composting		Curing		Finished Compost Storage		Total Project	
	(% wt)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)
Isopropyl alcohol	42.31	1.45	12693.00	0.80	6981.15	0.08	698.12	0.04	380.79	2.37	20753.06
Methanol	12.79	0.44	3837.00	0.24	2110.35	0.02	211.04	0.01	115.11	0.72	6273.50
Naphthalene	0.50	0.02	150.00	0.01	82.50	0.00	8.25	0.00	4.50	0.03	245.25
Propene	0.22	0.01	66.00	0.00	36.30	0.00	3.63	0.00	1.98	0.01	107.91
Acetylaldehyde	0.14	0.00	42.00	0.00	23.10	0.00	2.31	0.00	1.26	0.01	68.67
	Total		16788.00		9233.40		923.34		503.64		27448.38
	Total (TPY)		8.39		4.62		0.46		0.25		13.72

Notes:

1. Organic TAC speciation is from: Kumar, Anuj, et. al., "Volatile organic compound emissions from green waste composting: Characterization and ozone formation", Atmospheric Environment, January 2011.

APPENDIX D – BASELINE COMPOST FACILITY EMISSIONS

Agromin Merced
Baseline Mobile Source
Emission Calculations

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Table 1: Process Throughput

Table 1a: Process Throughput Compost Facility

Processing Step	Loss based on Initial Charge	Loss based on Previous Step	Baseline Throughput (TPY)	Baseline Throughput (TPD)
Initial Charge	---	---	11,330	36
Loss Upon Composting	20.0%	20%	9,064	29
Initial Charge to Secondary	---	---	9,064	29
Loss Upon Curing	10.0%	13%	7,931	25
Loss Upon Screening	10.0%	14%	6,798	22
Finished Product	---	---	6,798	22

Data and Parameters

Daily Operating Hours	9	hours/day
Raw Material quantity per truck	12	tons/truck
Raw Material truck count	945	Truck/year
Raw Material Receive Days	312	Day/year
Raw Material truck count	4	Truck/day
Compost quantity per truck	8	tons/truck
Compost delivery truck count	850	Truck/year
Compost shipment days	312	Day/year
Compost delivery truck count	3	Truck/day

Historic Throughput

Calendar Year	Throughput (TPY)
2022	9,344
2021	13,316
2020	16,345

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Table 2: Onroad Mobile Sources - Vehicle Information

Table 2a: Vehicle Information and Mileage Calculation

Vehicle Type	Vehicle Use	Vehicle Weight (lb)			Days	Veh/day	One-way Trips per Vehicle per Day	One-way Trips per Year	One-way Onsite Trip Mileage[1]	One-way Offsite Trip Mileage[2,3]	Total One-way Trip Mileage	Onsite Total VMT/yr	Offsite Total VMT/yr	Total VMT/yr
		Gross	Empty	Average										
LDT1	Supervisor	6,250	6,250	6,250	312	1	2	624	0.60	7	7.60	374	4,368	4,742
LDT1	Technical Staff	6,250	6,250	6,250	312	0	2	0	0.60	7	7.60	0	0	0
LDT1	Mechanic	6,250	6,250	6,250	312	1	2	624	0.60	7	7.60	374	4,368	4,742
LDT1	Equipment Operators	6,250	6,250	6,250	312	8	2	4,992	0.60	7	7.60	2,995	34,944	37,939
LDT1	Personnel for facility	6,250	6,250	6,250	312	1	2	624	0.60	7	7.60	374	4,368	4,742
LDT1	Miscellaneous Business	6,250	6,250	6,250	104	1	2	208	0.60	7	7.60	125	1,456	1,581
LDT1	Laboratory Services	6,250	6,250	6,250	104	0	2	0	0.60	7	7.60	0	0	0
LHD2	Delivery of Office Supplies	15,006	8,200	11,603	104	0	2	0	0.60	7	7.60	0	0	0
T7 Tractor	Ship Raw Material to Compost	47,000	23,000	35,000	312	4	2	2,496	0.60	50	50.60	1,498	124,800	126,298
T7 Tractor	Ship Finished Compost	39,000	23,000	31,000	312	3	2	1,872	0.60	50	50.60	1,123	93,600	94,723

Table 2b: Onsite/Offsite Vehicle Usage Information

Vehicle Type	Fuel	# Veh	Trips per Year	Onsite Total VMT/yr	Offsite Total VMT/yr	Total VMT/yr
LDT1	gasoline	12	7,072	4,243	49,504	53,747
LHD2	diesel	0	0	0	0	0
T7 Tractor	diesel	7	4,368	2,621	218,400	221,021

Notes:

1. Onsite mileage is the distance from the front gate of the landfill to the furthest point of the compost facility.

2. Mileage for employees based on the distance from **Merced** to the project site.

3. Mileage for raw material and finished compost shipment is the distance from the project site to the most distant of agricultural operatons in the County.

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Table 3: Onroad Mobile Sources Exhaust Emissions

Table 3a: Onroad Mobile Sources - Criteria Pollutant Exhaust Emissions

Pollutant	Vehicle Type	Running Exhaust EF (g/mile)	Idle EF (g/trip)	Start EF (g/trip)	Total Running Exhaust (lb/yr)	Total Idle (lb/yr)	Total Start (lb/yr)	Total Emissions (lb/yr)	Onsite Emissions (lb/yr)	Offsite Emissions (lb/yr)	Total Emissions (lb/day)	Onsite Emissions (lb/day)
NOx	LDT1	0.269	0.000	0.600	31.88	0.00	9.35	41.22	3.25	37.97	0.13	1.04E-02
	LHD2	0.089	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00E+00
	T7 Tractor	1.643	2.829	3.886	800.02	27.22	37.39	864.63	10.25	854.38	2.77	3.29E-02
VOC	LDT1	0.059	0.000	0.931	7.01	0.00	14.50	21.51	1.70	19.81	0.07	5.44E-03
	LHD2	0.020	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00E+00
	T7 Tractor	0.015	0.238	0.000	7.47	2.29	0.00	9.76	0.12	9.64	0.03	3.71E-04
CO	LDT1	2.797	0.000	8.792	331.16	0.00	136.95	468.11	36.96	431.15	1.50	1.18E-01
	LHD2	0.161	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00E+00
	T7 Tractor	0.086	3.473	0.000	42.03	33.41	0.00	75.44	0.89	74.55	0.24	2.87E-03
SOx	LDT1	0.003	0.000	0.001	0.41	0.00	0.02	0.43	0.03	0.39	0.00	1.08E-04
	LHD2	0.003	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00E+00
	T7 Tractor	0.015	0.006	0.000	7.23	0.05	0.00	7.28	0.09	7.20	0.02	2.77E-04
PM10	LDT1	0.003	0.000	0.004	0.31	0.00	0.07	0.38	0.03	0.35	0.00	9.63E-05
	LHD2	0.010	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00E+00
	T7 Tractor	0.023	0.001	0.000	11.35	0.01	0.00	11.37	0.13	11.23	0.04	4.32E-04
PM2.5	LDT1	0.002	0.000	0.004	0.29	0.00	0.06	0.35	0.03	0.32	0.00	8.86E-05
	LHD2	0.010	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00E+00
	T7 Tractor	0.022	0.001	0.000	10.86	0.01	0.00	10.87	0.13	10.74	0.03	4.13E-04

Table 3b: Onroad Mobile Sources - Fugitive ROG Emissions

Pollutant	Vehicle Type	Hot Soak EF (g/trip)	Running Loss EF (g/trip)	Diurnal EF (g/trip)	Total Hot Soak (lb/yr)	Total Running Loss (lb/yr)	Total Diurnal (lb/yr)	Total Emissions (lb/yr)	Onsite Emissions (lb/yr)	Offsite Emissions (lb/yr)	Total Emissions (lb/day)
VOC	LDT1	0.31	0.95	1.26	4.8	14.8	19.6	39.15	3.09	36.06	0.12
	LHD2	-	-	-	-	-	-	-	-	-	-
	T7 Tractor	-	-	-	-	-	-	-	-	-	-

Table 3c: Onroad Mobile Sources - Fugitive PM Emissions

Pollutant	Vehicle Type	Tire Wear (g/mile)	Break Wear (g/mile)	Total Tire Wear (lb/yr)	Total Break Wear (lb/yr)	Total Emissions (lb/yr)	Onsite Emissions (lb/yr)	Offsite Emissions (lb/yr)	Total Emissions (lb/day)
PM10	LDT1	0.0080	0.0092	0.95	1.09	2.04	0.16	1.88	0.007
	LHD2	0.0080	0.0084	0.00	0.00	0.00	0.00	0.00	0.000
	T7 Tractor	0.0360	0.0784	17.53	38.16	55.68	0.66	55.02	0.178
PM2.5	LDT1	0.0020	0.0032	0.24	0.38	0.62	0.05	0.57	0.002
	LHD2	0.0020	0.0029	0.00	0.00	0.00	0.00	0.00	0.000
	T7 Tractor	0.0090	0.0274	4.38	13.35	17.74	0.21	17.53	0.057

Table 3d: Summary of Criteria Pollutant Emissions from Onroad Operations Vehicles

Type	NO_x (lb/yr)	ROG (lb/yr)	CO (lb/yr)	SO_x (lb/yr)	PM_{10} (lb/yr)	$PM_{2.5}$ (lb/yr)
Exhaust	905.85	31.27	543.55	7.71	11.75	11.22
Fugitive	---	39.15	---	---	57.72	18.36
Total (Lb/Yr)	905.85	70.42	543.55	7.71	69.47	29.58
Total (TPY)	0.45	0.04	0.27	0.00	0.03	0.01

Table 3e: Onroad Mobile Sources - Greenhouse Gas Exhaust Emissions

Pollutant	Vehicle Type	Running Exhaust EF (g/mile)	Idle EF (g/trip)	Start EF (g/trip)	Total Running Exhaust (MT/yr)	Total Idle (MT/yr)	Total Start (MT/yr)	Total Emissions (MT/yr)
CO2	LDT1	351.164	0.000	97.732	18.9	0.000	0.7	20
	LHD2	302.343	0.000	0.000	0.0	0.000	0.0	0
	T7 Tractor	1568.355	582.644	0.000	346.6	2.545	0.0	349
CH4	LDT1	0.013	0.000	0.169	0.0	0.000	0.00	0.00
	LHD2	0.001	0.000	0.000	0.0	0.000	0.00	0.00
	T7 Tractor	0.001	0.011	0.000	0.0	0.000	0.00	0.00
N2O	LDT1	0.018	0.000	0.049	0.00	0.000	0.00	0.00
	LHD2	0.048	0.000	0.000	0.00	0.000	0.00	0.00
	T7 Tractor	0.247	0.092	0.000	0.05	0.000	0.00	0.06
CO2e	LDT1							20
	LHD2							0
	T7 Tractor							366
	Total							**386**

Table 3f: GHG Emissions from Onroad Mobile Source Activity

CO_2 (MT/Yr)	CH_4 (Kg/Yr)	N_2O (Kg/Yr)	Total CO_2e (MT/Yr)
369	2.10	56.32	386

Table 3g: Global Warming Potential

Pollutant	GWP
CO2	1
CH4	25
N2O	298

Notes:

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Table 4: Onroad Mobile Source Paved Road Dust

Table 4a: Paved Road PM_{10} Emission Factors[1]

Vehicle	Average Vehicle Weight (ton)	Pollutant	Freeway (lb/VMT)	Major (lb/VMT)	Collector (lb/VMT)	Local (lb/VMT)	Rural/Onsite (lb/VMT)
		$sL\ (g/m^2)^2$ -->	0.020	0.035	0.035	0.320	1.600
Fleet Average	2.40	PM10	1.48E-04	2.46E-04	2.46E-04	1.84E-03	7.97E-03
		PM2.5	3.70E-05	6.15E-05	6.15E-05	4.61E-04	1.99E-03

$$E = k\,(sL)^{0.91} \times (W)^{1.02} * C_f$$

Variable	Value	UOM
k (PM10)	1.00	g/VMT
k(PM2.5)	0.25	g/VMT
Rain Days[3]	49	day/yr
C_f	0.966	

Table 4b: Fraction of VMT by Functional Type of Roadway[2]

