4.2 AIR QUALITY AND GREENHOUSE GAS EMISSIONS

This analysis is based on an Air Quality and Greenhouse Gas Technical Report prepared for the project by AECOM (included as Appendix C, updated in October 2015), as well as other environmental documents prepared for the Tajiguas Landfill Project.

4.2.1 Setting

4.2.1.1 Climatological Setting

Southern California lies in a semi-permanent, high pressure zone of the eastern Pacific region. The coastal strip is characterized by limited rainfall (i.e., approximately 17.6 inches per year), most of which occurs in the winter season, and warm, dry summers tempered by cooling sea breezes. In spring, summer and fall, the climate is dominated by marine air. Light synoptic-scale winds in the region allow marine air influence to dominate temperatures and air flow. In winter, low pressure weather systems originating in the northern Pacific Ocean bring clouds, rain and strong winds into Santa Barbara County. Inland high pressure areas also bring periods of dry, warm offshore “Santa Ana” winds during the fall. For further discussion of regional topography, meteorology, and climate, please refer to Section 3.11.1.1 of the Tajiguas Landfill Expansion EIR (01-EIR-05), which remains valid and applicable to the proposed project.

The Tajiguas Landfill is located in Cañada de la Pila, a north-to-south oriented canyon, perpendicular to the east-west oriented Gaviota Coast. Sea breezes blowing from the ocean and land breezes from the mountains to the north of the landfill are channeled up Cañada de la Pila. East-west winds do not exert much effect at ground-level within the landfill because of the relatively high ridges that border the landfill on both sides. For further discussion of site-specific topography, meteorology, and climate, please refer to Section 3.11.1.1 of the Tajiguas Landfill Expansion EIR (01-EIR-05).

4.2.1.2 Ambient Air Quality

Air quality in the County is directly related to emissions and regional topographic and meteorological factors. The California Air Resources Board (CARB) has divided the state into regional air basins according to topographic air drainage features. The Tajiguas Landfill is situated in the South Central Coast Air Basin (SCCAB), which encompasses the counties of Ventura, Santa Barbara and San Luis Obispo. The U.S. Environmental Protection Agency (USEPA), CARB, and the local air districts classify an area as attainment, unclassified, or nonattainment depending on whether or not the monitored ambient air quality data shows compliance, insufficient data available, or non-compliance with the ambient air quality standards, respectively. The National and California Ambient Air Quality Standards (NAAQS and CAAQS) relevant to the proposed project are provided in Table 4.2-1.

Table 4.2-1. Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards	Federal Standards (NAAQS)	
			Primary	Secondary
Ozone (O$_3$)	1-hour	0.09 ppm (180 µg/m^3)	--	--
	8-hour	0.07 ppm (137 µg/m^3)	0.070 ~~0.075~~ ppm (137 ~~147~~ µg/m^3)	Same as primary
Respirable Particulate Matter (PM$_{10}$)	24-hour	50 µg/m^3	150 µg/m^3	Same as primary
	Annual	20 µg/m^3	--	--
Fine Particulate Matter (PM$_{2.5}$)	24-hour ~~(3)~~	--	35 µg/m^3	Same as primary
	Annual	12 µg/m^3	12 µg/m^3	Same as primary
Carbon Monoxide (CO)	1-hour	20 ppm (23 µg/m^3)	35 ppm (40 mg/m^3)	--
	8-hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	--
Nitrogen dioxide (NO$_2$)	1-hour	0.18 ppm (339 µg/m^3)	0.10 ppm (188 µg/m^3)	Same as primary
	Annual	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as primary
Sulfur dioxide (SO$_2$)	1-hour	0.25 ppm (655 µg/m^3)	0.075 ppm (196 µg/m^3)	--
	3-hour	--	--	0.50 ppm (1300 µg/m^3)
	24-hour	0.04 ppm (105 µg/m^3)	0.014 ppm (for certain areas)	--
	Annual Arithmetic Mean		0.030 ppm (for certain areas)	
Lead (Pb)	30-Day	1.5 µg/m^3	--	--
	Quarterly	---	1.5 µg/m^3	Same as primary
	3-Month	---	0.15 µg/m^3	Same as primary
Sulfates	24-hour	25 µg/m^3	--	--
Hydrogen sulfide (H$_2$S)	1-hour	0.03 ppm (42 µg/m^3)	--	--
Visibility Reducing Particles (VRP)	8-hour	Extinction coefficient of 0.23 per kilometer	--	--
Vinyl Chloride	24-hour	0.01 ppm (26 µg/m^3)	--	--

Attainment Status

Santa Barbara County was designated unclassifiable/attainment for the 2008 Federal 8-hour ozone standard on April 30, 2012. A revised Federal 8-hour ozone standard was adopted on October 1, 2015; however, no changes to area attainment designations are expected until 2017. The 1-hour Federal ozone standard was revoked for Santa Barbara County. The County is also considered in attainment for the State 1-hour standard for ozone as of June, 2007. The California 8-hour ozone standard was implemented in May, 2006. The County violates the California 8-hour ozone standard and the California standard for PM_{10}. The County is unclassifiable/attainment for the Federal $PM_{2.5}$ standard and unclassified for the California $PM_{2.5}$ standard (based on monitored data from 2007 to 2009).

According to Santa Barbara County's 2010 Clean Air Plan, the largest human-generated contributors to locally generated air pollution in Santa Barbara County are on-road mobile sources (cars and trucks). Other mobile sources (planes, trains, boats, off-road equipment, farm equipment), the evaporation of solvents, combustion of fossil fuels, surface cleaning and coating, prescribed burning, and petroleum production and marketing combine to make up the remainder (SBCAPCD and SBCAG 2011). The primary sources of PM_{10} and $PM_{2.5}$ include mineral quarries, grading, demolition, agricultural tilling, road dust, and vehicle exhaust.

Since the last air quality study was performed for the Tajiguas Landfill, the following changes have occurred related to the $PM_{2.5}$ and NO_2 CAAQS and NAAQS:

$PM_{2.5}$:

- In 2002, California adopted an annual $PM_{2.5}$ CAAQS of 12.0 $\mu g/m^3$. There is no 24-hour $PM_{2.5}$ CAAQS.
- On October 17, 2006, the 24-hour $PM_{2.5}$ NAAQS was lowered from 65 $\mu g/m^3$ to 35 $\mu g/m^3$.
- On December 14, 2012, USEPA strengthened the $PM_{2.5}$ annual NAAQS from 15 $\mu g/m^3$ to 12 $\mu g/m^3$, while retaining the 24-hour $PM_{2.5}$ NAAQS of 35 $\mu g/m^3$.
- Additionally during the intervening period between the last air quality study at Tajiguas Landfill and the current study, the policy of allowing the use of PM_{10} as a surrogate for a $PM_{2.5}$ compliance demonstration has ended.

NO_2:

- On February 9, 2010, the new 1-hour NO_2 NAAQS of 100 ppb (188 μg/m^3), measured by taking the 3-year average of the 98th percentile daily maximum impact, was promulgated. This NAAQS became effective in April 2010.
- On February 19, 2008, the California 1-hour NO_2 standard was strengthened from 470 μg/m^3 (0.25 ppm) to 339 μg/m^3 (0.18 ppm) and established an annual NO_2 standard of 57 μg/m^3. The strengthened California 1-hour NO_2 standard was promulgated subsequent to the prior EIRs.

Air Quality Monitoring

The air quality of Santa Barbara County is monitored by a network of 18 stations. Stations fall into two primary categories: State and Local Air Monitoring Stations (SLAMS) and Prevention of Significant Deterioration (PSD) stations. Six SLAMS measure urban and regional air quality. Two SLAMS stations are operated by the CARB (Santa Barbara and Santa Maria) and four by the Santa Barbara County Air Pollution Control District (SBCAPCD); Lompoc, Santa Ynez, El Capitan, and Goleta. Five of these stations measure ambient concentrations of carbon monoxide, ozone, nitrogen oxides, PM_{10}, and sulfur dioxide.

An air quality monitoring station is not located in the immediate vicinity of the Tajiguas Landfill. However, the Las Flores Canyon #1 PSD station is located approximately 4.8 miles east of the landfill. In addition, the El Capitan Beach SLAMS station is located approximately 6.2 miles to the east-southeast of the landfill. Table 4.2-2 lists the monitored maximum concentrations and number of exceedances of air quality standards at these two stations for the years 2011 through 2013. As shown in Table 4.2-2, ozone concentrations monitored at the Las Flores Canyon #1 station periodically exceed the State 8-hour standard, while ozone concentrations are typically lower at El Capitan Beach. The concentrations of PM_{10} monitored at the El Capitan and Las Flores station rarely exceeded the State or Federal standards during 2011 to 2013.