Freeway	Major	Collector	Local	Rural
33.25%	38.97%	27.59%	0.20%	note 4

Table 4c: Summary of Onroad VMT by Phase and Road Type

EMFAC Vehicle Type	Activity	Unit of Measure	Freeway	Major	Collector	Local	Rural	Total Offsite	Onsite	Total VMT
LDT1	Supervisor	VMT/day	4.66	5.46	3.86	0.03	0.50	15	1.2	16
		VMT/Yr	1,452	1,702	1,205	8.74	156.00	4,368	374	4,742
LDT1	Technical Staff	VMT/day	0.00	0.00	0.00	0.00	0.00	0	0	0
		VMT/Yr	0	0	0	0.00	0.00	0	0	0
LDT1	Mechanic	VMT/day	5	5	4	0.03	0.50	15	1.2	16
		VMT/Yr	1,452	1,702	1,205	8.74	156.00	4,368	374	4,742
LDT1	Equipment Operators	VMT/day	37	44	31	0.22	4.00	116	9.6	126
		VMT/Yr	11,619	13,618	9,641	69.89	1248.00	34,944	2,995	37,939
LDT1	Personnel for facility	VMT/day	5	5	4	0.03	0.50	15	1.2	16
		VMT/Yr	1,452	1,702	1,205	8.74	156.00	4,368	374	4,742
LDT1	Miscellaneous Business	VMT/day	5	5	4	0.03	0.50	15	1.2	16
		VMT/Yr	484	567	402	2.91	52.00	1,456	125	1,581
LDT1	Laboratory Services	VMT/day	0	0	0	0.00	0.00	0	0	0
		VMT/Yr	0	0	0	0.00	0.00	0	0	0
LHD2	Delivery of Office Supplies	VMT/day	0	0	0	0.00	0.00	0	0	0
		VMT/Yr	0	0	0	0.00	0.00	0	0	0
T7 Tractor	Ship Raw Material to Compost	VMT/day	133	156	110	0.80	2.00	402	4.8	407
		VMT/Yr	41,496	48,635	34,432	249.60	624.00	124,800	1,498	126,298
T7 Tractor	Ship Finished Compost	VMT/day	100	117	83	0.60	1.50	302	3.6	305
		VMT/Yr	31,122	36,476	25,824	187	468	93,600	1,123	94,723

Table 4d: Entrained Road Dust Emissions from Travel on Paved Roads (lb/day)

EMFAC Vehicle Type	Activity	Pollutant	Freeway	Major	Collector	Local	Rural	Onsite	Total
LDT1	Supervisor	PM10	6.88E-04	1.34E-03	9.50E-04	5.16E-05	3.99E-03	9.57E-03	1.66E-02
		PM2.5	1.72E-04	3.36E-04	2.38E-04	1.29E-05	9.97E-04	2.39E-03	4.15E-03
LDT1	Technical Staff	PM10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		PM2.5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
LDT1	Mechanic	PM10	6.88E-04	1.34E-03	9.50E-04	5.16E-05	3.99E-03	9.57E-03	1.66E-02
		PM2.5	1.72E-04	3.36E-04	2.38E-04	1.29E-05	9.97E-04	2.39E-03	4.15E-03
LDT1	Equipment Operators	PM10	5.51E-03	1.07E-02	7.60E-03	4.13E-04	3.19E-02	7.66E-02	1.33E-01
		PM2.5	1.38E-03	2.68E-03	1.90E-03	1.03E-04	7.97E-03	1.91E-02	3.32E-02
LDT1	Personnel for facility	PM10	6.88E-04	1.34E-03	9.50E-04	5.16E-05	3.99E-03	9.57E-03	1.66E-02
		PM2.5	1.72E-04	3.36E-04	2.38E-04	1.29E-05	9.97E-04	2.39E-03	4.15E-03
LDT1	Miscellaneous Business	PM10	6.88E-04	1.34E-03	9.50E-04	5.16E-05	3.99E-03	9.57E-03	1.66E-02
		PM2.5	1.72E-04	3.36E-04	2.38E-04	1.29E-05	9.97E-04	2.39E-03	4.15E-03
LDT1	Laboratory Services	PM10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		PM2.5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
LHD2	Delivery of Office Supplies	PM10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		PM2.5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
T7 Tractor	Ship Raw Material to Compost	PM10	1.97E-02	3.84E-02	2.72E-02	1.47E-03	1.59E-02	3.83E-02	1.41E-01
		PM2.5	4.92E-03	9.59E-03	6.79E-03	3.69E-04	3.99E-03	9.57E-03	3.52E-02
T7 Tractor	Ship Finished Compost	PM10	1.47E-02	2.88E-02	2.04E-02	1.11E-03	1.20E-02	2.87E-02	1.06E-01
		PM2.5	3.69E-03	7.19E-03	5.09E-03	2.77E-04	2.99E-03	7.18E-03	2.64E-02
Total	All	PM10	0.04	0.08	0.06	0.00	0.08	0.18	0.45
		PM2.5	0.01	0.02	0.01	0.00	0.02	0.05	0.11

Table 4e: Entrained Road Dust Emissions from Travel on Paved Roads (lb/yr)

EMFAC Vehicle Type	Activity	Pollutant	Freeway	Major	Collector	Local	Rural	Onsite	Total
LDT1	Supervisor	PM10	0.21	0.42	0.30	0.02	1.24	2.99	5.18
		PM2.5	0.05	0.10	0.07	0.00	0.31	0.75	1.29
LDT1	Technical Staff	PM10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		PM2.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LDT1	Mechanic	PM10	0.21	0.42	0.30	0.02	1.24	2.99	5.18
		PM2.5	0.05	0.10	0.07	0.00	0.31	0.75	1.29
LDT1	Equipment Operators	PM10	1.72	3.35	2.37	0.13	9.95	23.88	41.41
		PM2.5	0.43	0.84	0.59	0.03	2.49	5.97	10.35
LDT1	Personnel for facility	PM10	0.21	0.42	0.30	0.02	1.24	2.99	5.18
		PM2.5	0.05	0.10	0.07	0.00	0.31	0.75	1.29
LDT1	Miscellaneous Business	PM10	0.07	0.14	0.10	0.01	0.41	1.00	1.73
		PM2.5	0.02	0.03	0.02	0.00	0.10	0.25	0.43
LDT1	Laboratory Services	PM10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		PM2.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LHD2	Delivery of Office Supplies	PM10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		PM2.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T7 Tractor	Ship Raw Material to Compost	PM10	6.14	11.97	8.47	0.46	4.98	11.94	43.95
		PM2.5	1.53	2.99	2.12	0.12	1.24	2.99	10.99
T7 Tractor	Ship Finished Compost	PM10	4.60	8.98	6.35	0.35	3.73	8.96	32.96
		PM2.5	1.15	2.24	1.59	0.09	0.93	2.24	8.24
Total	All	PM10	13.17	25.69	18.19	0.99	22.81	54.73	135.58
		PM2.5	3.29	6.42	4.55	0.25	5.70	13.68	33.89

Notes:

1. Methodology per AP-42, 13.2.1 Paved Roads
2. SJVAPCD, Appendix A: Comments and Responses Rule 9510 and 3180 December 15, 2005

3. http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-d2020-4-0-full-merge.pdf?sfvrsn=6, Table 1.1 has 49 days with precipitation > 0.1 inches for Merced County.
4. Rural is assumed to be 0.25 miles.

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Table 5: Site (Access/Egress) Fugitive Dust From Travel on Unpaved Roads

Table 5a: Unpaved Road Emission Factors[1]

EMFAC Vehicle Type	Activity	PM Emission Factors[2,3] (lb/VMT)	
		PM10	PM2.5
LDT1	Supervisor	0.8677	0.0868
LDT1	Technical Staff	0.8677	0.0868
LDT1	Mechanic	0.8677	0.0868
LDT1	Equipment Operators	0.8677	0.0868
LDT1	Personnel for facility	0.8677	0.0868
LDT1	Miscellaneous Business	0.8677	0.0868
LDT1	Laboratory Services	0.8677	0.0868
LHD2	Delivery of Office Supplies	1.1462	0.1146
T7 Tractor	Ship Raw Material to Compost	1.8839	0.1884
T7 Tractor	Ship Finished Compost	1.7838	0.1784

Variable	Value	UOM
Road Silt Content	6.4	%
Rain Days[4]	49.0	day/year

Table 5b: Vehicle Miles Travelled for Transport of Personnel, Supplies, Materials and Product

EMFAC Vehicle Type	Activity	Vehicle Weight (ton)			No. of days	Veh/day	Trips/Day	Trips/Year	Miles per Trip	Total VMT[5] (mi/day)	Total VMT[5] (mi/yr)
		Gross	Empty	Average							
LDT1	Supervisor	3.13	3.13	3.13	312	1	2	624	0.6	1.2	374
LDT1	Technical Staff	3.13	3.13	3.13	312	0	2	0	0.6	0	0
LDT1	Mechanic	3.13	3.13	3.13	312	1	2	624	0.6	1.2	374
LDT1	Equipment Operators	3.13	3.13	3.13	312	8	2	4,992	0.6	9.6	2,995
LDT1	Personnel for facility	3.13	3.13	3.13	312	1	2	624	0.6	1.2	374
LDT1	Miscellaneous Business	3.13	3.13	3.13	104	1	2	208	0.6	1.2	125
LDT1	Laboratory Services	3.13	3.13	3.13	104	0	2	0	0.6	0	0
LHD2	Delivery of Office Supplies	7.50	4.10	5.80	104	0	2	0	0.6	0	0
T7 Tractor	Ship Raw Material to Compost	23.50	11.50	17.50	312	0	2	2,496	0.6	0	1,498
T7 Tractor	Ship Finished Compost	19.50	11.50	15.50	312	3	2	1,872	0.6	3.6	1,123

Table 5c: Entrained Road Dust from Unpaved Roads

EMFAC Vehicle Type	Activity	Uncontrolled (lb/day)		Controlled (lb/day)		Uncontrolled (lb/yr)		Controlled (lb/yr)	
		PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
LDT1	Supervisor	1.04	0.10	0.47	0.05	324.87	32.49	146.19	14.62
LDT1	Technical Staff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LDT1	Mechanic	1.04	0.10	0.47	0.05	324.87	32.49	146.19	14.62
LDT1	Equipment Operators	8.33	0.83	3.75	0.37	2,598.93	259.89	1,169.52	116.95
LDT1	Personnel for facility	1.04	0.10	0.47	0.05	324.87	32.49	146.19	14.62
LDT1	Miscellaneous Business	1.04	0.10	0.47	0.05	108.29	10.83	48.73	4.87
LDT1	Laboratory Services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LHD2	Delivery of Office Supplies	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T7 Tractor	Ship Raw Material to Compost	0.00	0.00	0.00	0.00	2,821.30	282.13	1,269.58	126.96
T7 Tractor	Ship Finished Compost	6.42	0.64	2.89	0.29	2,003.51	200.35	901.58	90.16
Total		18.9	1.9	8.5	0.9	8,506.6	850.7	3,828.0	382.8
Total (ton/yr)						4.3	0.4	1.9	0.2

Control Efficiency for Watering Roadways[b] 55%

Notes:

1. EPA AP-42 5th Edition, Chapter 13, Section 13.2.2, Equation 1a.
2. MISCELLANEOUS PROCESS METHODOLOGY 7.9 Entrained Road Travel, Paved Road Dust (Revised and updated, November 2016), https://ww3.arb.ca.gov/ei/areasrc/fullpdf/full7-9_2016.pdf
3. Because daily emissions are being calculated, and it does not rain daily, the rain correction factor has been omitted from the calculation.
4. http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-d2020-4-0-full-merge.pdf?sfvrsn=6, Table 1.1 has 49 days with precipitation > 0.1 inches for Merced County.
5. The access roads are currently unpaved.
6. Assumes twice daily watering; http://www.aqmd.gov/docs/default-source/ceqa/handbook/mitigation-measures-and-control-efficiencies/fugitive-dust/fugitive-dust-table-xi-d.doc?sfvrsn=2

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Table 6: Offroad Equipment - Criteria Pollutant and GHG Emissions

Table 6a: Emission Factors

Unit Count	Offroad Equipment	Typical Model (or Equivalent)	Engine Tier and Information				NOx (g/BHp-hr)	VOC (g/BHp-hr)	CO (g/BHp-hr)	SOx (g/BHp-hr)	PM10 (g/BHp-hr)	PM2.5 (g/BHp-hr)	CO2 (kg/gal)	CH4 (g/gal)	N2O (g/gal)
			Tier	BHp	BSFC (lb/hp-hr)	Op Load[1]									
1	Fuel Truck	Freightliner M2106	4f	350	0.3602	0.38	0.30	0.14	2.60	0.005	0.010	0.010	10.210	0.410	0.080
1	Tractors	Massey Fergusen, 7619	4f	200	0.3602	0.37	0.30	0.14	2.60	0.005	0.010	0.010	10.210	0.410	0.080
1	Excavator	Caterpillar 326	4f	201	0.3602	0.38	0.30	0.14	2.60	0.005	0.010	0.010	10.210	0.410	0.080
3	Loader	Caterpillar, 962K	4f	250	0.3602	0.37	0.30	0.14	2.60	0.005	0.010	0.010	10.210	0.410	0.080
1	Water Truck	International, 7400 6x4	4f	350	0.3602	0.38	0.30	0.14	2.60	0.005	0.010	0.010	10.210	0.410	0.080
1	Sweeper Truck	Freightliner M2	4f	240	0.3602	0.46	0.30	0.14	2.60	0.005	0.010	0.010	10.210	0.410	0.080

Table 6b: Total Criteria Pollutant Emissions from Offroad Equipment

Unit Count	Offroad Equipment	Typical Model (or Equivalent)	Engine Characteristics				Criteria Pollutant Exhaust Emissions (lb/day)					
			BHp	Op Load[1]	Hr/Day	Hr/Yr	NOx	VOC	CO	SOx	PM10	PM2.5
1	Fuel Truck	Freightliner M2106	350	0.38	2.00	624	0.18	0.08	1.52	0.00	0.01	0.01
1	Tractors	Massey Fergusen, 7619	200	0.37	9.00	2,808	0.44	0.21	3.82	0.01	0.01	0.01
1	Excavator	Caterpillar 326	201	0.38	9.00	2,808	0.45	0.21	3.94	0.01	0.02	0.02
3	Loader	Caterpillar, 962K	250	0.37	9.00	2,808	1.65	0.77	14.32	0.03	0.06	0.06
1	Water Truck	International, 7400 6x4	350	0.38	9.00	2,808	0.79	0.37	6.86	0.01	0.03	0.03
1	Sweeper Truck	Freightliner M2	240	0.46	9.00	2,808	0.66	0.31	5.70	0.01	0.02	0.02
Total Emissions from offroad equipment (lb/day)							4.17	1.95	36.15	0.07	0.14	0.14

Table 6c: Total Criteria Pollutant Emissions from Offroad Equipment

Unit Count	Offroad Equipment	Typical Model (or Equivalent)	Engine Characteristics				Criteria Pollutant Exhaust Emissions (lb/yr)					
			BHp	Op Load[1]	Hr/Day	Hr/Yr	NOx	VOC	CO	SOx	PM10	PM2.5
1	Fuel Truck	Freightliner M2106	350	0.38	2.00	624	54.89	25.61	475.70	0.90	1.83	1.83
1	Tractors	Massey Fergusen, 7619	200	0.37	9.00	2,808	137.43	64.13	1,191.05	2.25	4.58	4.58
1	Excavator	Caterpillar 326	201	0.38	9.00	2,808	141.85	66.20	1,229.35	2.32	4.73	4.73
3	Loader	Caterpillar, 962K	250	0.37	9.00	2,808	515.36	240.50	4,466.43	8.42	17.18	17.18
1	Water Truck	International, 7400 6x4	350	0.38	9.00	2,808	247.00	115.27	2,140.67	4.04	8.23	8.23
1	Sweeper Truck	Freightliner M2	240	0.46	9.00	2,808	205.03	95.68	1,776.91	3.35	6.83	6.83
Total Emissions from offroad equipment (lb/yr)							1,301.55	607.39	11,280.12	21.27	43.39	43.39
Total Emissions from offroad equipment (TPY)							0.65	0.30	5.64	0.01	0.02	0.02

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Baseline Mobile Source
Emission Calculations

Table 6d: Offroad Equipment - GHG Emissions[2]

Unit Count	Offroad Equipment	Typical Model (or Equivalent)	Engine Information				Fuel (gal/yr)	CO2 (MT/yr)	CH4 (kg/yr)	N2O (kg/yr)	CO2e (MT/Yr)
			Tier	BHp	BSFC (lb/hp-hr)	Op Load[1]					
1	Fuel Truck	Freightliner M2106	4f	350	0.3602	0.38	4,240	43	2	0	43
1	Tractors	Massey Fergusen, 7619	4f	200	0.3602	0.37	10,617	108	4	1	109
1	Excavator	Caterpillar 326	4f	201	0.3602	0.38	10,959	112	4	1	112
3	Loader	Caterpillar, 962K	4f	250	0.3602	0.37	39,814	407	16	3	408
1	Water Truck	International, 7400 6x4	4f	350	0.3602	0.38	19,082	195	8	2	195
1	Sweeper Truck	Freightliner M2	4f	240	0.3602	0.46	15,840	162	6	1	162
Total GHG Exhaust Emissions from Equipment			----	----	----	----	100,552	1,027	41	8	1,030

Table 6e: Brake Specific Fuel Consumption (BSFC) Conversion

Parameter	Value	Unit of Measure	Basis
BSFC	7000	btu/hp-hr	Per EPA AP-42 Table 3,3-1, Footnote a
Heat Content	137,000	btu/gal	SDS
Density	7.05	lb/gal	SDS
Heat Content	19432.62	Btu/lb	calculated
BSFC	0.3602	lb/hp-hr	calculated

Table 6f: Global Warming Potential

Pollutant	GWP
CO2	1
CH4	25
N2O	298

Data and Parameters

Operating Days	312	day/yr

Notes:

1. http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-d2020-4-0-full-merge.pdf?sfvrsn=6, Table 3.3.

2. Solid, gaseous, liquid and biomass fuels: Federal Register (2009) EPA; 40 CFR Parts 86, 87, 89 et al; Mandatory Reporting of Greenhouse Gases; Final Rule , 30Oct09, 261 pp. Tables C-1 and C-2 at FR pp. 56409-56410. Revised emission factors for selected fuels: Federal Register (2010) EPA; 40 CFR Part 98; Mandatory Reporting of Greenhouse Gases; Final Rule, 17Dec10, 81 pp. With Amendments from Memo: Table of Final 2013 Revisions to the Greenhouse Gas Reporting Rule (PDF) to 40 CFR part 98, subpart C: Table C–1 to Subpart C—Default CO2 Emission Factors and High Heat Values for Various Types of Fuel and Table C–2 to Subpart C—Default CH4 and N2O Emission Factors for Various Types of Fuel.

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Table 7: Fugitive Dust From Offroad Equipment Travel on Unpaved Areas and Haul Roads[1]

Table 7a: EPA Predictive Emission Factors for Offroad Equipment[2]

No. of Units	Equipment Description and Use		PM Emission Factors[3] (lb/VMT)	
			PM10	PM2.5
1	Fuel Truck	Freightliner M2106	2.0667	0.2067
1	Tractors	Massey Fergusen, 7619	1.3171	0.1317
1	Excavator	Caterpillar 326	2.3481	0.2348
3	Loader	Caterpillar, 962K	2.1106	0.2111
1	Water Truck[4]	International, 7400 6x4	0.0000	0.0000
1	Sweeper Truck[4]	Freightliner M2	0.0000	0.0000

Variable	Value	UOM
Road Silt Content	6.4	%
Rain Days[5]	49.0	day/year

Table 7b: Onsite Equipment Tonnage, Operating Hours, and VMT

No. of Units	Equipment Description and Use		GVW (tons)	Empty (tons)	Average (tons)	Operating Hours (hr/day)	Operating Hours (hr/yr)	Ave. Speed[4] (MPH)	Total Travel (VMT/day)	Total Travel (VMT/yr)
1	Fuel Truck	Freightliner M2106	31.5	11.5	21.5	2.0	624	2.0	4.0	1,248
1	Tractors	Massey Fergusen, 7619	7.9	7.9	7.9	9.0	2,808	0.3	2.7	842
1	Excavator	Caterpillar 326	28.6	28.6	28.6	9.0	2,808	0.3	2.7	842
3	Loader	Caterpillar, 962K	22.5	22.5	22.5	9.0	2,808	0.3	8.1	2,527
1	Water Truck	International, 7400 6x4	31.5	11.5	21.5	9.0	2,808	3.0	27.0	8,424
1	Sweeper Truck	Freightliner M2	16.5	16.5	16.5	9.0	2,808	3.0	27.0	8,424

Table 7c: Offroad Equipment Unpaved Road Dust Emissions

No. of Units	Equipment Description and Use		Uncontrolled (lb/day)		Controlled (lb/day)		Uncontrolled (lb/yr)		Controlled (lb/yr)	
			PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
1	Fuel Truck	Freightliner M2106	8.27	0.83	1.15	0.11	2579	258	357	36
1	Tractors	Massey Fergusen, 7619	3.56	0.36	0.49	0.05	1110	111	154	15
1	Excavator	Caterpillar 326	6.34	0.63	0.88	0.09	1978	198	274	27
3	Loader	Caterpillar, 962K	17.10	1.71	2.37	0.24	5334	533	739	74
1	Water Truck	International, 7400 6x4	0.00	0.00	0.00	0.00	0	0	0	0
1	Sweeper Truck	Freightliner M2	0.00	0.00	0.00	0.00	0	0	0	0
Total Dust from Equip. On Unpaved Areas (Lb/Day or Lb/Year)			35.26	3.53	4.89	0.49	11001	1100	1525	152
Total Dust from Equip. On Unpaved Areas (Ton/Year)			---	---	---	---	5.5	0.6	0.8	0.1

Overall Control Efficiency[6]	86%	
Control for watering	55%	Ref 6
Control for vehicle speed	44%	Ref 6
Control for sweeping	45%	Ref 7

Notes:

1. Although compost surfaces are paved, because the compost processing areas are expected to have compost residuals covering the active surfaces, the unpaved road calculations are used to estimate emissions.
2. EPA AP-42 5th Edition, Chapter 13, Section 13.2.2, Equation 1a.
3. Because daily emissions are being calculated, and it does not rain daily, the rain correction factor has been omitted from the calculation.
4. Entrained road dust is assumed to be negligible for the water truck due to watering and the sweeper truck due to watering and sweeping.
5. http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-d2020-4-0-full-merge.pdf?sfvrsn=6, Table 1.1 has 49 days with precipitation > 0.1 inches for Merced County.
6. Assumes twice daily watering and limiting travel speed to 25 mph; http://www.aqmd.gov/docs/default-source/ceqa/handbook/mitigation-measures-and-control-efficiencies/fugitive-dust/fugitive-dust-table-xi-d.doc?sfvrsn=2.
7. Chow, Judith C., et. al., "Evaluation of Regenerative-air Vacuum Street Sweeping on Geological Contributions to PM10", Journal of the Air & Waste Management Association, published online 06 Mar 2012.

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Table 8: Summary of Emissions

Table 8a: Summary of Daily Criteria Pollutant Emissions

Activity	NOx (lb/day)	VOC (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
3. Onroad Vehicle Exhaust	2.90	0.22	1.74	0.02	0.22	0.09
4. Onroad Vehicle Paved Road Dust	---	---	---	---	0.45	0.11
5. Onroad Vehicle Unpaved Road Dust	---	---	---	---	8.51	0.85
6. Offroad Equipment Exhaust	4.17	1.95	36.15	0.07	0.14	0.14
7. Offroad Equipment Unpaved Dust	---	---	---	---	4.89	0.49
Total	7.08	2.16	37.90	0.09	14.21	1.69

Table 8b: Summary of Annual Criteria Pollutant Emissions

Activity	NOx (lb/yr)	VOC (lb/yr)	CO (lb/yr)	SOx (lb/yr)	PM10 (lb/yr)	PM2.5 (lb/yr)
3. Onroad Vehicle Exhaust	906	70	544	8	69	30
4. Onroad Vehicle Paved Road Dust	---	---	---	---	136	34
5. Onroad Vehicle Unpaved Road Dust	---	---	---	---	3828	383
6. Offroad Equipment Exhaust	1302	607	11280	21	43	43
7. Offroad Equipment Unpaved Dust	---	---	---	---	1525	152
Total	2207	678	11824	29	5601	642
Total (TPY)	1.10	0.34	5.91	0.01	2.80	0.32

Table 8c: Summary of Annual GHG Emissions

Activity	CO2 (MT/yr)	CH4 (MT/yr)	N2O (MT/yr)	CO2e (MT/Yr)
3. Onroad Vehicle Exhaust	369	0.0	0.1	386
4. Onroad Vehicle Paved Road Dust	---	---	---	---
5. Onroad Vehicle Unpaved Road Dust	---	---	---	---
6. Offroad Equipment Exhaust	1027	41	8	1030
7. Offroad Equipment Unpaved Dust	---	---	---	---
Total	**1395**	**41**	**8**	**1416**

Notes:

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Table 9: Diesel and Gasoline Vehicle TAC Emissions

Table 9a: DPM Emissions

Vehicle	PM10 Emissions (lb/hr)		PM10 Emissions (lb/day)		PM10 Emissions (lb/yr)	
	Onsite Exhaust	Nearsite Exhaust[1,2]	Onsite Exhaust	Nearsite Exhaust[1,2]	Onsite Exhaust	Nearsite Exhaust[1,2]
LHD2	0.000	0.000	0.000	0.000	0.000	0.000
T7 Tractor	0.004	0.006	0.036	0.056	0.135	0.040
Fuel Truck	0.001	0.000	0.006	0.000	1.830	0
Tractors	0.002	0.000	0.015	0.000	4.581	0
Excavator	0.002	0.000	0.015	0.000	4.728	0
Loader	0.006	0.000	0.055	0.000	17.179	0
Water Truck	0.003	0.000	0.026	0.000	8.233	0
Sweeper Truck	0.002	0.000	0.022	0.000	6.834	0
Total PM10 = DPM	0.019	0.006	0.175	0.056	43.520	0.040