4.2.1.3 Existing Sources and Emissions at the Tajiguas Landfill

As discussed in the Tajiguas Landfill Expansion EIR (01-EIR-05) the following is a list of the existing on-site and off-site air emissions sources associated with the current operation of the Tajiguas Landfill.

On-site sources:

- Combustion products from landfill gas control system;
- Landfill gas emissions (fugitive) from the surface of the covered waste;

- Exhaust emissions from haul trucks, non-road mobile equipment and on-road vehicles for maintenance, delivery, employees, County staff and visitors; and
- Fugitive dust emissions from landfill operations, such as vehicle and non-road equipment travel on paved and unpaved roads, dozers and scrapers moving dirt in excavation and working face areas, and wind erosion of disturbed soil.

Table 4.2-2. Air Quality Summary for Non-Attainment Pollutants in the Project Area

Parameter	**Standard**	**Year**		
		2011	**2012**	**2013**
Ozone – parts per million (ppm) (El Capitan Beach/Las Flores Canyon)				
Maximum 1-hr concentration monitored		0.105/0.099	0.074/0.091	0.069/0.081
Number of days exceeding CAAQS	0.09	1/1	0/0	0/0
Maximum 8-hr concentration monitored		0.077/0.091	0.063/0.082	0.061/0.074
Number of days exceeding 8-hour NAAQS	0.075	1/1	0/2	0/0
Number of days exceeding 8-hour CAAQS	0.07	1/2	0/4	0/1
PM_{10} – micrograms per cubic meter (μg/m^3) (El Capitan Beach/Las Flores Canyon)				
Maximum sample		36/33	41/35	55/51.4
Number of samples exceeding CAAQS	50	0/0	0/0	2/1
Number of samples exceeding NAAQS	150	0/0	0/0	0/0

Off-site sources:

- Haul trucks;
- Delivery vehicles;
- Employee, County staff and visitor vehicles; and
- On-site service vehicles used off-site.

4.2.1.4 Landfill Baseline Greenhouse Gas Emissions

Greenhouse gas (GHG) emissions associated with ongoing waste disposal at the Tajiguas Landfill have been projected into the future to facilitate comparison to the proposed project. This projection is used in the impact analysis to demonstrate the additive effects of project-related waste diversion over an extended time period. Methodologies and equations from 40 CFR 98 Subpart HH were used to develop the projection. Baseline data were taken directly from the Tajiguas Landfill's 2012 report to the USEPA. Projected years required the following additional assumptions:

- 188,654 metric tons (MT) of waste disposed of annually (current 10 year average).

- Annual waste is disposed of until 2036, when the landfill reaches capacity (with project).
- Final emissions projection year of 2066.

Whether or not Tajiguas Landfill is expanded after 2026, waste will continue to be generated and disposed of at another location, producing landfill gas (methane). The proposed project would extend the life of the landfill until 2036. To develop an appropriate baseline for comparison, it was assumed that waste would be disposed of under the current conditions at Tajiguas Landfill until 2036. The final emissions year was selected as 2066 because the USEPA (2010) estimates that a landfill can produce methane emissions from waste for up to 30 years. Based on these inputs annual emissions were calculated and are shown in Figure 4.2-1. Total GHG emissions estimated to be produced from 2015-2066 under existing conditions is 3,288,000 MT carbon dioxide equivalent (CO_2e), with an estimated annual average over the 52-year period of 63,231 MT CO_2e.

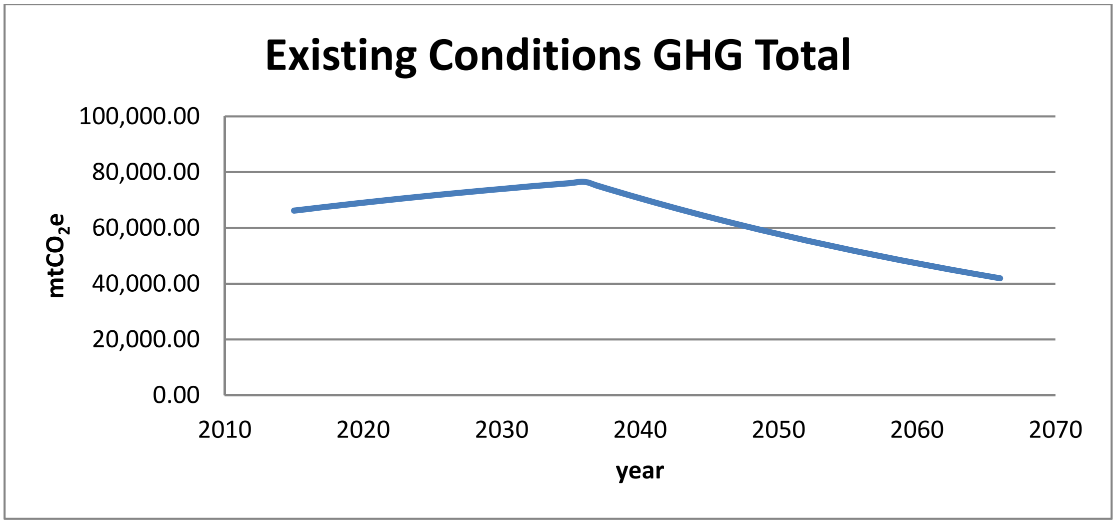


Figure 4.2-1. Projected Total Greenhouse Gas Emissions for Current Tajiguas Landfill Conditions

4.2.1.5 Sensitive Receptors

Some land uses are considered more sensitive to air pollution than others due to population groups and/or activities involved. Sensitive population groups include children, the elderly, the acutely ill and the chronically ill, especially those with cardio-respiratory diseases. Residential areas are also considered to be sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present.

Recreational land uses may be considered moderately sensitive to air pollution. Although exposure periods are generally short, exercise places a high demand on respiratory functions, which can be impaired by air pollution. In addition, noticeable air pollution can detract from the enjoyment of recreation. Industrial and commercial areas are considered the least sensitive to air pollution. Exposure periods are relatively short and intermittent, as the majority of the workers tend to stay indoors most of the time. In addition, the working population is generally the healthiest segment of the public.

The nearest population centers include Solvang approximately 8 miles to the north, and the cities of Goleta and Santa Barbara, which are approximately 18 miles and 20 miles southeast of the project site, respectively. Approximately 0.5 miles to the south of the project site there are several residences located along Arroyo Quemado Lane, south of the U.S. 101 Freeway, in unincorporated Santa Barbara County. The nearest existing residential receptor to the project is located approximately 0.73 miles to the southeast of the project site (see Figure 4.2-3). A proposed residence on agricultural zoned property would be located closer, on APN 081-150-034 approximately 1,750 feet south of the proposed composting area. An additional receptor considered in the odor analysis is the Baron Ranch hiking trail, which runs in a north-south direction approximately 1,600 feet east of the site.

4.2.1.6 Attainment Planning

Federal

The Federal government first adopted the Clean Air Act (CAA) in 1963 to improve air quality and protect citizens' health and welfare, which required implementation of the NAAQS. The NAAQS are revised and changed when scientific evidence indicates a need. The CAA also requires each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The CAA Amendments of 1990 added requirements for states with non-attainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies.

The USEPA has been charged with implementing Federal air quality programs, which includes the review and approval of all SIPs to determine conformation to the mandates of the CAA and its amendments, and to determine whether implementation of the SIPs will achieve air quality goals. If the USEPA determines that a SIP is inadequate, a Federal Implementation Plan that imposes additional control measures may be prepared for the non-attainment area. Failure to submit an approvable SIP or to implement the plan within the mandated time frame may result in application of sanctions to transportation funding and stationary air pollution sources within the air basin.

Pursuant to the CAA, State and local agencies are responsible for planning for attainment and maintenance of the NAAQS. The USEPA classifies air basins (i.e., distinct geographic regions) as either “attainment” or “non-attainment” for each criteria pollutant, based on whether or not the NAAQS have been achieved. Some air basins have not received sufficient analysis for certain criteria air pollutants and are designated as “unclassified” for those pollutants. The SBCAPCD and the CARB are the responsible agencies for providing attainment plans and for demonstrating attainment of these standards within the proposed project area.

State

The California Clean Air Act (CCAA), signed into law in 1988, requires all areas to achieve and maintain attainment with the CAAQS by the earliest possible date. The CCAA, enforced by CARB, requires that each area exceeding the CAAQS develop a plan aimed at achieving those standards. The California Health and Safety Code, Section 40914, requires air districts to design a plan that achieves an annual reduction in district-wide emissions of 5 percent or more, averaged every consecutive 3-year period. To satisfy this requirement, the local air districts are required to develop and implement air pollution reduction measures, which are described in their clean air plans, incorporated into the SIP, and outline strategies for achieving the State ambient air quality standards for criteria pollutants for which the region is classified as non-attainment.