Table 9b: Gasoline Vehicle Mileage and Fuel Consumption

Parameter	Onsite	Near-site[3]
VMT/Day	14	11
Fuel Consumption (gal/day)	0.84	0.70

Average Fuel Economy Light Truck[4] 16.20 MPG

Table 9c: TAC Emissions from Onroad Gasoline Vehicles

TAC	CAS#	Emission Factor[5] (lb/1000-gal)	Onsite (lb/day)	Near-site (lb/day)	Onsite (lb/yr)	Near-site (lb/yr)	Total (lb/hr)	Total (lb/day)	Total lb/yr)
1,2,4-Trimethylbenzene	95636	5.89E-01	4.945E-04	4.121E-04	1.543E-01	1.286E-01	1.01E-04	9.07E-04	2.83E-01
1,3-Butadiene	106990	3.24E-01	2.720E-04	2.267E-04	8.486E-02	7.072E-02	5.54E-05	4.99E-04	1.56E-01
Acetaldehyde	75070	1.47E-01	1.234E-04	1.028E-04	3.850E-02	3.209E-02	2.51E-05	2.26E-04	7.06E-02
Acrolein	107028	8.25E-02	6.926E-05	5.772E-05	2.161E-02	1.801E-02	1.41E-05	1.27E-04	3.96E-02
Benzene	71432	1.57E+00	1.318E-03	1.098E-03	4.112E-01	3.427E-01	2.68E-04	2.42E-03	7.54E-01
Chlorine	7782505	4.55E-01	3.820E-04	3.183E-04	1.192E-01	9.931E-02	7.78E-05	7.00E-04	2.18E-01
Copper	7440508	3.30E-03	2.770E-06	2.309E-06	8.644E-04	7.203E-04	5.64E-07	5.08E-06	1.58E-03
Ethyl benzene	100414	6.42E-01	5.390E-04	4.491E-04	1.682E-01	1.401E-01	1.10E-04	9.88E-04	3.08E-01
Formaldehyde	50000	1.01E+00	8.479E-04	7.066E-04	2.645E-01	2.205E-01	1.73E-04	1.55E-03	4.85E-01
Hexane	110543	9.42E-01	7.908E-04	6.590E-04	2.467E-01	2.056E-01	1.61E-04	1.45E-03	4.52E-01
Manganese	7439965	3.30E-03	2.770E-06	2.309E-06	8.644E-04	7.203E-04	5.64E-07	5.08E-06	1.58E-03
Methanol	67561	2.42E-01	2.032E-04	1.693E-04	6.339E-02	5.282E-02	4.14E-05	3.72E-04	1.16E-01
Methyl ethyl ketone {2-Butanor	78933	1.18E-02	9.906E-06	8.255E-06	3.091E-03	2.576E-03	2.02E-06	1.82E-05	5.67E-03
Methyl tert-butyl ether	1634044	1.15E+00	9.654E-04	8.045E-04	3.012E-01	2.510E-01	1.97E-04	1.77E-03	5.52E-01
m-Xylene	108383	2.17E+00	1.822E-03	1.518E-03	5.684E-01	4.736E-01	3.71E-04	3.34E-03	1.04E+00
Naphthalene	91203	2.95E-02	2.477E-05	2.064E-05	7.727E-03	6.439E-03	5.04E-06	4.54E-05	1.42E-02
Nickel	7440020	3.30E-03	2.770E-06	2.309E-06	8.644E-04	7.203E-04	5.64E-07	5.08E-06	1.58E-03
o-Xylene	95476	7.54E-01	6.330E-04	5.275E-04	1.975E-01	1.646E-01	1.29E-04	1.16E-03	3.62E-01
Styrene	100425	7.07E-02	5.935E-05	4.946E-05	1.852E-02	1.543E-02	1.21E-05	1.09E-04	3.39E-02
Toluene	108883	3.50E+00	2.938E-03	2.449E-03	9.167E-01	7.640E-01	5.99E-04	5.39E-03	1.68E+00

Notes:

1. Nearsite mileage is estimated based on the total offsite distance multipiled by a ratio of 0.25 miles divided by the one-way trip length.
2. Offroad equipment operates onsite only.
3. Near site mileage is calculated based on the total number of gasoline vehicle trips per year divided by the operating days per year, multiplied by 0.25 miles (one way) multiplied by 2 (two way trip).
4. https://en.wikipedia.org/wiki/Fuel_efficiency
5. SJVAPCD, AB 2588 “Hot Spots” Air Toxics Profiles, March 27, 2017, District Toxic Profile ID 176, Gasoline-Fired Portable Catalyst ICE

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Table 10: TAC from Paved Road Dust

Table 10a: Criteria Pollutant Information

Pollutant	Onsite (lb/hr)	Near-site[1] (lb/hr)	Onsite (lb/day)	Near-site[1] (lb/day)	Onsite (lb/yr)	Near-site[1] (lb/yr)
PM10	0.0202	0.0084	0.18	0.08	54.73	22.81
		0.02862				77.54

Table 10b: TAC from Paved Road Dust

TAC	Wt. Fraction[2]	TAC Emissions	
		lb/hr	lb/yr
Arsenic	0.000013	3.72E-07	1.01E-03
Cadmium	0.000003	8.59E-08	2.33E-04
Hexavalent Chromium[3]	0.00000085	2.43E-08	6.59E-05
Cobalt	0.000023	6.58E-07	1.78E-03
Copper	0.000148	4.24E-06	1.15E-02
Lead	0.000124	3.55E-06	9.62E-03
Manganese	0.0008	2.29E-05	6.20E-02
Nickel	0.000012	3.43E-07	9.30E-04
Mercury	0.000009	2.58E-07	6.98E-04
Selenium	0.000002	5.72E-08	1.55E-04
Vanadium (Fume Or Dust)	0.000071	2.03E-06	5.51E-03

Notes:

1. Nearsite emissions include emissions up to 1/4 mile offsite. Nearsite PM10 emissions are calculated in Table 4 as "Rural" emissions.
2. CARB speciation profile for Paved Roads (#471), accessed: https://ww2.arb.ca.gov/speciation-profiles-used-carb-modeling
3. Hexavalent chromium is assumed to be 5% of total chromium per SJVAPCD guidance.

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Table 11: TAC from Offroad Vehicles Operation on Unpaved Surfaces

Table 11a: Offroad Equipment Entrained Dust Emissions

Source	lb/hr	lb/day	lb/yr
Unpaved Road Dust from Site Access	0.95	8.51	3827.98
Unpaved Road Dust Composting	0.54	4.89	1524.70
Total PM10	1.49	13.40	5352.68

Table 11b: TAC from Vehicle/Equipment Travel on Unpaved Surfaces

TAC	Concentration[1,2] (lb/lb Dust)	TAC Emissions (lb/hr)	TAC Emissions (lb/yr)
Arsenic	6.20E-06	9.23E-06	3.32E-02
Cadmium	2.00E-06	2.98E-06	1.07E-02
Hexavalent Chromium	2.45E-06	3.65E-06	1.31E-02
Cobalt	8.80E-06	1.31E-05	4.71E-02
Copper	6.90E-05	1.03E-04	3.69E-01
Lead	2.00E-04	2.98E-04	1.07E+00
Manganese	4.40E-04	6.55E-04	2.36E+00
Nickel	9.50E-05	1.41E-04	5.09E-01
Mercury	1.00E-06	1.49E-06	5.35E-03
Selenium	1.00E-06	1.49E-06	5.35E-03

Notes:

1. Although compost surfaces are paved, because the compost processing areas are expected to have compost residuals covering the active surfaces, the unpaved road calculations are used to estimate emissions, and compost dust speciation is used for TAC..

2. SJVAPCD Toxic Emission Factors for fugitive dust from "PM10 based Emissions from Operations generating Dust from Greenwaste Composting" (June 7, 2016), accessed: https://www.valleyair.org/busind/pto/emission_factors/emission_factors_idx.htm

Agromin Merced Compost Facility Baseline
Emission Calculations

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Table 1: Compost Process Throughput

Table 1: Process Throughput Calculations

Processing Step	Loss based on Initial Charge	Loss based on Previous Step	Proposed Project (TPY)	Proposed Project (TPD)
Initial Charge	---	---	11,330	36
Loss Upon Composting	20.0%	20%	9,064	29
Initial Charge to Secondary	---	---	9,064	29
Loss Upon Curing	10.0%	13%	7,931	25
Loss Upon Screening	10.0%	14%	6,798	22
Finished Product	---	---	6,798	22

Data and Parameters			Notes
Daily Operating Hours	9	hours/day	
Raw Material quantity per truck	12	tons/truck	*Assumption*
Raw Material truck count	945	Truck/year	
Raw Material Receive Days	312	Day/year	
Raw Material truck count	4	Truck/day	
Compost quantity per truck	8	tons/truck	*Assumption*
Compost delivery truck count	850	Truck/year	
Compost shipment days	312	Day/year	*Assume shipment of compost product 6 days per week*
Compost delivery truck count	3	Truck/day	

Historic Throughput

Calendar Year	Throughput (TPY)
2022	9,344
2021	13,316
2020	16,345

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Table 2: Compost Process Emission Factors

Table 2a: Emission Factors

Pollutant	Phase	Emission Factor	Note
VOC	Feedstock Storage	0.2 lb/wet ton/day	1
VOC	Composting	3.22 lb/ton	2
VOC	Curing	0.358 lb/ton	3
VOC	Storage	0.02 lb/ton	4
NH_3	Feedstock Storage	0.20 lb/ton/day	1
NH_3	Composting + Curing	0.7800 lb/ton	5
NH_3	Storage	0.00038 lb/ton	6

Table 2b: Uncontrolled Grinding and Screening PM Emission Factors

Process Operation	Emission Factor		Note
	PM10 (lb/ton)	PM2.5 (lb/ton)	
Grinding	0.0144	0.00216	7
Screening	0.0144	0.00216	8

Table 2c: Material Handling PM Emission Factors

Variable	Emission Factor		Note
	PM10	PM2.5	
Particle Size Multiplier (dimensionless)	0.35	0.053	9
Mean Wind Speed (MPH)	4.92	4.92	10
Material Moisture Content (%)	4.80	4.80	9
Emission Factor (lb/ton/drop point)	0.00032	0.00005	calculated

Table 2d: Wind Erosion PM Emission Factors[11]

Variable	PM10	PM2.5	Note
Particulate aerodynamic factor	0.50	0.20	11
Average silt loading of storage pile in percent (%),	0.50	0.50	Assumed
Average number of days during the year with at least 0.01 inches of precipitation	49.00	49.00	12
Percentage of time with unobstructed wind speed >12 mph in percent (%)	5.41	5.41	13
Wind Erosion EF (lb/acre/day)	1.37E-01	5.50E-02	Calculated

Table 2e: TAC Speciation

TAC	Speciation (% wt)	Note
Isopropyl alcohol	42.31	14
Methanol	12.79	14
Naphthalene	0.50	14
Propene	0.22	14
Acetylaldehyde	0.14	14

Notes:

1. SJVAPCD Compost Emission Factor Report, Originally Published September 15, 2010, Revised March 21, 2023, Table 7.

2. San Joaquin Valley Air Pollution Control District, "Compost Emission Factor Report", Originally Published September 15, 2010, Revised March 21, 2023, Table 4.
3. San Joaquin Valley Air Pollution Control District, Compost ROG Emission Factors, September 15, 2010, Table 4.
4. Northern Recycling Zamora Compost Facility Baseline Air Emissions Assessment, Air Emissions Source Test, Appendix C, Table 4.2. This test report is an appendix to SJVAPCD's "Compost ROG Emission Factors", September 15, 2010.
5. SJVAPCD Compost Emission Factor Report, Originally Published September 15, 2010, Revised March 21, 2023, Table 7.
6. SJVAPCD Compost VOC Emission Factors, Sept 15, 2010, App C, Table 4.3 which is based on 15 days storage.
7. BAAQMD, Title V Permit Evaluation, Guadalupe Rubbish Disposal Co., Site A3294. BAAQMD references AP-42 for log debarking. Assume 15% fraction of PM2.5.

8. AP-42 section 10.3 Plywood Veneer and Layout Operations Table 10.3-1 (4th Edition) for log debarking, assuming 60% of emissions are PM10 with a 15% fraction of PM2.5.
9. AP-42, Chapter 13.2.4 Aggregate Handling and Storage Piles. Moisture content used is the maximum allowed by the method. Actual moisture content will be higher, thus these emission factors are conservative.
10. CalEEMod 2021. http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-d2020-4-0-full-merge.pdf?sfvrsn=6, Table 1.1
11. Mojave Desert Air Quality Management District, "Emissions Inventory Guidance, Mineral Handling and Processing Industries", Section G, Wind Erosion from Storage Piles, April 2000.
12. http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-d2020-4-0-full-merge.pdf?sfvrsn=6, Table 1.1 has 49 days with precipitation > 0.1 inches for Merced County.
13. Average per met data 2007 - 2010.
14. Organic TAC speciation is from: Kumar, Anuj, et. al., "Volatile organic compound emissions from green waste composting: Characterization and ozone formation", Atmospheric Environment, January 2011.

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Table 3: Grinding and Screening PM Emissions

Table 3a: Emission Factors

Process Operation	Value	
	PM10	PM2.5
Grinding	0.0144	0.00216
Screening	0.0144	0.00216

Table 3b: Grinding and Screening PM Emissions

Operation	Annual Throughput (ton/yr)	Average Daily Throughput (ton/day)	Annual Emissions (lb/yr)		Average Daily Emissions (lb/day)		Average Hourly Emissions (lb/hr)	
			PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Grinding	11330	36	40.79	6.12	0.13	0.02	0.01	0.00
Screening	7931	25	28.55	4.28	0.09	0.01	0.01	0.00
		Total	69.34	10.40	0.22	0.03	0.02	0.00
		Total (TPY)	0.03	0.01				

Data and Parameters

Operating Hours	9	hrs/day
Control Efficiency for Watering	75%	Ref: 1

References:

1. Mojave Desert Air Quality Management District, "Emissions Inventory Guidance, Mineral Handling and Processing Industries", Material Handling Table 5, April 2000.

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Table 4: Material Handling PM Emissions

Table 4: Material Handling PM Emissions

Process Step	Annual Throughput (ton/yr)	Average Daily Throughput (ton/day)	No. of Drop Points	Annual Emissions (lb/yr)		Average Daily Emissions (lb/day)		Average Hourly Emissions (lb/hr)	
				PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Feedstock	11,330	36	1	3.65	0.55	0.01	0.00	0.001	0.000
Grinding	11,330	36	2	7.30	1.10	0.02	0.00	0.003	0.000
Composting	11,330	36	1	3.65	0.55	0.01	0.00	0.001	0.000
Curing	9,064	29	1	2.92	0.44	0.01	0.00	0.001	0.000
Screening	7,931	25	2	5.11	0.77	0.02	0.00	0.002	0.000
Finished Compost Storage	6,798	22	1	2.19	0.33	0.01	0.00	0.001	0.000
Truck Loadout	6,798	22	1	2.19	0.33	0.01	0.00	0.001	0.000
			Total (lb/yr)	26.99	4.09	0.09	0.01	0.01	0.00
			Total (TPY)	0.01	0.00				

Data and Parameters

Operating Schedule	9	hr/day
Days per year	312	day/yr
PM10 EF	3.22E-04	lb/ton/drop
PM2.5 EF	4.88E-05	lb/ton/drop

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Table 5: Wind Erosion PM Emissions

Table 5a: Wind Erosion Dimensions/Area

Area	Acres
Receiving/Greenwaste Storage	1
Composting	2
Curing	1
Finished Compost Storage	1

Table 5b: Wind Erosion PM Emission Factors

Variable	PM10 lb/acre/day	PM2.5 lb/acre/day
Inactive Day Wind Erosion EF	1.37E-01	5.50E-02

Table 5c: Wind Erosion PM Emissions

Area	Acres	Operating Days	Annual Emissions (lb/yr)		Peak Daily Emissions (lb/day)		Peak Hourly Emissions (lb/hr)	
			PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Feedstock Storage	1.00	365	12.54	5.02	0.03	0.01	0.00	0.00
Composting	2.00	365	25.08	10.03	0.07	0.03	0.00	0.00
Curing	1.00	365	12.54	5.02	0.03	0.01	0.00	0.00
Finished Compost Storage	1.00	365	12.54	5.02	0.03	0.01	0.00	0.00
		Total	62.69	25.08	0.17	0.07	0.01	0.00
		Total (TPY)	0.03	0.01				

Data and Parameters	Value	UOM	Notes:
1. Control by watering per MDAQMD Mineral Guidance	75%		All piles are watered for dust suppression or moisture control, or both.
	52	weeks/yr	Constant
Days per year	365	day/yr	Constant
Constant	24	hr/day	Constant
Conversion	43560	ft^2/acre	Constant

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Table 6: Composting VOC Emissions

Table 6: Composting VOC Emissions

Process Unit	Annual Throughput (ton/yr)	Peak Daily Throughput (ton/day)	Emission Factor	Annual Emissions (lb/yr)	Peak Daily Emissions (lb/day)	Peak Hourly Emissions (lb/hr)
Feedstock Storage	11,330	36	0.2 lb/wet ton/day	4,532	12.42	0.52
Composting	11,330	36	3.22 lb/ton	36,505	100.01	4.17
Curing	11,330	36	0.358 lb/ton	4,056	11.11	0.46
Finished Compost Storage	6,798	22	0.02 lb/ton	136	0.37	0.02
			Total (lb/yr)	45,229	123.92	5.16
			Total (TPY)	22.61		

Data and Parameters			Notes
Daily Hours of Emissions	24	hr/day	Constant
Feedstock Storage Duration	2	days	Project Description
Raw Material Processed in Receiving Storage	100%		Assumption
Days per year	365	days per year	

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Table 7: Summary of Emissions

Table 7a: Summary of Daily Criteria Pollutant Emissions

Activity	NOx (lb/day)	VOC (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
3. Composting/Curing	---	123.92	---	---	---	---
4. Grind and Screen	---	---	---	---	0.22	0.03
5. Material Handling	---	---	---	---	0.09	0.01
6. Wind Erosion	---	---	---	---	0.17	0.07
Total	0.00	123.92	0.00	0.00	0.48	0.12

Table 7b: Summary of Annual Criteria Pollutant Emissions

Activity	NOx (lb/yr)	VOC (lb/yr)	CO (lb/yr)	SOx (lb/yr)	PM10 (lb/yr)	PM2.5 (lb/yr)
3. Composting/Curing	---	45,229	---	---	---	---
4. Grind and Screen	---	---	---	---	69.34	10.40
5. Material Handling	---	---	---	---	26.99	4.09
6. Wind Erosion	---	---	---	---	62.69	25.08
Total	0.00	45,229	0.00	0.00	159.03	39.57
Total (TPY)	0.00	22.61	0.00	0.00	0.08	0.02

Note:

1. CO_2 emissions from composting are not calculated because the CO_2 is biogenic and, therefore, part of the natural carbon cycle.

Table 8: TAC from Composting Dust

Table 8a: Material Handling and Wind Erosion Dust Emissions

Source	lb/hr	lb/yr
Grinding and Screening	0.02	69.34
Material Handling	0.01	26.99
Wind Erosion	0.01	62.69
Total PM10	**0.04**	**159.03**

Table 8b: TAC from Material Handling and Wind Erosion

TAC	Concentration (lb/lb Dust)	TAC Emissions (lb/hr)	TAC Emissions (lb/yr)
Arsenic	6.20E-06	2.57E-07	9.86E-04
Cadmium	2.00E-06	8.29E-08	3.18E-04
Hexavalent Chrome	2.45E-06	1.02E-07	3.90E-04
Cobalt	8.80E-06	3.65E-07	1.40E-03
Copper	6.90E-05	2.86E-06	1.10E-02
Lead	2.00E-04	8.29E-06	3.18E-02
Manganese	4.40E-04	1.82E-05	7.00E-02
Mercury	1.00E-06	4.15E-08	1.59E-04
Nickel	9.50E-05	3.94E-06	1.51E-02
Selenium	1.00E-06	4.15E-08	1.59E-04
			0.131

Notes:

1. SJVAPCD Toxic Emission Factors for fugitive dust from "PM10 based Emissions from Operations generating Dust from Greenwaste Composting" (June 7, 2016), accessed: https://www.valleyair.org/busind/pto/emission_factors/emission_factors_idx.htm
2. Hexavalent chromium is assumed to be 5% of total chromium per SJVAPCD guidance.

Table 9: NH3 Emissions

Table 9: NH3 Emissions

Process Unit	Annual Throughput (ton/yr)	Daily Throughput (ton/day)	Emission Factor	Annual Emissions (lb/yr)	Hourly Emissions (lb/hr)
Feedstock Storage	11,330	36	0.2 lb/ton/day	4,532	0.52
Composting + Curing	11,330	36	0.7800 lb/ton	8,837	1.01
Finished Compost Storage	6,798	22	0.0004 lb/ton	3	0.00

Data and Parameters

Annual Hours of Emissions	8760	hr/day
Days feedstock storage	2.00	days

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Table 10: Organic TAC Emissions

Table 10a: VOC Emissions

Feedstock Storage		Composting		Curing		Finished Compost Storage		Total	
(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)
0.52	4532.00	4.17	36,505	0.46	4,056	0.02	136	5.16	45,229

Table 10b: Organic TAC Emissions

TAC	Speciation[1]	Feedstock Storage		Composting		Curing		Finished Compost Storage		Total Project	
	(% wt)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)
Isopropyl alcohol	42.31	0.22	1,917.49	1.76	15,445.38	0.20	1,716.15	0.01	57.52	2.18	19,136.54
Methanol	12.79	0.07	579.64	0.53	4,669.02	0.06	518.78	0.00	17.39	0.66	5,784.84
Naphthalene	0.50	0.00	22.66	0.02	182.53	0.00	20.28	0.00	0.68	0.03	226.15
Propene	0.22	0.00	9.97	0.01	80.31	0.00	8.92	0.00	0.30	0.01	99.50
Acetylaldehyde	0.14	0.00	6.34	0.01	51.11	0.00	5.68	0.00	0.19	0.01	63.32
			2,536.11		20,428.34		2,269.82		76.08		25,310.35
			1.27		10.21		1.13		0.04		12.66

Notes:

1. Organic TAC speciation is from: Kumar, Anuj, et. al., "Volatile organic compound emissions from green waste composting: Characterization and ozone formation", Atmospheric Environment, January 2011.

APPENDIX E – BASELINE LANDFILL GHG EMISSIONS

Appendix E:
Landfill GHG Emissions

Air Quality and GHG Technical Report

Prepared for:

Agromin Corporation
Highway 59 Composting Facility
7040 N. Highway 59
Merced, CA 95348

February 2024

Table of Contents

List of Tables

Attachments

List of Acronyms and Abbreviations

CH_4	Methane
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
EPA	[United States] Environmental Protection Agency
GHG	Greenhouse Gas
MSW	Municipal Solid Waste
MT	Metric Ton
N_2O	Nitrous Oxide
ROG	Reactive Organic Gas
TPD	Tons per Day
TPY	Tons per Year
WARM	Waste Reduction Model

Appendix E: Landfill GHG Emissions

1.0 INTRODUCTION

The Highway 59 Landfill is an existing facility, permitted to dispose of up to 1,500 tons per day (TPD) of waste. The existing windrow composting operations at the site diverts 11,330 TPY of organic waste from landfill (based on the 2-year historic average). The proposed Project would divert an additional 63,670 TPY from landfill. However, the landfill would continue to operate and intends to retain the ability to operate at the permitted capacity of 1,500 TPD of waste. Thus, the facility staffing and vehicles and equipment required to operate the landfill itself remain unchanged following the implementation of the proposed CASP composting facility. While emissions from organic waste disposal will be avoided, emissions associated with landfill operation (i.e. haul trucks, worker commute, material handling equipment) would be the same following project implementation as they are now and are not estimated.

There is no change expected in the emissions associated with hauling organic waste to the proposed CASP composting facility; the waste would be generated at the same locations and delivered to the Highway 59 site. Under current business-as-usual operations, 11,330 TPY of organic waste is composted (based on the 2-year historic average) and 63,670 TPY is landfilled. Under the proposed Project scenario, 75,000 TPY of organic waste would be processed through the CASP composting facility.

Emissions from other types of activities, e.g., wind erosion, offroad equipment operation, and water truck operation, would remain unchanged for the landfill itself with or without the proposed Project. Because no change to emissions from these sources is anticipated, emissions estimates are not provided.

Given this operational plan for the landfill, the diversion of organic waste from the landfill to composting will reduce the quantity of organic matter disposed in the landfill by an additional 63,670,000 TPY. Organic matter decomposed in landfills produces greenhouse gas (GHG) emissions; thus, a reduction in organic waste disposal will reduce/avoid the emissions of these pollutants.

The methodology used to estimate GHG emission reductions is explained in this appendix, and the data and assumptions used in the calculations are provided. Emission calculation worksheets are provided in Attachment E-1.

2.0 LANDFILL EMISSIONS

2.1 Emission Calculation Methodology

The Waste Reduction Model (WARM) was created by the U.S. Environmental Protection Agency (EPA) to help solid waste planners and organizations estimate GHG emission reductions and economic impacts from several different waste management practices (EPA 2020).

WARM calculates GHG emissions, energy, and economic impacts for baseline and alternative waste management practices, including source reduction, recycling, combustion, composting, and landfilling. The user can construct various scenarios by simply entering data on the amount of waste handled by material type and by management practice. WARM applies material-specific emission and economic factors for each management practice to calculate the GHG emissions, energy savings, and economic impacts of each scenario. Several key inputs, such as landfill gas recovery practices and transportation distances to municipal solid waste (MSW) facilities, can be modified by the user.

The model calculates emissions in metric tons (MT) of carbon dioxide equivalents (CO_2e) across a wide range of material types commonly found in MSW. The GHG emission factors used in WARM are based on a life cycle perspective.

2.2 Process Inputs

Emissions were estimated for two scenarios:

- The baseline business-as-usual case, which reflects the 2-year historic average compost throughput of the existing compost facility of 11,330 tons per year and 63,670 TPY disposed to landfill; and
- The proposed Project, which would compost 75,000 TPY of mixed organic waste in the proposed CASP.