The CCAA mandates that every three years areas update their clean air plans (i.e., the AQMP) to attain the State ozone standard. The SBCAPCD Board adopted the 2010 Clean Air Plan on January 20, 2011. The 2010 Plan provides the three-year update to the SBCAPCD’s 2007 Clean Air Plan. Previous plans developed to comply with the state ozone standard include the 1991 Air Quality Attainment Plan, the 1994 Clean Air Plan, the 1998 Clean Air Plan, the 2001 Clean Air Plan and the 2004 Clean Air Plan.

The SBCAPCD prepared the 2010 Clean Air Plan in partnership with Santa Barbara County Association of Government (SBCAG) and the CARB. SBCAG provided future growth projections, developed the transportation control measures, and estimated the on-road mobile source emissions. CARB provided information on statewide mobile sources and consumer product control measures. The 2010 Clean Air Plan includes a climate protection chapter, with an inventory of carbon dioxide (CO_2) emissions in the County. This chapter is informational, and not regulatory. CO_2 is the most prevalent greenhouse gas, and the one for which the SBCAPCD has the most accurate data. The 2013 Clean Air Plan was adopted on March 19, 2015 as a triennial update to the 2010 Clean Air Plan and indicates air quality is improving, and strategies for further air pollutant emissions reductions are focused on mobile sources, particularly marine shipping.

Local Authority

The SBCAPCD is the local agency that has primary responsibility for regulating stationary sources of air pollution located within its jurisdictional boundaries. To this end, the SBCAPCD implements air quality programs required by State and federal mandates, enforces rules and regulations based on air pollution laws, and educates businesses and residents about their role in protecting air quality. The SBCAPCD is also responsible for managing and permitting existing, new, and modified sources of air emissions within the County.

The applicable rules and regulations for this project include:

- Rule 201 (Permits Required): This rule requires an Authority to Construct and Permit to Operate before the construction or operation, respectively, of non-exempt emission sources.
- Rule 302 (Visible Emissions): This rule limits visible emissions from emissions sources.
- Rule 303 (Nuisance): This rules states that a person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.
- Rule 309 (Specific Contaminants): This rule sets limits on the concentrations of discharges of combustion contaminants, including SO_2, NO_2, CO, CO_2 and particulate matter.
- Rule 311 (Sulfur Content of Fuels): This rule sets limits on the sulfur content of fuels, and would apply to any combustion of natural gas or propane in the CHP engines or flare.
- Rule 333 (Control of Emissions from Reciprocating Internal Combustion Engines): This rule establishes limits on emissions from reciprocating internal combustion engines, including emissions of NO_x, ROC and CO from lean-burn spark ignition engines.
- Rule 345 (Control of Fugitive Dust from Construction and Demolition Activities): This rule applies to any activity associated with construction or demolition of a structure or structures. Activities subject to this regulation are also subject to Rule 302 (Visible Emissions) and Rule 303 (Nuisance).
- Rule 359 (Flares and Thermal Oxidizers): This rule applies to combustion of gases in flares associated with petroleum production and natural gas transportation, and includes limits on sulfur content and NO_x and ROC emissions.

- Rules 801 to 809 (New Source Review – NSR): These rules apply to any applicant for a new or modified stationary source which emits or may emit any affected pollutant. The proposed CHP engines would be subject to NSR.

4.2.1.7 Toxic Air Contaminants

Federal Authority

The USEPA administers several programs that regulate emissions of hazardous air pollutants (HAPs) from stationary and mobile sources. The USEPA identified 189 HAPs that may present a threat to human health or the environment and are regulated under control technology programs. Also, the USEPA has identified 33 urban HAPs that pose the greatest threats to public health in urban areas and are regulated under the Urban Air Toxics Strategy. The USEPA regulates HAP emissions primarily by setting emissions standards for vehicles and technology standards for industrial source categories. The primary regulations controlling HAP emissions are USEPA's National Emission Standards for Hazardous Air Pollutants (NESHAP). The USEPA has developed NESHAP requirements (40 CFR 63, Subpart ZZZZ) for reciprocating internal combustion engines that would apply to the proposed CHP engines.

State Authority

Similar to the federal HAPs, toxic air contaminants (TACs) are defined in California as air pollutants (primarily specific chemical compounds) which may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health. A primary health concern due to exposure to TACs is the risk of contracting cancer. The carcinogenic potential of TACs is of particular public health concern because it is currently believed by many scientists that there is no "safe" level of exposure to carcinogens; that is, any exposure to a carcinogen poses some risk of causing cancer. Health statistics show that one in four people (or 250,000 in a million) will contract cancer over their lifetime from all causes, including diet, genetic factors, and lifestyle choices (Doll and Peto, 1981).

Unlike carcinogens, most non-carcinogens have a threshold level of exposure below which the compound will not pose a health risk. The California Environmental Protection Agency (CalEPA) and California Office of Environmental Health Hazard Assessment (OEHHA) have developed reference exposure levels (RELs) for non-carcinogenic TACs that are health-conservative estimates of the levels of exposure at or below which health effects are not expected. The non-cancer health risk due to exposure to a TAC is assessed by comparing the estimated level of exposure to the REL. The comparison is expressed as the ratio of the estimated exposure level to the REL, called the hazard index.

CARB reviews scientific research on exposure and health effects to identify the TACs that pose the greatest threat to public health. CARB maintains a 20-station toxic monitoring network within major urban areas. Data from these monitoring stations is used to determine the average annual concentrations of TACs and to assess the effectiveness of controls.

The California State Legislature passed The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588) of 1987, and amended the Act in 1992. There are four main purposes of this legislation:

1. Identify the amount of toxic substances emitted into the air by specific businesses;
2. Estimate potential adverse health effects for members of the public exposed to these toxic air pollutants;
3. Inform the public of these toxic air emissions and the associated health impacts; and
4. Protect the public health by reducing toxic air emissions from businesses.

The California Air Toxics Program, developed by CARB, established the process for identification and control of TAC emissions and includes provisions to make the public aware of significant toxic exposures and to reduce risk. The CalEPA and the OEHHA have developed guidelines for evaluating risk. In addition, the state has adopted the Airborne Toxics Control Measures for Stationary Compression Ignition Engines, which limits the types of fuel allowed, establishes maximum allowable emission rates, and establishes recordkeeping requirements for equipment operators.

Some of the compounds that have been identified as TACs to date are briefly described below.

- DPM (diesel particulate matter): formed from the combustion of diesel fuels consists of very small carbon particles, or “soot,” which absorb diesel-related cancer-causing substances. DPM has the potential to contribute to cancer, premature death, and other health impacts, and currently contributes over 70 percent of the currently known risks from TACs.
- ROC: organic compounds that easily vaporize at room temperature such as benzene, toluene, xylenes, and certain alcohols. Sources include motor vehicle exhaust, burning waste, gasoline, industrial and consumer products, pesticides, industrial processes, degreasing operations, pharmaceutical manufacturing, and dry cleaning operations. Some ROC are highly reactive and contribute to the formation of ozone, while others have adverse, chronic, and acute health effects. In some cases, ROC can be both highly reactive and potentially toxic.

- Carbonyl compounds: such as aldehydes and ketones, contain a carbon atom and an oxygen atom linked with a double bond (C=O). CARB currently monitors four carbonyls: formaldehyde, acetaldehyde, methyl ethyl ketone, and acrolein. Major sources of directly emitted carbonyls are fuel combustion, mobile sources, and process emissions from oil refineries. Some carbonyls are highly reactive and contribute to ozone formation, while others have adverse chronic and acute health effects. In some cases, carbonyls can be both highly reactive and potentially toxic.
- Vinyl Chloride: a highly toxic, flammable carcinogen emitted by combustion sources. Infants and children are sensitive to the inhalation of vinyl chloride.
- Hydrogen Sulfide: a by-product of oil production and refining, and desulfurization processes in sewage treatment and has adverse chronic inhalation effects.

Local Authority

The SBCAPCD oversees implementation of the Air Toxics "Hot Spots" Program, which requires affected businesses, with assistance from the SBCAPCD, identify air toxic emissions. Businesses that release considerable amounts of toxic air pollutants are required to estimate public health risks associated with these emissions by performing a risk assessment. The SBCAPCD then oversees public notification and risk reduction programs required for businesses that pose a significant risk.

4.2.1.8 Greenhouse Gases and Global Climate Change

Introduction

Climate change, often referred to as “global warming” is a global environmental issue that refers to any significant change in measures of climate, including temperature, precipitation, or wind. Climate change refers to variations from baseline conditions that extend for a period (decades or longer) of time and is a result of both natural factors, such as volcanic eruptions, and anthropogenic, or man-made, factors including changes in land-use and burning of fossil fuels (USEPA 2010). Anthropogenic activities such as deforestation and fossil fuel combustion emit heat-trapping GHGs, defined as any gas that absorbs infrared radiation within the atmosphere. The heat absorption potential of a GHG is referred to as the “Global Warming Potential” (GWP). Each GHG has a GWP value based on the heat-absorption properties of the GHG relative to CO_2. This is commonly referred to as CO_2 equivalent (e).