WARM model inputs are shown in Table 2-1.

Table 2-1: WARM Model Inputs

Parameter	Baseline (Business as Usual)	Proposed Composting
Disposal Quantity	11,330 to compost 63,670 to landfill (75,000 TPY total)	75,000 TPY
Waste Disposition	Windrow composting and Landfill w/ landfill gas collection and flare	CASP Composting
Waste Composition	Mixed Organics: Food Waste 53%, Yard Trimmings 47%	Mixed Organics: Food Waste 53%, Yard Trimmings 47%
Moisture Condition	Dry (k=0.02), Less than 20 inches of precipitation per year	N/A

Parameter	Baseline (Business as Usual)	Proposed Composting
Transportation Distance[1]	50 miles	50 miles

2.3 Emissions

The WARM model output results are summarized in Table 2-2. As shown, the proposed project results in a net reduction in GHG emissions compared to the baseline, business-as-usual disposal of 4,168.74 MT CO_2e per year (= 6,113.06 - 1,944.32).

Table 2-2: Comparison of Baseline to Project GHG Emissions

Parameter	Baseline (Business as Usual)	Proposed Composting
Disposal Quantity	75,000 TPY	75,000 TPY
GHG Emissions	(1,944.32 MT/yr)	(6,113.06 MT/yr)

The baseline emissions reflect a reduction in GHG emissions from landfilling. This result is counterintuitive in light of AB 1383 goals, as landfill diversion is a key GHG reduction strategy of AB 1383. The EPA explains the apparent discrepancy this way (EPA 2010):

> *"When organic materials derived from biomass sources are landfilled, a portion of the carbon in these materials does not decompose; however, under natural conditions, virtually all of the material would decompose aerobically, and the carbon would be released as biogenic carbon dioxide (CO_2). When the materials are landfilled, aerobic biodegradation is prevented. The carbon in those materials that does not fully decompose in landfills (anaerobically) is removed from the global carbon cycle, is said to be "stored", and is counted as an anthropogenic sink."*

> *"In landfills, anaerobic bacteria digest organic materials that are derived from biomass sources, including food scraps, yard trimmings, paper, and wood, to produce methane (CH_4) and CO_2. Although the CO_2 emissions would naturally occur from these materials due to natural degradation, the CH_4 emissions would not, and are therefore considered anthropogenic GHGs and accounted for in WARM. The landfilled materials that are not fully decomposed by anaerobic bacteria are stored in the landfill. This remaining undecomposed carbon is considered an anthropogenic sink, since this carbon would have normally been released as biogenic CO_2 from natural decomposition completing the photosynthesis/ respiration cycle."*

[1] The distance used in this analysis is the approximate distance from the facility to the agricultural area in the County that is furthest from the facility. As a practical matter, the compost facility and landfill are co-located, so the transportation emissions are equal between the management options.

3.0 REFERENCES

EPA 2020. U.S. Environmental Protection Agency, Waste Reduction Model (WARM), version: 15, software version: 1.5, accessed: https://www.epa.gov/warm.

EPA 2010. U.S. Environmental Protection Agency, “Landfill Carbon Storage in WARM”, October 27.

ATTACHMENT E-1 – WARM CALCULATION WORKSHEETS

rsion 15

Waste Reduction Model (WARM) -- Inputs

Use this worksheet to describe the baseline and alternative waste management scenarios that you want to compare. The blue shaded areas indicate where you need to enter information.
Please enter data in short tons (1 short ton = 2,000 lbs.)

1. Describe the baseline generation and management for the waste materials listed below.
If the material is not generated in your community or you do not want to analyze it, leave it blank or enter 0. Make sure that the total quantity generated equals the total quantity managed.

2. Describe the alternative management scenario for the waste materials generated in the baseline.
Any decrease in generation should be entered in the Source Reduction column.
Any increase in generation should be entered in the Source Reduction column as a negative value.
Make sure that the total quantity generated equals the total quantity managed.

Material Type	Material	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Tons Generated	Tons Source Reduced	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested
Paper	Corrugated Containers				NA	NA	0.00					NA	NA
	Magazines/Third-class Mail				NA	NA	0.00					NA	NA
	Newspaper				NA	NA	0.00					NA	NA
	Office Paper				NA	NA	0.00					NA	NA
	Phonebooks				NA	NA	0.00					NA	NA
	Textbooks				NA	NA	0.00					NA	NA
	Mixed Paper (general)				NA	NA	0.00					NA	NA
	Mixed Paper (primarily residential)				NA	NA	0.00					NA	NA
	Mixed Paper (primarily from offices)				NA	NA	0.00					NA	NA
Food Waste	Food Waste	NA					0.00		NA				
	Food Waste (non-meat)	NA					0.00		NA				
	Food Waste (meat only)	NA					0.00		NA				
	Beef	NA					0.00		NA				
	Poultry	NA					0.00		NA				
	Grains	NA					0.00		NA				
	Bread	NA					0.00		NA				
	Fruits and Vegetables	NA					0.00		NA				
	Dairy Products	NA					0.00		NA				
Yard Trimmings	Yard Trimmings	NA					0.00	NA	NA				
	Grass	NA					0.00	NA	NA				
	Leaves	NA					0.00	NA	NA				
	Branches	NA					0.00	NA	NA				
Mixed Plastics	HDPE				NA	NA	0.00					NA	NA
	LDPE	NA			NA	NA	0.00		NA			NA	NA
	PET				NA	NA	0.00					NA	NA
	LLDPE	NA			NA	NA	0.00		NA			NA	NA
	PP				NA	NA	0.00					NA	NA
	PS	NA			NA	NA	0.00		NA			NA	NA
	PVC	NA			NA	NA	0.00		NA			NA	NA
	Mixed Plastics				NA	NA	0.00					NA	NA
Bioplastics	PLA	NA				NA	0.00		NA				NA
Electronics	Desktop CPUs				NA	NA	0.00					NA	NA
	Portable Electronic Devices				NA	NA	0.00					NA	NA
	Flat-Panel Displays				NA	NA	0.00					NA	NA
	CRT Displays				NA	NA	0.00	NA				NA	NA
	Electronic Peripherals				NA	NA	0.00					NA	NA
	Hard-Copy Devices				NA	NA	0.00					NA	NA
	Mixed Electronics				NA	NA	0.00	NA				NA	NA
Metals	Aluminum Cans				NA	NA	0.00					NA	NA
	Aluminum Ingot				NA	NA	0.00					NA	NA
	Steel Cans				NA	NA	0.00					NA	NA
	Copper Wire				NA	NA	0.00					NA	NA
	Mixed Metals				NA	NA	0.00					NA	NA
Glass	Glass				NA	NA	0.00					NA	NA
Construction Materials	Asphalt Concrete			NA	NA	NA	0.00				NA	NA	NA
	Asphalt Shingles				NA	NA	0.00					NA	NA
	Carpet				NA	NA	0.00					NA	NA
	Clay Bricks	NA		NA	NA	NA	0.00		NA		NA	NA	NA
	Concrete			NA	NA	NA	0.00	NA			NA	NA	NA
	Dimensional Lumber				NA	NA	0.00					NA	NA
	Drywall			NA	NA	NA	0.00				NA	NA	NA
	Fiberglass Insulation	NA		NA	NA	NA	0.00		NA		NA	NA	NA
	Fly Ash			NA	NA	NA	0.00	NA			NA	NA	NA
	Medium-density Fiberboard	NA			NA	NA	0.00		NA			NA	NA
	Structural Steel			NA	NA	NA	0.00				NA	NA	NA
	Vinyl Flooring	NA			NA	NA	0.00		NA			NA	NA
	Wood Flooring	NA			NA	NA	0.00		NA			NA	NA
Tires	Tires				NA	NA	0.00					NA	NA
Mixed Materials	Mixed Recyclables				NA	NA	0.00	NA				NA	NA
	Mixed Organics	NA	63,670.00		11,330.00		75,000.00	NA	NA			75,000.00	
	Mixed MSW	NA			NA	NA	0.00	NA	NA			NA	NA

Please refer to the User's Guide if you need assistance completing this table.

3. In order to account for the avoided electricity-related emissions in the landfilling and combustion pathways, EPA assigns the appropriate regional "marginal" electricity grid mix emission factor based on your location. Select state for which you are conducting this analysis.

Please select state or select national average:	California
Region Location:	Pacific

4. To estimate the benefits from source reduction, EPA usually assumes that the material that is source reduced would have been manufactured from the current mix of virgin and recycled inputs. However, you may choose to estimate the emission reductions from source reduction under the assumption that the material would have been manufactured from 100% virgin inputs in order to obtain an upper bound estimate of the benefits from source reduction. Select which assumption you want to use in the analysis. Note that for materials for which information on the share of recycled inputs used in production is unavailable or is not a common practice; EPA assumes that the current mix is comprised of 100% virgin inputs. Consequently, the source reduction benefits of both the "Current mix" and "100% virgin" inputs are the same.

- (●) Current Mix
- ( ) 100% Virgin

5. The emissions from landfilling depends on whether the landfill where your waste is disposed has a landfill gas (LFG) control system. If you do not know whether your landfill has LFG control, select "National Average" to calculate emissions based on the estimated proportions of landfills with LFG control in 2012 and proceed to question 7. If your landfill does not have a LFG system, select "No LFG Recovery" and proceed to question 8. If a LFG system is in place at your landfill, select "LFG Recovery" and click one of the options in 6a to indicate whether LFG is recovered for energy or flared.

- ( ) National Average
- (●) LFG Recovery
- ( ) No LFG Recovery

6a. If your landfill has gas recovery, does it recover the methane for energy or flare it?

- ( ) Recover for energy
- (●) Flare

6b. For landfills that recover gas, the landfill gas collection efficiency will vary throughout the life of the landfill. Based on a literature review of field measurements and expert discussion, a range of collection efficiencies was estimated for a series of different landfill scenarios. The "typical" landfill is judged to represent the average U.S. landfill, although it must be recognized that every landfill is unique and a typical landfill is an approximation of reality. The worst-case collection scenario represents a landfill that is in compliance with EPA's New Source Performance Standards (NSPS). The aggressive gas collection scenario includes landfills where the operator is aggressive in gas collection relative to a typical landfill. Bioreactor landfills, which are operated to accelerate decomposition, are assumed to collect gas aggressively. The California regulatory collection scenario allows users to estimate and view landfill management results based on California regulatory requirements.

- ( ) Typical operation - DEFAULT
- ( ) Worst-case collection
- ( ) Aggressive gas collection
- (●) California regulatory collection

	Landfill gas collection efficiency (%) assumptions
Typical	*Years 0-1: 0%; Years 2-4: 50%; Years 5-14: 75%; Years 15 to 1 year before final cover: 82.5%; Final cover: 90%*
Worst-case	*Years 0-4: 0%; Years 5-9: 50%; Years 10-14: 75%; Years 15 to 1 year before final cover: 82.5%; Final cover: 90%*
Aggressive	*Year 0: 0%; Years 0.5-2: 50%; Years 3-14: 75%; Years 15 to 1 year before final cover: 82.5%; Final cover: 90%*
California	*Year 0: 0%; Year 1: 50%; Years 2-7: 80%; Years 8 to 1 year before final cover: 85%; Final cover: 90%*

7. Which of the following moisture conditions and associated bulk MSW decay rate (k) most accurately describes the average conditions at the landfill? The decay rates, also referred to as k values, describe the rate of change per year (yr-1) for the decomposition of organic waste in landfills. A higher average decay rate means that waste decomposes faster in the landfill.

- ( ) National average - DEFAULT
- (●) Dry (k=0.02)
- ( ) Moderate (k = 0.04)
- ( ) Wet (k = 0.06)
- ( ) Bioreactor (k = 0.12)

	Moisture condition assumptions
Dry (k=0.02)	*Less than 20 inches of precipitation per year*
Moderate (k=0.04)	*Between 20 and 40 inches of precipitation per year*
Wet (k=0.06)	*Greater than 40 inches of precipitation per year*
Bioreactor (k=0.12)	*Water is added until the moisture content reaches 40 percent moisture on a wet weight basis*
National average	*Weighted average based on the share of waste received at each landfill type*

8a. For anaerobic digestion of food waste materials (including beef, poultry, grains, bread, fruits and vegetables, and dairy products), please choose the appropriate type of anaerobic digestion process used.
Note that for grass, leaves, branches, yard trimmings and mixed organics, wet digestion is not applicable based on current technology and practices in the United States. Therefore, dry digestion is the only digestion type modeled in WARM for these materials.
Only one type of digestion process (wet or dry) can be modeled at a time in WARM.

- ○ Wet Digestion
- ◉ Dry Digestion

8b. WARM assumes that digestate resulting from anaerobic digestion processes will be applied to land. In many cases, the digestate is cured before land application.
When digestate is cured, the digestate is dewatered and any liquids are recovered and returned to the reactor (when using a wet digester). Next, the digestate is aerobically cured in turned windrows, then screened and applied to agricultural fields.
Select whether the digestate resulting from your anaerobic digester is cured before land application.