According to data from the National Oceanic and Atmospheric Administration and the National Aeronautics and Space Administration, the Earth's average surface temperature has increased by about 1.2 to 1.4 ºF in the last century. The eight warmest years on record (since 1850) have all occurred since 1998, with the warmest year being 2012. Based on available data, the rise in temperature is most likely due to anthropogenic sources (USEPA, 2010).

Unlike criteria air pollutants and TACs, which are of regional and local concern, GHGs emissions are a global issue, as climate change is not a localized phenomenon. Eight recognized GHGs are described below. The first six are commonly analyzed for projects, while the last two are often excluded for reasons described below.

- Carbon Dioxide (CO_2): natural sources include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic degassing; anthropogenic sources of CO_2 include burning fuels such as coal, oil, natural gas, and wood.
- Methane (CH_4): natural sources include wetlands, permafrost, oceans and wildfires; anthropogenic sources include fossil fuel production, rice cultivation, biomass burning, animal husbandry (fermentation during manure management), and landfills.
- Nitrous Oxide (N_2O): natural sources include microbial processes in soil and water, including those reactions which occur in nitrogen-rich fertilizers; anthropogenic sources include industrial processes, fuel combustion, aerosol spray propellant, and use of racing fuels.
- Chlorofluorocarbons (CFCs): no natural sources, synthesized for use as refrigerants, aerosol propellants, and cleaning solvents.
- Hydroflourocarbons (HFCs): no natural sources, synthesized for use in refrigeration, air conditioning, foam blowing, aerosols, and fire extinguishing.
- Sulfur Hexaflouride (SF_6): no natural sources, synthesized for use as an electrical insulator in high voltage equipment that transmits and distributes electricity. SF_6 has a long lifespan and high GWP potency.
- Ozone: unlike the other GHGs, ozone in the troposphere is relatively short-lived and, therefore, is not global in nature. Due to the nature of ozone, and because this project is not anticipated to contribute a significant level of ozone, it is excluded from consideration in this analysis.

- Water Vapor: the most abundant and variable GHG in the atmosphere. It is not considered a pollutant and maintains a climate necessary for life. Because this project is not anticipated to contribute significant levels of water vapor to the environment, it is excluded from consideration in this analysis.

The primary GHGs that would be emitted during construction and operation of the TRRP and which are currently emitted from operation of the landfill are CO_2, CH_4 and N_2O. The project is not expected to have any associated use or release of HFCs, CFCs or SF_6.

The GWP of the three primary GHGs associated with the project are defined by the USEPA and were recently revised (effective January 1, 2014): CO_2 – GWP of 1, CH_4 – GWP of 25, and N_2O – GWP of 298.

International Authority

The Intergovernmental Panel on Climate Change (IPCC) is the leading body for the assessment of climate change. The IPCC is a scientific body that reviews and assesses the most recent scientific, technical, and socio-economic information produced worldwide relevant to the understanding of climate change. The scientific evidence brought up by the first IPCC Assessment Report of 1990 unveiled the importance of climate change as a topic deserving international political attention to tackle its consequences; it therefore played a decisive role in leading to the creation of the United Nations Framework Convention on Climate Change, the key international treaty to reduce global warming and cope with the consequences of climate change.

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

Federal Authority

On September 22, 2009, the USEPA released its final GHG Reporting Rule (Reporting Rule), in response to the fiscal year 2008 Consolidated Appropriations Act (H.R. 2764; Public Law 110-161) that required the USEPA to develop “… mandatory reporting of GHGs above appropriate thresholds in all sectors of the economy”. The Reporting Rule applies to most entities that emit 25,000 metric tons (MT) CO_2e or more per year. On September 30, 2011, facility owners were required to submit an annual GHG emissions report with detailed calculations of facility GHG emissions. The Reporting Rule mandates recordkeeping and administrative requirements in order for the USEPA to verify annual GHG emissions reports but does not regulate GHG as a pollutant.

The CAA defines the USEPA's responsibilities for protecting and improving the nation's air quality and the stratospheric ozone layer. The U.S. Congress has not passed new legislation regulating the emissions of GHGs. Lacking action from the federal government for guidance on GHG regulation and mitigation, multiple states joined together in litigation to force the USEPA to regulate GHGs. In the 2007 case of Massachusetts v. USEPA, several states requested that the USEPA recognize and regulate GHGs as air pollutants. The Supreme Court ruled affirmatively that the existing CAA gave the USEPA the authority to regulate GHGs. Subsequently, the USEPA announced a proposal to adjust implementation (called "tailoring") of the CAA to facilitate inclusion of regulation for GHGs, and, in June 2010 USEPA issued the GHG Tailoring Rule to regulate GHGs under the CAA. As a result, federally enforceable permitting requirements on new and modified facilities that are major sources of GHG emissions were created.

State Authority

In efforts to reduce and mitigate climate change impacts, state and local governments are implementing policies and initiatives aimed at reducing GHG emissions. California, one of the largest state contributors to the national GHG emission inventory, has adopted significant reduction targets and strategies. The primary legislation affecting GHG emissions in California is the California Global Warming Solutions Act (Assembly Bill [AB] 32). AB 32 focuses on reducing GHG emissions in California. AB 32 requires the CARB to adopt rules and regulations that would achieve GHG emissions equivalent to statewide levels in 1990 by 2020. In addition, two State-level Executive Orders have been enacted by the Governor (Executive Order S-3-05, signed June 1, 2005, and Executive Order S-01-07, signed January 18, 2007) that mandate reductions in GHG emissions.

Local Authority

SBCAPCD is in the process of developing a proposal to adopt GHG thresholds of significance for stationary source projects. Upon the recommendation of the SBCAPCD's Community Advisory Council and with direction from the Board of Directors, the SBCAPCD included a discussion of GHG emissions and climate protection in the 2010 Clean Air Plan. However, the discussion of GHG emissions and climate change in the 2010 Clean Air Plan is informational and not regulatory in nature; its inclusion is not mandated by state planning requirements.

Santa Barbara County's methodology to address Global Climate Change in CEQA documents is evolving. The County completed the first phase (Climate Action Study) of its climate action strategy in September 2011. The Climate Action Study provides a County-wide GHG inventory and an evaluation of potential emission reduction measures. The second phase of the County's climate action strategy is an Energy and Climate Action Plan (ECAP), ~~for which a draft has been completed and is under environmental review.~~ which was adopted by the County Board of Supervisors on June 2, 2015. The ECAP includes a base year (2007) GHG inventory for unincorporated areas of the County, which identifies total GHG emissions of 1,192,970 metric tons CO_2e and 28,560 metric tons CO_2e for construction and mining equipment (primary project-related GHG source). Note that the base year inventory does not include stationary sources and energy use (natural gas combustion and electricity generation). The focus of the ECAP is to establish a 15 percent GHG reduction target from baseline (by 2020), and develop source-based and land use-based strategies to meet this target.

~~At the March 12, 2013 Santa Barbara County Board of Supervisors hearing, the Board endorsed a 15 percent GHG reduction target and implementation mechanisms included in Option 4 of the Energy and Climate Action Plan Summary Information.~~ ECAP GHG emission reduction measures ~~that would be implemented under Option 4~~ that are potentially relevant for the TRRP include waste reduction, increased recycling opportunities, construction and demolition waste recycling and landfill disposal reductions.

4.2.1.9 Odors

State Authority

Section 41700 of the California Health and Safety Code allows air districts to adopt rules or regulations to protect the public from nuisance odor violations.

41700 (a) Except as otherwise provided in Section 41705, a person shall not discharge from any source whatsoever quantities of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or that endanger the comfort, repose, health, or safety of any of those persons or the public, or that cause, or have a natural tendency to cause, injury or damage to business or property.

41700 (b) (1) A district may adopt a rule or regulation, consistent with protecting the public's comfort, repose, health, and safety, and not causing injury, detriment, nuisance, or annoyance, that ensures district staff and resources are not used to investigate complaints determined to be repeated and unsubstantiated, alleging a nuisance odor violation of subdivision (a).

Section 41700 of the Health and Safety Code (nuisance) does not apply to composting operations as indicated in Section 41705(a)(2). The proposed project would operate under a revised solid waste facility permit enforced by the Santa Barbara County Environmental Health Department, and must comply with Title 14 of the California Code of Regulations which address nuisance and odors (see Sections 17408.5, 17867).

Local Authority

- The Santa Barbara County Environmental Thresholds and Guidelines Manual (revised 2015 ~~2008~~) requires that environmental documents address odor impacts if a project has the potential to cause an odor or other long-term air quality nuisance problem impacting a considerable number of people. As previously discussed, SBCAPCD is the agency responsible for regulating stationary sources of air pollution in the County. The SBCAPCD CEQA guidelines (SBCAPCD, 2014a) state the following with regard to odors:If a project has the potential to cause an odor or other long-term air quality nuisance problem impacting a considerable number of people, the environmental document (Initial Study, ND or EIR) should describe the history of complaints from pre-existing conditions, the number of people affected and other relevant information so that the impacts can be mitigated where feasible.
- New projects that have a high probability of emitting objectionable odors or new developments that may be affected because of their location downwind should be identified early in the Initial Study. This may prevent nuisance problems after the project is built. Odor issues can sometimes be resolved by changing the location of the equipment or the process.
- Nuisance impacts need not be quantified at the initial study stage and may be analyzed qualitatively on a case by case basis.

The following SBCAPCD rules apply to the discharge of odors:

- Rule 303 (Nuisance): states that a person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property (identical to California Health and Safety Code 41700).

- Rule 310 (Odorous Organic Sulfides): this rule prohibits the discharge of excessive amount of hydrogen sulfide and organic sulfides into the atmosphere from any single source or any number of sources within one contiguous property. SBCAPCD provides quantitative thresholds as the ground level concentrations of hydrogen sulfide at or beyond the property line which are 0.06 ppm for an averaging time of 3 minutes and 0.03 ppm for an averaging time of 1 hour.

4.2.2 Impact Analysis and Mitigation Measures

4.2.2.1 Thresholds of Significance

Significance thresholds for air emissions are derived from the State CEQA Guidelines, the Santa Barbara County Environmental Thresholds and Guidelines Manual (revised 2015 ~~2008~~), and rules and regulations of the SBCAPCD.

Criteria Pollutants

Short-term/Construction Emissions. Short-term air quality impacts generally occur during project construction. CEQA requires a discussion of short-term impacts of a project in the environmental document. However, the County generally considers temporary construction emissions insignificant and quantitative thresholds for construction emissions have not been established.

Under SBCAPCD Rule 202 D.16, if the combined emissions from all construction equipment used to construct a stationary source which requires an Authority to Construct permit have the potential to exceed 25 tons of any pollutant, except carbon monoxide, in a 12-month period, the owner of the stationary source shall provide offsets under the provisions of Rule 804 and shall demonstrate that no ambient air quality standard will be violated.

Long-term/Operational Emissions Thresholds. Long-term air quality impacts occur during project operation and include emissions from any equipment or process used in the project (e.g., residential water heaters, engines, boilers, and operations using paints or solvents) and motor vehicle emissions associated with the project. These emissions must be summed in order to determine the significance of the project's long-term impact on air quality.

A significant adverse air quality impact may occur when a project, individually or cumulatively, triggers any one of the following:

- Interferes with progress toward the attainment of the ozone standard by releasing emissions which equal or exceed the established long-term quantitative thresholds for NO_x and ROC;

- Equals or exceeds the state or federal ambient air quality standards for any criteria pollutant (as determined by modeling);

- Emits (from all sources, except registered portable equipment) greater than the daily trigger for offsets in the SBCAPCD New Source Review Rule (55 pounds per day for NO_x or ROC; 80 pounds per day for PM_{10});
- Emits greater than 25 pounds per day of NO_x or ROC (motor vehicle trips only);
- Causes or contributes to a violation of a State or Federal air quality standard (except ozone); and
- Is inconsistent with adopted State and Federal Air Quality Plans (2013 ~~2010~~ Clean Air Plan).

Toxic Air Contaminants

A significant impact related to toxic air contaminants may occur when a project, individually or cumulatively, exceeds the SBCAPCD health risk significance thresholds (10 excess cancer cases per million and/or an acute or chronic hazard index of 1.0 or greater) at a location of an existing or planned residence or work place. Additionally, an acute hazard index of 1.0 or greater at any off-site location that is reasonably accessible to the public is also considered a significant impact.

Greenhouse Gas Emissions

~~Santa Barbara County has not adopted thresholds of significance for GHG emissions and therefore must make a determination on a case-by-case basis.~~ There is currently much debate about appropriate threshold levels of significance with suggestions associated with either “bright-line” (numeric) thresholds or “business as usual” (BAU) thresholds. With few exceptions, bright line thresholds offer more stringent and rigid constraints on proposed projects, while the details of BAU thresholds currently leave room for a large range of interpretation.

The California Air Pollution Control Officers Association (CAPCOA) has indicated that waste diversion programs from landfills offer GHG emissions reduction opportunities. To this end, the proposed threshold for this project should be bright-line, as this methodology is stringent and will demonstrate the overall benefits of the project.

~~A 10,000 MT CO_2e per year interim threshold has been adopted by three other air districts including the South Coast Air Quality Management District. In the absence of specific Santa Barbara County thresholds of significance, the County Planning Department has directed their staff to refer to the San Luis Obispo County Air Pollution Control Boards (SLOAPCD) adopted thresholds of significance for GHG emissions as a guideline in evaluating Santa Barbara County projects (Interim GHG Emission Evaluation Santa Barbara County Planning & Development Department, Revised December, 2012). The following table summarizes these standards:~~

~~Interim Significance Determination Criteria~~

~~GHG Emission Source Category~~	**~~Operational Emissions~~**
~~Other than Stationary Sources~~	~~1,150 MT CO_2e/yr~~ ~~OR~~ ~~4.9 MT CO_2e/SP/yr (residents + employees)~~
~~Stationary Sources~~	~~10,000 MT CO_2e /yr~~

An EIR was prepared to assess the potential impacts of the proposed ECAP (PMC 2015). At the May 19, 2015 EIR certification hearing, the Santa Barbara County Board of Supervisors approved the Final EIR for the ECAP and passed a resolution to adopt the ECAP and amend the County's Energy Element. Also at the May 19, 2015, the Board of Supervisors approved a resolution amending the Santa Barbara County's Environmental Thresholds and Guidelines Manual by adding a threshold of significance to guide the County's environmental analysis of greenhouse gas emissions from industrial stationary sources associated with projects subject to CEQA. The Board adopted a 1,000 $MTCO_2$e/year bright-line threshold and the County's Environmental Thresholds and Guidelines Manual was subsequently revised in July 2015 to reflect the new GHG significance threshold for industrial stationary sources. This threshold is applicable to the proposed project and is used to determine the significance of GHG emissions. The GHG emissions associated with operation of the proposed project would remain below this threshold when compared to existing conditions because it would provide a substantial overall reduction of GHG emissions (see Table 4.2-15), due to the diversion of organic waste.

Odors

The County of Santa Barbara Environmental Thresholds and Guidelines Manual (revised 2015 ~~2008~~) does not include a quantitative odor threshold. The Manual specifies those data required for an odor assessment if a project has the potential to cause a nuisance odor impacting a large number of people. The required information includes a history of complaints from pre-existing conditions and the number of people affected. The analysis is not required to quantify nuisance impacts at the initial study stage, and the impact may be analyzed qualitatively on a case by case basis. The SBCAPCD also does not have a specific odor threshold for use in evaluating projects under CEQA. However, given the statewide concerns over odor impacts from composting operations and the potential for odors from the processing of municipal solid waste, and based on concerns regarding odor emissions from SBCAPCD staff, further research was conducted as a part of this air quality analysis to identify a potential numeric guideline that could be used to assist in the analysis of potential nuisance odor impacts from the project.

The Ventura County APCD's CEQA guidelines (VCAPCD, 2003) for odors provide quantitative thresholds on the number of complaints for a project locating near an existing source of odorous emissions; the guidelines also provide a 1-mile screening distance between odorous land uses and receptors for landfill, solid waste transfer and composting facilities. A review of odor guidelines and regulations in other California jurisdictions shows that off-site standards or guidelines on odor from wastewater treatment plants are available (but no off-site standards for odor from MSW operation). An off-site odor concentration of 5 odor units per cubic meter (OU/m^3) has been adopted by the BAAQMD, CARB and City of San Diego (RWDI, 2005). An odor unit is defined as the amount of an odorous substance, mixed in one cubic meter (m^3) of air, which can be perceived as a smell by 50 percent of people in the area.

In North America, 35 percent of all jurisdictions had an odor standard/guideline between 4 and 6.9 OU/m^3 (RWDI, 2005) for wastewater treatment plants or composting facilities. A technical report prepared for the United Kingdom Environment Agency found that 'annoyance' typically occurs between 5 and 10 OU/m^3 (van Harreveld et al. 2002). Based on this research, an odor concentration of 5 OU/m^3 was selected as a guideline to determine if project-related odors can be detected off-site.

Although an odor may be detected, the frequency of occurrences and the number of receptors where an odor might be detected are also considerations in determining the significance of the odor impact. To determine if detectable odors would result in a nuisance impact, a frequency analysis was conducted to identify the number of hours per year odors would be detectable. For the purposes of this impact analysis, if an odor can be detected more than two percent of the time by a considerable number of receptors, a significant nuisance odor impact may occur and violate Section 41700 of the Health and Safety Code and SBCAPCD Rule 303. This threshold is based on guidance provided by Bull et al. (2014).