- ◉ Cured - DEFAULT
- ○ Not cured

9a. Emissions that occur during transport of materials to the management facility are included in this model. You may use default transport distances, indicated in the table below, or provide information on the transport distances for the various MSW management options.

- ○ Use Default Distances
- ◉ Provide Information

9b. If you have chosen to provide information, please fill in the table below. Distances should be from the curb to the landfill, combustor, or material recovery facility (MRF).
***Please note that if you chose to provide information, you must provide distances for both the baseline and the alternative scenarios.**

Management Option	Default Distance (Miles)	Distance (Miles)
Landfill	20	50.00
Combustion	20	
Recycling	20	
Composting	20	50.00
Anaerobic Digestion	20	

10. If you wish to personalize your results report, input your name & organization, and also specify the project period corresponding to the data you entered above.

Name	Agromin
Organization	Hwy 59 Compost

Project Period	From	01/01/25	to	01/01/45

Congratulations! You have finished all the inputs.
A summary of your results awaits you on the sheet(s) titled "Summary Report."
For more detailed analyses of results, see the sheet(s) titled "Analysis Results."

GHG Emissions Analysis -- Summary Report

Version 15

GHG Emissions Waste Management Analysis for Hwy 59 Compost
Prepared by: Agromin
Project Period for this Analysis: 01/01/25 to 01/01/45

Note: If you wish to save these results, rename this file (e.g., WARM-MN1) and save it. Then the "Analysis Inputs" sheet of the "WARM" file will be blank when you are ready to make another model run.

GHG Emissions from Baseline Waste Management ($MTCO_2E$): (1,944.32)

Material	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Total $MTCO_2E$
Mixed Organics	NA	63,670.00	-	11,330.00	-	(1,944.32)
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GHG Emissions from Alternative Waste Management Scenario ($MTCO_2E$): (6,113.06)

Material	Tons Source Reduced	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Total $MTCO_2E$
Mixed Organics	NA	NA	-	-	75,000.00	-	(6,113.06)
							0
							0
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Change (Alt - Base) $MTCO_2E$
(4,168.74)
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Total Change in GHG Emissions ($MTCO_2E$): (4,168.74)

Note: a negative value (i.e., a value in parentheses) indicates an emission reduction; a positive value indicates an emission increase.

This is equivalent to…		
Removing annual emissions from	**885**	Passenger Vehicles
Conserving	**469,082**	Gallons of Gasoline
Conserving	**173,697**	Cylinders of Propane Used for Home Barbeques
	0.00023%	Annual CO_2 emissions from the U.S. transportation sector
	0.00023%	Annual CO_2 emissions from the U.S. electricity sector

a) For explanation of methodology, see the EPA WARM Documentation: Documentation Chapters for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WARM)
-- available on the Internet at https://www.epa.gov/warm/documentation-chapters-greenhouse-gas-emission-and-energy-factors-used-waste-reduction-model

b) Emissions estimates provided by this model are intended to support voluntary GHG measurement and reporting initiatives.

c) The GHG emissions results estimated in WARM indicate the full life-cycle benefits waste management alternatives. Due to the timing of the GHG emissions from the waste management pathways, (e.g., avoided landfilling and increased recycling), the actual GHG implications may accrue over the long-term. Therefore, one should not interpret the GHG emissions implications as occurring all in one year, but rather through time.

APPENDIX F – HEALTH RISK PRIORITIZATION SCORE

Name: Construction | **Prioritization Calculator**

Applicability	Use to provide a Prioritization score based on the emission potency method. Entries required in yellow areas, output in gray areas.			
Author or updater	Matthew Cegielski	*Last Update*	November 2, 2020	
Facility: **ID#:** **Project #:** **Unit and Process#**				
Operating Hours hr/yr	8,760.00			

Receptor Proximity and Proximity Factors		Cancer Score	Chronic Score	Acute Score	Max Score
0< R<100	**1.000**	1.38E+02	2.05E-01	0.00E+00	1.38E+02
100≤R<250	**0.250**	3.45E+01	5.12E-02	0.00E+00	3.45E+01
250≤R<500	**0.040**	5.53E+00	8.19E-03	0.00E+00	5.53E+00
500≤R<1000	**0.011**	1.52E+00	2.25E-03	0.00E+00	1.52E+00
1000≤R<1500	**0.003**	4.14E-01	6.14E-04	0.00E+00	4.14E-01
1500≤R<2000	**0.002**	2.76E-01	4.10E-04	0.00E+00	2.76E-01
2000<R	**0.001**	1.38E-01	2.05E-04	0.00E+00	1.38E-01

Receptor proximity is in meters. Priortization scores are calculated by multiplying the total scores summed below by the proximity factors. Record the Max score for your receptor distance. If the substance list for the unit is longer than the number of rows here or if there are multiple processes use additional worksheets and sum the totals of the Max Scores.

0

Enter the unit's CAS# of the substances emitted and their amounts.

Prioritzation score for each substance generated below. Totals on last row.

Substance	CAS#	Annual Emissions (lbs/yr)	Maximum Hourly (lbs/hr)	Average Hourly (lbs/hr)	Cancer	Chronic	Acute
Diesel engine exhaust, particulate matter (Diesel PM)	**9901**	59.811	0.00E+00	6.83E-03	1.38E+02	2.05E-01	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				Totals	**1.38E+02**	**2.05E-01**	**0.00E+00**

Yorke ENGINEERING, LLC
www.YorkeEngr.com

Total Prioritization Score

Receptor Proximity and Proximity Factors		Compost			Mobile			TOTAL
		Max Score	**Max Score**	**Max Score**	**Max Score**	**Max Score**	**Max Score**	**Total Max Score**
0< R<100	**1.000**	1.40E+00	6.56E+01	2.89E+00	1.72E+02	5.45E-01	8.69E+00	2.51E+02
100≤R<250	**0.250**	3.50E-01	1.64E+01	7.22E-01	4.29E+01	1.36E-01	2.17E+00	6.27E+01
250≤R<500	**0.040**	5.61E-02	2.63E+00	1.15E-01	6.87E+00	2.18E-02	3.48E-01	1.00E+01
500≤R<1000	**0.011**	1.54E-02	7.22E-01	3.17E-02	1.89E+00	6.00E-03	9.56E-02	2.76E+00
1000≤R<1500	**0.003**	4.20E-03	1.97E-01	8.66E-03	5.15E-01	1.64E-03	2.61E-02	7.53E-01
1500≤R<2000	**0.002**	2.80E-03	1.31E-01	5.77E-03	3.44E-01	1.09E-03	1.74E-02	5.02E-01
2000<R	**0.001**	1.40E-03	6.56E-02	2.89E-03	1.72E-01	5.45E-04	8.69E-03	2.51E-01

Note, total risks incorporate both ICEs and flare. Conservative as both ICEs and flare are not run simultaneously.

Distance from nearest source to nearest sensitive rreceptor, a residence to the south, is approximately 1 mile (1609 meters)

	Cancer	Chronic	Acute
NH3	0.00E+00	2.80E-03	1.75E-03
Organics	1.31E-01	1.11E-03	2.35E-03
Dust	5.77E-03	3.20E-04	3.68E-04
Diesel and Exhaust	3.44E-01	5.95E-04	9.80E-05
Paved Road Dust	1.09E-03	7.30E-05	2.90E-05
Unpaved Road Dust	1.74E-02	7.16E-04	5.04E-04
	4.99E-01	**5.61E-03**	**5.10E-03**

Name: Composting - Ammonia

Prioritization Calculator

Applicability	Use to provide a Prioritization score based on the emission potency method. Entries required in yellow areas, output in gray areas.				
Author or updater	Matthew Cegielski	*Last Update*	November 2, 2020		
Facility: **ID#:** **Project #:** **Unit and Process#**					
Operating Hours hr/yr	8,760.00				

Receptor Proximity and Proximity Factors		Cancer Score	Chronic Score	Acute Score	Max Score
0< R<100	**1.000**	0.00E+00	1.40E+00	8.76E-01	1.40E+00
100≤R<250	**0.250**	0.00E+00	3.50E-01	2.19E-01	3.50E-01
250≤R<500	**0.040**	0.00E+00	5.61E-02	3.50E-02	5.61E-02
500≤R<1000	**0.011**	0.00E+00	1.54E-02	9.63E-03	1.54E-02
1000≤R<1500	**0.003**	0.00E+00	4.20E-03	2.63E-03	4.20E-03
1500≤R<2000	**0.002**	0.00E+00	2.80E-03	1.75E-03	2.80E-03
2000<R	**0.001**	0.00E+00	1.40E-03	8.76E-04	1.40E-03

Receptor proximity is in meters. Priortization scores are calculated by multiplying the total scores summed below by the proximity factors. Record the Max score for your receptor distance. If the substance list for the unit is longer than the number of rows here or if there are multiple processes use additional worksheets and sum the totals of the Max Scores.

0	Enter the unit's CAS# of the substances emitted and their amounts.				Prioritzation score for each substance generated below. Totals on last row.		
Substance	**CAS#**	**Annual Emissions (lbs/yr)**	**Maximum Hourly (lbs/hr)**	**Average Hourly (lbs/hr)**	**Cancer**	**Chronic**	**Acute**
Ammonia	**7664417**	16,367.10	1.87	1.87E+00	0.00E+00	1.40E+00	8.76E-01
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				Totals	**0.00E+00**	**1.40E+00**	**8.76E-01**

Name: Composting - Organics

Prioritization Calculator

Applicability	Use to provide a Prioritization score based on the emission potency method. Entries required in yellow areas, output in gray areas.						
Author or updater	Matthew Cegielski		*Last Update*	November 2, 2020			
Facility: **ID#:** **Project #:** **Unit and Process#**							
Operating Hours hr/yr	8,760.00						

Receptor Proximity and Proximity Factors		Cancer Score	Chronic Score	Acute Score	Max Score
0< R<100	**1.000**	6.56E+01	5.53E-01	1.17E+00	6.56E+01
100≤R<250	**0.250**	1.64E+01	1.38E-01	2.93E-01	1.64E+01
250≤R<500	**0.040**	2.63E+00	2.21E-02	4.70E-02	2.63E+00
500≤R<1000	**0.011**	7.22E-01	6.09E-03	1.29E-02	7.22E-01
1000≤R<1500	**0.003**	1.97E-01	1.66E-03	3.52E-03	1.97E-01
1500≤R<2000	**0.002**	1.31E-01	1.11E-03	2.35E-03	1.31E-01
2000<R	**0.001**	6.56E-02	5.53E-04	1.17E-03	6.56E-02

Receptor proximity is in meters. Priortization scores are calculated by multiplying the total scores summed below by the proximity factors. Record the Max score for your receptor distance. If the substance list for the unit is longer than the number of rows here or if there are multiple processes use additional worksheets and sum the totals of the Max Scores.

Enter the unit's CAS# of the substances emitted and their amounts.

Prioritzation score for each substance generated below. Totals on last row.

0

Substance	CAS#	Annual Emissions (lbs/yr)	Maximum Hourly (lbs/hr)	Average Hourly (lbs/hr)	Cancer	Chronic	Acute
Isopropyl alcohol	**67630**	20,753.06	2.37	2.37E+00	0.00E+00	5.08E-02	1.11E+00
Methanol	**67561**	6,273.50	0.72	7.16E-01	0.00E+00	2.69E-02	3.84E-02
Naphthalene	**91203**	245.25	0.03	2.80E-02	6.42E+01	4.67E-01	0.00E+00
Propylene	**115071**	107.91	0.01	1.23E-02	0.00E+00	6.16E-04	0.00E+00
Acetaldehyde	**75070**	68.67	0.01	7.84E-03	1.43E+00	8.40E-03	2.50E-02
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				Totals	**6.56E+01**	**5.53E-01**	**1.17E+00**

Name: Composting - Dust

Prioritization Calculator

Applicability	Use to provide a Prioritization score based on the emission potency method. Entries required in yellow areas, output in gray areas.				
Author or updater	Matthew Cegielski	*Last Update*	November 2, 2020		
Facility: **ID#:** **Project #:** **Unit and Process#**					
Operating Hours hr/yr	8,760.00				

Receptor Proximity and Proximity Factors		Cancer Score	Chronic Score	Acute Score	Max Score
0< R<100	**1.000**	2.89E+00	1.60E-01	1.84E-01	2.89E+00
100≤R<250	**0.250**	7.22E-01	4.00E-02	4.60E-02	7.22E-01
250≤R<500	**0.040**	1.15E-01	6.39E-03	7.36E-03	1.15E-01
500≤R<1000	**0.011**	3.17E-02	1.76E-03	2.02E-03	3.17E-02
1000≤R<1500	**0.003**	8.66E-03	4.80E-04	5.52E-04	8.66E-03
1500≤R<2000	**0.002**	5.77E-03	3.20E-04	3.68E-04	5.77E-03
2000<R	**0.001**	2.89E-03	1.60E-04	1.84E-04	2.89E-03

Receptor proximity is in meters. Priortization scores are calculated by multiplying the total scores summed below by the proximity factors. Record the Max score for your receptor distance. If the substance list for the unit is longer than the number of rows here or if there are multiple processes use additional worksheets and sum the totals of the Max Scores.