4.2.2.2 Approved Tajiguas Landfill Expansion Project

The following is a summary of air quality impacts identified for the approved Tajiguas Landfill Expansion Project in 01-EIR-05 (see Section 3.11.3).

1. The average daily off-site mobile source NO_x emissions increase over baseline (July 1998-December 1999) was considered a significant and unavoidable impact (Class I). Mitigation measure AQ-1 was implemented to reduce mobile source emissions associated with landfill operation.

2. The 1-hour NO_2 air quality standard would be exceeded as a result of on-site landfill emissions (mobile equipment exhaust and landfill gas combustion), and was considered a significant and unavoidable impact (Class I). Mitigation measure AQ-1 was implemented to reduce mobile source emissions associated with landfill operation, and mitigation measure AQ-4 was implemented to provide a buffer east of the landfill (Baron Ranch).
3. The 24-hour PM_{10} air quality standard would be exceeded as a result of on-site landfill emissions (mobile equipment operation, vehicle operation on unpaved roads, wind erosion), and was considered a significant and unavoidable impact (Class I). Mitigation measure AQ-1 was implemented to reduce mobile source emissions associated with landfill operation, mitigation measure AQ-3 was implemented to reduce fugitive dust, and mitigation measure AQ-4 was implemented to provide a buffer east of the landfill (Baron Ranch).
4. The maximum modeled carcinogenic health risk at the project boundary (associated with landfill gas, fuel combustion and landfill gas combustion) would be 15 in-a-million, and considered a significant and unavoidable impact (Class I). Mitigation measure AQ-4 was implemented to provide a buffer east of the landfill (Baron Ranch).
5. The potential chronic and acute non-carcinogenic health risks along the project boundary and at residences would be below the USEPA and CAPCOA significance criteria resulting in adverse but less than significant air quality impact (Class III).
6. Odors generated by waste and landfill gas could result in off-site impacts and were considered significant but mitigable (Class II). Mitigation measure AQ-4 was implemented to provide a buffer east of the landfill (Baron Ranch), and mitigation measure AQ-5 was implemented to control fugitive landfill gas.
7. The potential for dust generated by landfill operations to result in off-site impacts was considered a less than significant impact (Class III)

4.2.2.3 Approved Tajiguas Landfill Reconfiguration and Baron Ranch Restoration Project

No additional air quality impacts (beyond those discussed for the Landfill Expansion Project [Section 4.2.2.2]) were identified in association with the approved Tajiguas Landfill Reconfiguration Project. Landfill reconfiguration involved deleting the buttress fill and reduced the amount of excavation and related earth handling (soil movement, stockpiling, spreading and compaction) by approximately 1.3 million cubic yards. Which was expected to result in reduced use of earth handling equipment (dozers, wheeled loaders and scrapers) and associated air emissions. However, existing significant and unavoidable (Class I) air quality impacts associated with off-site vehicle emissions (waste, employee and materials transportation) were expected to continue with the landfill reconfiguration as the permitted volume of waste handled, the permitted traffic volumes and number of on-site staff would remain the same and the amount of active equipment and associated emissions on a typical day of operations was not expected to substantially change.

The health risk assessment prepared in 01-EIR-05 was considered adequate (if not conservative) to address the health risk associated with continued operation of the landfill as reconfigured.

4.2.2.4 Proposed Tajiguas Resource Recovery Project

Methodology and Assumptions

The methodologies presented in this ~~technical report~~ SEIR are based on the Santa Barbara County Environmental Thresholds and Guidelines Manual (revised 2015 ~~October 2008~~), the SBCAPCD Scope and Content of Air Quality Sections in Environmental Documents (SBCAPCD, 2014a) guidance document, the SBCAPCD Modeling Guidelines for Health Risk Assessments (SBCAPCD, 2014b), and USEPA's Guidelines on Air Quality Models (USEPA, 2008). Methods and models used to quantify and evaluate air quality impacts (discussed in detail Air Quality and Greenhouse Gas Technical Report) are summarized below.

Criteria Pollutant Emissions – Off-Road Equipment. The combustion of fuel by heavy equipment that would be used to construct project facilities and operate the proposed MRF, AD Facility and composting area would result in the generation of criteria pollutant emissions - CO, ROC, NO_x, sulfur oxides (SO_x), PM_{10} and $PM_{2.5}$. Daily emissions from construction equipment were calculated using emissions factors from CARB's OFFROAD 2007 model (CARB, 2006), by daily construction equipment operating hours. The types, horsepower ratings, numbers and daily operating hours for heavy equipment were developed based on the project description and supplementary information provided by the RRWMD's vendor ~~(Mustang)~~.

Criteria Pollutant Emissions – Motor Vehicles. Daily exhaust emissions from on-site and off-site motor vehicle travel were calculated by multiplying emission factors, in grams per mile, calculated using CARB's EMFAC2011 model (CARB, 2013a) by daily on-site and off-site vehicle-miles-traveled (VMT). The EMFAC2011 model estimates County-wide daily emissions and VMT by type of vehicle and type of fuel. The emission factors by type of vehicle and fuel were calculated by dividing daily emissions in Santa Barbara County by daily VMT in Santa Barbara County. Trip generation data and trip destinations (to calculate VMT) were obtained from the Traffic and Circulation Study prepared for the project (see Appendix K).

County-owned transfer trucks are assumed to be diesel fueled. ROC, NO_x and particulate matter emission factors for these trucks were taken from the EMFAC2011 model. Compressed natural gas would be used to fuel trucks used to transport finished compost and recovered recyclables off-site. Emissions factors for compressed natural gas were obtained from Table D-1a of the Carl Moyer Program 2011 Guidelines (CARB, 2011). CO emission factors were obtained from the EMFAC2011 model for 2017 model year T7 tractors.

Criteria Pollutant Emissions - Fugitive Particulate Matter from Off-Road Vehicle Travel. Vehicles traveling on unpaved surfaces on-site would generate airborne dust (fugitive PM_{10} and $PM_{2.5}$ emissions). These emissions were calculated using Equation 1a from Section 13.2.2, Unpaved Roads, of Compilation of Air Pollutant Emissions Factors (AP-42) (USEPA, 2006b). A control efficiency of 79 percent was applied to the uncontrolled emissions based on requiring the construction contractor to apply water three times per day and to limit vehicle speeds on unpaved roads and other unpaved surfaces to 15 miles per hour. Applying water three times per day is estimated to reduce uncontrolled emissions by 50 percent, and limiting vehicle speeds to 15 miles per hour is estimated to reduce emissions by 57 percent (Western Regional Air Partnership, 2006).

Criteria Pollutant Emissions - Fugitive Particulate Matter from On-Road Vehicles. Fugitive PM_{10} and $PM_{2.5}$ emissions from vehicles traveling on paved roads were estimated by multiplying emission factors, in pounds per VMT, by daily VMT by type of vehicle. The emission factors were calculated using Equation 1 from Section 13.2.1 of AP-42 (USEPA, 2006a).

Criteria Pollutant Emissions - Fugitive Particulate Matter Emissions from Earthwork Activities. Fugitive PM_{10} and $PM_{2.5}$ emissions from grading and scraping were estimated by multiplying VMT by emission factors from Table 11.9-1 in Section 11.9 of AP-42 (USEPA, 1972). Bulldozing emissions were estimated by using emission factors from Table 11.9-1, Western Surface Coal Mining, of AP-42 (USEPA, 2004) by daily bulldozer operating hours. The silt content used in the equations was the average value for landfill roads from Section 13.2.2 of AP-42 (USEPA, 2006a), and the moisture content used was the default value for overburden from Section 11.9 of AP-42.

A control efficiency of 61 percent was applied to the uncontrolled emission factors, based on requiring the construction contractor to apply water every three hours (Western Regional Air Partnership, 2006). Daily emissions from soil dropping were estimated using Equation 1 in Section 13.2.4, of AP-42 (USEPA, 2006a) by daily cubic yards of cut and fill.

Criteria Pollutant Emissions - Evaporative Emissions from Architectural Coating. Daily ROC emissions from architectural coating were estimated by multiplying the ROC content of the coatings, in pounds per gallon, by the daily quantity of coatings applied, in gallons.

Criteria Pollutant Emissions - Fugitive ROC Emissions from Asphaltic Paving. Asphaltic paving would generate fugitive ROC emissions when the paving material cures. Daily ROC emissions from asphaltic paving were estimated by multiplying the default emission factor, in pounds per acre, from the CalEEMod model (Environ, 2011) by the area paved per day.

Criteria Pollutant Emissions - Combined Heat & Power (CHP) Engines. The two CHP engines would combust bio-gas generated by the AD Facility, and have an engine horsepower rating of 1,573 horsepower. Maximum hourly CO, ROC, NO_x, PM_{10} and $PM_{2.5}$ exhaust emissions from the CHP engines were estimated by multiplying emission factors, in grams per brake-horsepower-hour (g/bhp-hr), by the engine horsepower ratings. The engines would be equipped with selective catalytic reduction (SCR) systems to control NO_x emissions and oxidation catalysts to control CO and ROC emissions. The CO, ROC and NO_x emission factors were provided by the control system manufacturer and the filterable particulate matter emission factor was estimated by Bekon Energy Technologies.

The condensable particulate matter emission factor was from Table 3.2-2 in Section 3.2, Natural Gas Fired Reciprocating Internal Combustion Engines, of AP-42 (USEPA, 2000). It was assumed that both the filterable and condensable PM_{10} and $PM_{2.5}$ emission factors would be the same as the particulate matter emission factor.

Emissions from the CHP engines were estimated based on the following operating scenarios, which include supplementing bio-gas fuel with natural gas (or propane):

- During normal operation with both engines operating, the CHP engines would be fueled with a mixture of approximately 86.5 percent bio-gas and 13.5 percent natural gas;
- When only one engine is operating, it would be fueled with bio-gas only; and
- During engine start-up and SCR system burn-in (initial catalyst conditioning), the CHP engine would be fueled with natural gas only, and only one engine would start up at a time.

Propane and natural gas have similar emission factors; therefore, combustion of propane in the engines as a startup/assisting fuel in place of natural gas would have a minimal effect on air pollutant emissions.

When an engine is brought online after being shut-down for maintenance or other reasons, approximately 30 minutes without any removal of CO, ROC or NOx would occur before the emission control system reaches operating temperature. Emissions during start-up periods were estimated by multiplying uncontrolled emission factors by the engine horsepower ratings. The system vendor estimates that a maximum of 36 start-ups per year would occur for each CHP engine.

The SCR system vendor estimates that the SCR system catalyst would need to be replaced approximately once every two years. The catalyst is coated with a protective material to avoid damage in shipment. Approximately 120 hours of operation at full engine load is required to burn off the coating. During this period, the control system is anticipated to operate at approximately 50 percent of normal control efficiency, according to the control system vendor.

Hourly SO_2 emissions were estimated from the anticipated sulfur content of the bio-gas, the hourly bio-gas consumption, provided by the engine manufacturer, and the assumption that all sulfur in the bio-gas would be converted to SO_2. The bio-gas would be treated with carbon filters that would reduce the sulfur concentration prior to use by the engines. The vendor's technology provider estimated that the carbon filters would reduce the bio-gas sulfur content from approximately 200 parts per million by volume (ppmv) to approximately 20 ppmv.

Maximum daily emissions were estimated based on one engine operating at 100 percent load for 24 hours per day and the other engine operating at 100 percent load for 30 minutes during a start-up and at 100 percent load for 23.5 hours with normal emission control system operation. Annual emissions for each engine were estimated by multiplying estimated hourly emissions by estimated operating hours per year for start-ups (36 startups/year x 0.5 hours/start-up = 18 hours/year), catalyst burn-in (120 hours/year) and normal operations (8,760 hours/year – 18 hours for start-ups – 120 hours/year for catalyst burn-in – 438 hours/year offline for maintenance = 8,184 hours/year).

Criteria Pollutant Emissions - Rolling Bed Dryer (RBD). The RBD would dry paper processed by the MRF with heat provided by the CHP engines' exhaust. Both CHP engines would exhaust completely through the RBD when it is operating. The RBD is anticipated to operate 16 hours per day, six days per week, and would be equipped with a dust collector to capture PM_{10}/$PM_{2.5}$.

Criteria Pollutant Emissions – Flare. The flare would be operated when bio-gas from one of the 16 anaerobic digester vessels is purged through the flare prior to opening the vessel to remove the digestate. The exhaust from the two CHP engines would be directed through the vessel during the purging process. However, the flow from the CHP engines' exhaust would not result in additional emissions from the flare combustion because the bio-gas entering the engines would already have been combusted. The vendor estimates that the purging process is anticipated to require one hour and to occur 278 times per year. Therefore, the hourly heat input was assumed to be one-sixteenth of the heat input for the two CHP engines when operating at 100 percent load.

The flare would also be operated when one ~~or both~~ CHP engine~~(s)~~ is~~/are~~ offline for maintenance or other reasons. The hourly heat input was assumed to be equal to the heat input for either one or two CHP engines when operating at 100 percent load. The vendor estimates that each CHP engine would be offline for five percent of the time during a year, which is equal to 438 hours per year.

The flare manufacturer and model have not yet been selected. However, the vendor has indicated that emissions from the flare would be approximately the same as from a John Zink Model ZTOF flare. Maximum hourly CO, ROC, NO_x, PM_{10} and $PM_{2.5}$ emissions from the flare were estimated by multiplying emission factors, in pounds per million British thermal units (MMBtu), by the flare heat input, in MMBtu per hour. The CO, NO_x and particulate matter emission factors were provided by John Zink and the ROC emission factor was the limit specified in SBCAPCD Rule 359.

Hourly SO_2 emissions were estimated from the anticipated sulfur content of the bio-gas, the hourly bio-gas consumption and the assumption that all sulfur in the bio-gas would be converted to SO_2. The bio-gas would not be treated prior to combustion in the flare. The vendor's technology provider estimated that the bio-gas sulfur content would be approximately 200 ppmv. The bio-gas consumption when an anaerobic digester vessel is purged was assumed to be one-sixteenth of the bio-gas consumption by the two CHP engines operating at 100 percent load. The bio-gas consumption when one or both CHP engine(s) is/are offline was assumed to be equal to the bio-gas consumption when one or both of the CHP engines operating at 100 percent load.

Maximum daily emissions were estimated based on the flare operating for one hour per day between the hours of 8 a.m. and 4 p.m. for anaerobic digester purging plus 24 hour per day with both CHP engines offline. It should be noted that the assumption that both CHP engines would be offline at the same time is a conservative assumption, because only one engine would be taken offline at a time for maintenance. Annual emissions were estimated by the sum of estimated hourly emissions during anaerobic digester purging multiplied by 278 operating hours per year and hourly emissions with two engines offline multiplied by 438 hours per year.

Criteria Pollutant Emissions - Fuel Storage Tank. The project would include one 10,000 gallon above-ground diesel fuel storage tank to provide fuel for mobile equipment. The vendor's engineering staff estimated the throughput for the mobile equipment fuel storage tank to be 240,000 gallons per year. Annual ROC emissions from the fuel storage tank were calculated using the USEPA TANKS program, version 4.0.9d (USEPA, 2006c). Daily ROC emissions from each storage tank were calculated by dividing annual emissions by 365 days per year.

Criteria Pollutant Emissions – Emergency Generator. The project would include one 150 kilowatt/hour diesel-fueled emergency generator to provide emergency power for the MRF building in the event of a power outage. Maximum hourly CO, ROC, NOx, PM_{10} and $PM_{2.5}$ emissions from the generator were estimated by multiplying emission factors, in g/bhp-hr, by the engine horsepower rating and the amount of time during an hour that the engine is anticipated to be operated during testing and maintenance. The generator would be purchased after 2015 and would meet Tier 4 emission standards. Hourly SO_2 emissions were estimated from the limit for sulfur in diesel fuel of 15 parts-per-million by weight (ppmw), the hourly fuel consumption by the engine at 100 percent load as specified by the manufacturer and the amount of time during an hour that the engine is anticipated to be operated during testing and maintenance.

The vendor’s engineering staff estimated that the generator would be operated for 30 minutes once per week for testing and maintenance. Therefore, daily emissions would be the same as hourly emissions. Annual emissions were estimated by multiplying daily emissions by 52 days of operation for testing and maintenance per year.

Criteria Pollutant Emissions – Emergency Generator Diesel Fuel Storage Tank. The project would include a skid-mounted diesel fuel storage tank for use with the emergency generator. The throughput of this tank is estimated to be 1,005 gallons per year. Annual ROC emissions from each storage tank were calculated using the USEPA TANKS program, version 4.0.9d (USEPA, 2006c). Daily ROC emissions from each storage tank were calculated by dividing annual emissions by 365 days per year.

Criteria Pollutant Emissions – Mobile Equipment Operating within the MRF and AD Facility. Air in the MRF and AD Facility buildings would be drawn into baghouse particulate matter filtration systems and discharged to the bio-filters with particulate matter control efficiencies of 99.9 percent, based on manufacturer’s specifications. Therefore, a control efficiency of 99.9 percent was applied to PM_{10} and $PM_{2.5}$ emissions from equipment operating in the MRF and AD Facility buildings.