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Enter the unit's CAS# of the substances emitted and their amounts.

Prioritzation score for each substance generated below. Totals on last row.

Substance	CAS#	Annual Emissions (lbs/yr)	Maximum Hourly (lbs/hr)	Average Hourly (lbs/hr)	Cancer	Chronic	Acute
Arsenic	**7440382**	4.73E-03	1.50E-06	5.40E-07	1.20E-01	5.40E-03	1.12E-02
Cadmium	**7440439**	1.53E-03	4.83E-07	1.74E-07	4.94E-02	1.31E-03	0.00E+00
Chromium, hexavalent	**18540299**	1.87E-03	5.91E-07	2.13E-07	2.16E+00	1.60E-04	0.00E+00
Cobalt	**7440484**	6.72E-03	2.12E-06	7.67E-07	3.98E-01	0.00E+00	0.00E+00
Copper	**7440508**	5.27E-02	1.67E-05	6.01E-06	0.00E+00	0.00E+00	2.50E-04
Lead	**7439921**	1.53E-01	4.83E-05	1.74E-05	1.41E-02	0.00E+00	0.00E+00
Manganese	**7439965**	3.36E-01	1.06E-04	3.83E-05	0.00E+00	6.39E-02	0.00E+00
Mercury	**7439976**	7.63E-04	2.41E-07	8.71E-08	0.00E+00	4.36E-04	6.04E-04
Nickel	**7440020**	7.25E-02	2.29E-05	8.28E-06	1.45E-01	8.87E-02	1.72E-01
Selenium	**7782492**	7.63E-04	2.41E-07	8.71E-08	0.00E+00	6.53E-07	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				Totals	**2.89E+00**	**1.60E-01**	**1.84E-01**

Name: Mobile Sources - Diesel and Gas Exhaust

Prioritization Calculator

Applicability	Use to provide a Prioritization score based on the emission potency method. Entries required in yellow areas, output in gray areas.		
Author or updater	Matthew Cegielski	*Last Update*	November 2, 2020
Facility: **ID#:** **Project #:** **Unit and Process#**			
Operating Hours hr/yr	8,760.00		

Receptor Proximity and Proximity Factors		Cancer Score	Chronic Score	Acute Score	Max Score
0< R<100	**1.000**	1.72E+02	2.97E-01	4.90E-02	1.72E+02
100≤R<250	**0.250**	4.29E+01	7.43E-02	1.22E-02	4.29E+01
250≤R<500	**0.040**	6.87E+00	1.19E-02	1.96E-03	6.87E+00
500≤R<1000	**0.011**	1.89E+00	3.27E-03	5.39E-04	1.89E+00
1000≤R<1500	**0.003**	5.15E-01	8.92E-04	1.47E-04	5.15E-01
1500≤R<2000	**0.002**	3.44E-01	5.95E-04	9.80E-05	3.44E-01
2000<R	**0.001**	1.72E-01	2.97E-04	4.90E-05	1.72E-01

Receptor proximity is in meters. Priortization scores are calculated by multiplying the total scores summed below by the proximity factors. Record the Max score for your receptor distance. If the substance list for the unit is longer than the number of rows here or if there are multiple processes use additional worksheets and sum the totals of the Max Scores.

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Enter the unit's CAS# of the substances emitted and their amounts.

Prioritzation score for each substance generated below. Totals on last row.

Substance	CAS#	Annual Emissions (lbs/yr)	Maximum Hourly (lbs/hr)	Average Hourly (lbs/hr)	Cancer	Chronic	Acute
Diesel engine exhaust, particulate matter (Diesel PM)	**9901**	74.097	6.84E-02	8.46E-03	1.71E+02	2.54E-01	0.00E+00
1,2,4-Trimethylbenze	**95636**	4.16E-01	1.48E-04	4.75E-05	0.00E+00	0.00E+00	0.00E+00
1,3-Butadiene	**106990**	2.29E-01	8.15E-05	2.61E-05	2.99E-01	1.96E-03	1.85E-04
Acetaldehyde	**75070**	1.04E-01	3.70E-05	1.19E-05	2.16E-03	1.27E-05	1.18E-04
Acrolein	**107028**	5.83E-02	2.07E-05	6.65E-06	0.00E+00	2.85E-03	1.24E-02
Benzene	**71432**	1.11E+00	3.95E-04	1.27E-04	2.48E-01	6.33E-03	2.19E-02
Chlorine	**7782505**	3.21E-01	1.14E-04	3.67E-05	0.00E+00	2.75E-02	8.17E-04
Copper	**7440508**	2.33E-03	8.30E-07	2.66E-07	0.00E+00	0.00E+00	1.24E-05
Ethyl benzene	**100414**	4.53E-01	1.61E-04	5.18E-05	8.73E-03	3.88E-06	0.00E+00
Formaldehyde	**50000**	7.13E-01	2.54E-04	8.14E-05	3.30E-02	1.36E-03	6.93E-03
Hexane	**110543**	6.65E-01	2.37E-04	7.59E-05	0.00E+00	1.63E-06	0.00E+00
Manganese	**7439965**	2.33E-03	8.30E-07	2.66E-07	0.00E+00	4.43E-04	0.00E+00
Methanol	**67561**	1.71E-01	6.09E-05	1.95E-05	0.00E+00	7.32E-07	3.26E-06
Methyl ethyl ketone	**78933**	8.33E-03	2.97E-06	9.51E-07	0.00E+00	0.00E+00	3.42E-07
Methyl tert-butyl ether	**1634044**	8.12E-01	2.89E-04	9.27E-05	1.63E-03	1.74E-06	0.00E+00
m-Xylene	**108383**	1.53E+00	5.46E-04	1.75E-04	0.00E+00	3.75E-05	3.72E-05
Naphthalene	**91203**	2.08E-02	7.42E-06	2.38E-06	5.45E-03	3.96E-05	0.00E+00
Nickel	**7440020**	2.33E-03	8.30E-07	2.66E-07	4.67E-03	2.85E-03	6.22E-03
o-Xylene	**95476**	5.32E-01	1.90E-04	6.08E-05	0.00E+00	1.30E-05	1.29E-05
Styrene	**100425**	4.99E-02	1.78E-05	5.70E-06	0.00E+00	9.50E-07	1.27E-06
Toluene	**108883**	2.47E+00	8.80E-04	2.82E-04	0.00E+00	1.01E-04	2.64E-04
				Totals	**1.72E+02**	**2.97E-01**	**4.90E-02**

Name: Mobile Sources - Paved Road Dust

Prioritization Calculator

Applicability	Use to provide a Prioritization score based on the emission potency method. Entries required in yellow areas, output in gray areas.				
Author or updater	Matthew Cegielski	*Last Update*	November 2, 2020		
Facility: **ID#:** **Project #:** **Unit and Process#**					
Operating Hours hr/yr	8,760.00				

Receptor Proximity and Proximity Factors		Cancer Score	Chronic Score	Acute Score	Max Score
0< R<100	**1.000**	5.45E-01	3.65E-02	1.45E-02	5.45E-01
100≤R<250	**0.250**	1.36E-01	9.12E-03	3.63E-03	1.36E-01
250≤R<500	**0.040**	2.18E-02	1.46E-03	5.81E-04	2.18E-02
500≤R<1000	**0.011**	6.00E-03	4.01E-04	1.60E-04	6.00E-03
1000≤R<1500	**0.003**	1.64E-03	1.09E-04	4.35E-05	1.64E-03
1500≤R<2000	**0.002**	1.09E-03	7.30E-05	2.90E-05	1.09E-03
2000<R	**0.001**	5.45E-04	3.65E-05	1.45E-05	5.45E-04

Receptor proximity is in meters. Priortization scores are calculated by multiplying the total scores summed below by the proximity factors. Record the Max score for your receptor distance. If the substance list for the unit is longer than the number of rows here or if there are multiple processes use additional worksheets and sum the totals of the Max Scores.

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Enter the unit's CAS# of the substances emitted and their amounts.

Prioritzation score for each substance generated below. Totals on last row.

Substance	CAS#	Annual Emissions (lbs/yr)	Maximum Hourly (lbs/hr)	Average Hourly (lbs/hr)	Cancer	Chronic	Acute
Arsenic	**7440382**	2.53E-03	9.40E-07	2.89E-07	6.43E-02	2.89E-03	7.05E-03
Cadmium	**7440439**	5.84E-04	2.17E-07	6.66E-08	1.89E-02	5.00E-04	0.00E+00
Chromium, hexavalent	**18540299**	1.65E-04	6.15E-08	1.89E-08	1.91E-01	1.42E-05	0.00E+00
Cobalt	**7440484**	4.47E-03	1.66E-06	5.11E-07	2.65E-01	0.00E+00	0.00E+00
Copper	**7440508**	2.88E-02	1.07E-05	3.29E-06	0.00E+00	0.00E+00	1.61E-04
Lead	**7439921**	2.41E-02	8.97E-06	2.75E-06	2.23E-03	0.00E+00	0.00E+00
Manganese	**7439965**	1.56E-01	5.78E-05	1.78E-05	0.00E+00	2.96E-02	0.00E+00
Mercury	**7439976**	2.33E-03	8.68E-07	2.67E-07	0.00E+00	1.33E-03	2.17E-03
Nickel	**7440020**	1.75E-03	6.51E-07	2.00E-07	3.51E-03	2.14E-03	4.88E-03
Selenium	**7782492**	3.89E-04	1.45E-07	4.44E-08	0.00E+00	3.33E-07	0.00E+00
Vanadium (fume or dust)	**7440622**	1.38E-02	5.13E-06	1.58E-06	0.00E+00	0.00E+00	2.57E-04
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				Totals	**5.45E-01**	**3.65E-02**	**1.45E-02**

Name: Mobile Sources - Unpaved Road Dust

Prioritization Calculator

Applicability	Use to provide a Prioritization score based on the emission potency method. Entries required in yellow areas, output in gray areas.			
Author or updater	Matthew Cegielski	*Last Update*	November 2, 2020	
Facility:				
ID#:				
Project #:				
Unit and Process#				
Operating Hours hr/yr	8,760.00			

Receptor Proximity and Proximity Factors		Cancer Score	Chronic Score	Acute Score	Max Score
0< R<100	**1.000**	8.69E+00	3.58E-01	2.52E-01	8.69E+00
100≤R<250	**0.250**	2.17E+00	8.96E-02	6.30E-02	2.17E+00
250≤R<500	**0.040**	3.48E-01	1.43E-02	1.01E-02	3.48E-01
500≤R<1000	**0.011**	9.56E-02	3.94E-03	2.77E-03	9.56E-02
1000≤R<1500	**0.003**	2.61E-02	1.07E-03	7.56E-04	2.61E-02
1500≤R<2000	**0.002**	1.74E-02	7.16E-04	5.04E-04	1.74E-02
2000<R	**0.001**	8.69E-03	3.58E-04	2.52E-04	8.69E-03

Receptor proximity is in meters. Priortization scores are calculated by multiplying the total scores summed below by the proximity factors. Record the Max score for your receptor distance. If the substance list for the unit is longer than the number of rows here or if there are multiple processes use additional worksheets and sum the totals of the Max Scores.

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Enter the unit's CAS# of the substances emitted and their amounts.

Prioritzation score for each substance generated below. Totals on last row.

Substance	CAS#	Annual Emissions (lbs/yr)	Maximum Hourly (lbs/hr)	Average Hourly (lbs/hr)	Cancer	Chronic	Acute
Arsenic	**7440382**	1.50E-02	5.34E-06	1.71E-06	3.81E-01	1.71E-02	4.00E-02
Cadmium	**7440439**	4.84E-03	1.72E-06	5.52E-07	1.56E-01	4.14E-03	0.00E+00
Chromium, hexavalent	**18540299**	5.92E-03	2.11E-06	6.76E-07	6.84E+00	5.07E-04	0.00E+00
Cobalt	**7440484**	2.13E-02	7.58E-06	2.43E-06	1.26E+00	0.00E+00	0.00E+00
Copper	**7440508**	1.67E-01	5.94E-05	1.90E-05	0.00E+00	0.00E+00	8.91E-04
Lead	**7439921**	4.84E-01	1.72E-04	5.52E-05	4.47E-02	0.00E+00	0.00E+00
Manganese	**7439965**	1.06E+00	3.79E-04	1.21E-04	0.00E+00	2.02E-01	0.00E+00
Mercury	**7439976**	2.30E-01	8.18E-05	2.62E-05	0.00E+00	1.31E-01	2.04E-01
Nickel	**7440020**	2.42E-03	8.61E-07	2.76E-07	4.84E-03	2.96E-03	6.46E-03
Selenium	**7782492**	2.42E-03	8.61E-07	2.76E-07	0.00E+00	2.07E-06	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				Totals	**8.69E+00**	**3.58E-01**	**2.52E-01**