Criteria Pollutant Emissions - Fugitive Particulate Matter Emissions from Material Handling. Project material transfers would include handling incoming MSW, organic waste from the MRF, completed digestate, and finished compost. Additionally, MRF residue and digestate residue would be unloaded at the landfill active face. However, unloading these materials would replace unloading of materials that currently occurs at the landfill. Therefore, emissions associated with unloading MRF residue and digestate residue would not increase emissions from current landfill operations and were not included in the project emission calculations.

Daily fugitive PM_{10} and $PM_{2.5}$ emissions from material handling were estimated using emission factors from Equation 1 in Section 13.2.4 of AP-42 (USEPA, 2006b) by daily quantities of the materials that would be transferred. The moisture contents used in the equation for digestate and compost was the maximum used to develop the fugitive particulate matter equation for material transfers (4.8 percent). This a conservative estimate as the moisture content ~~were~~ estimated by the vendor (50 percent for digestate and 40 percent for compost). Air in the MRF and AD facility buildings would be drawn into baghouse particulate matter filtration systems and discharged to the bio-filters; therefore, a control efficiency of 99.9 percent was applied to PM_{10} and $PM_{2.5}$ emissions from transfers inside the MRF and AD Facility buildings.

Criteria Pollutant Emissions - Fugitive Particulate Matter Emissions from ~~Digestate and~~ Compost Screening. Daily fugitive PM_{10} and $PM_{2.5}$ emissions from screening ~~digestate and~~ compost were estimated by using emission factors from Table 11.19.2-2 of AP-42 (USEPA, 2006b). ~~A control efficiency of 99.9 percent was applied to PM_{10} and $PM_{2.5}$ emissions from screening digestate, which would occur inside the AD Facility building.~~

Criteria Pollutant Emissions - Fugitive Particulate Matter Emissions from Chipping and Grinding. Hourly fugitive PM_{10} and $PM_{2.5}$ emissions from chipping and grinding wood were estimated using emission factors recommended by the BAAQMD from a previous edition of AP-42, Table 10.3-1 for tub grinders (BAAQMD, 2008).

Criteria Pollutant Emissions - Fugitive ROC Emissions from Composting Windrows. Following anaerobic digestion of organic waste, the digestate would be mixed with wood chips and composted. Fugitive ROC emissions from the compost windrows was estimated by multiplying an emission factor by the estimated surface area of the compost windrows. Emission factors for composting anaerobic digestate mixed with wood chips are not available. Hourly fugitive ROC emissions from the composting windrows were estimated based on the methods presented in the document entitled "Compost VOC Emission Factors" by the San Joaquin Valley Air Pollution Control District (2010).

The maximum digestate production would be 73,590 tons/year. Based on recent sampling of organic MSW in Santa Barbara County, 48.1 ~~According to estimates provided by the vendor (Mustang), 68.2~~ percent of the digestate would be produced from food waste and 51.9 ~~23.2~~ percent would be produced from green waste. Volatile organic compound (VOC) emission factors for both food waste and green-waste were taken from San Joaquin Valley Air Pollution Control District (2010).

Based on BAAQMD's Engineering Evaluation for Zero Waste Energy's proposed anaerobic digestion facility, a 97 percent capture of the TRRP feedstock's bio-methane potential and related ROC emissions during the two 28-day in-vessel anaerobic digestion phases was assumed to occur. Therefore, only three percent of the potential ROC emissions of the feedstock could be emitted during digestate composting.

In addition, the RRWMD Vendor has committed to implementing current Best Available Control Technology (BACT) for digestate composting, consisting of:

- Blending digestate with 20 percent inert dry wood chips;
- Interactive pile management (compost pile turning);
- 20 minutes irrigation after pile turning;
- Large pile size; and

- Application of finished compost to the new compost piles to act as a pseudo bio-filter.

Implementation of these BACT measures is anticipated to achieve a further reduction in ROC emissions of 90 percent.

Criteria Pollutant Emissions - Short-Term Peak Emissions Scenarios. Emissions of $NO_{x,}$ CO, and SO_x would be higher than normal during certain short-term operations. Three additional scenarios were modeled for determining maximum short-term impacts of these criteria pollutants:

- The flare combusting the landfill gas while both CHP engines are offline;
- Start-up of one CHP engine while the second is in normal operating mode; and,
- SCR burn-in on one CHP engine while the second is in normal operating mode.

Short-term NOx, CO, and SOx emissions were evaluated for these three scenarios because (1) the flare is a higher emitting source of these pollutants than the CHP engines; (2) NOx and CO control technologies (i.e., SCR and oxidation catalyst) are not as efficient at reducing emissions during startup. Further, there are very stringent short-term NO_2 NAAQS and CAAQS that warrant these additional analyses.

Although these scenarios would occur infrequently, they can be planned and are not considered to be upsets, and hence were evaluated in order to ensure maximum impacts were determined. Only $NO_{x,}$ CO, and SO_x were evaluated for these three scenarios as PM_{10} and $PM_{2.5}$ emissions would be approximately the same during start-up and catalyst burn-off since the control system is not intended to reduce PM_{10} and $PM_{2.5}$ emissions.

To reduce emissions during SCR burn-in; landfill gas would not be used to fuel the engine during this period. Instead, only propane from the existing propane tank or natural gas, if available from a future pipeline, would be used as fuel to ensure the minimum criteria pollutant emissions during the SCR burn-in period.

Criteria Pollutant Emissions - Fugitive ROC Emissions from Organic Waste in the AD Facility. Organic waste materials from the MRF may be stored in the AD Facility for up to 24 hours prior to loading into an anaerobic digestion vessel. These materials may begin to decay before loading into a vessel, emitting fugitive ROC into the AD Facility building. The ROC emitted within the AD Facility building would be controlled by venting the air through the bio-filter prior to being exhausted to the atmosphere.

Fugitive ROC emissions from the decomposition of the organic waste prior to being exhausted through the bio-filter were estimated by multiplying the daily amount of food waste and green waste anticipated to be stored in the AD Facility building by the emission factors used to estimate windrow ROC emissions, divided by the cycle length, in days, to estimate emission factors for the one-day period that the waste materials may be stored in the AD Facility building prior to loading into anaerobic digestion vessels. The bio-filter manufacturer estimates that the bio-filter would remove 95 percent of the ROC emissions. Hourly emissions were estimated by dividing daily emissions by 24 hours per day, and annual emissions estimated by multiplying daily emissions by 365 days per year.

<u>Ambient Air Dispersion Modeling - Overview</u>. The most recent version of the USEPA's ISCST3 model (version 02035) was used in the analysis. ISCST3 was applied with non-default options as required by SBCAPCD Guidance; GRDRIS, NOBID, NOCALM. The modeling was run on one year (1989) of meteorological data provided by SBCAPCD consisting of surface observations from Los Flores Canyon Site 4, in Goleta, California, and concurrent upper air data from Vandenberg Air Force Base in Vandenberg, California. The 1989 dataset corresponds to the single year that has been processed by the SBCAPCD for modeling. Based on CEQA requirements, air dispersion modeling was conducted to demonstrate compliance against the NAAQS and CAAQS. Modeling was conducted for the criteria pollutants SO_2, $PM_{2.5}$, PM_{10}, NO_2 and CO. Lead emissions were assumed negligible based on the type of sources associated with the proposed project and lead was not modeled in this analysis. The modeling conducted involved assessing the air quality impacts of (1) the proposed sources associated with the proposed project, and (2) existing monitored background concentrations to represent non-modeled sources in the area.

An important difference between the modeling of the criteria pollutants and the modeling of health risks is the sources that were included. The existing landfill sources were not included in the criteria pollutant modeling, as the maximum air pollutant background levels that were observed at local monitoring stations were added to the results of the project modelling. This approach is generally conservative as it accounts for existing emissions (including landfill sources) at the maximum observed levels.

However, the health risk assessment integrates TAC emissions to determine the overall health impacts. There are no background data for TAC emissions available in this area. Therefore, based on the SBCAPCD modeling guidelines (SBCAPCD, 2014b), emissions of TACs from the existing landfill sources, adjusted to estimated post-project levels, were included in the dispersion modeling to produce a facility-wide health risk assessment.

Ambient Air Dispersion Modeling - Good Engineering Practice (GEP) Stack Height. GEP stack height is defined as the stack height necessary to ensure that emissions from the stack do not result in excessive concentrations of any air pollutant as a result of atmospheric downwash, wakes or eddy effects created by the source, nearby structures, or terrain features. A GEP stack height analysis was performed for all proposed stacks for each modeling scenario in accordance with USEPA's guidelines (USEPA, 1985). All proposed stacks are less than the GEP formula height, and therefore potentially subject to building downwash. Wind direction-specific building dimensions for input to ISCST3 were developed with the USEPA's Building Profile Input Processor (BPIP-PRIME) for input to ISCST3.

Ambient Air Dispersion Modeling - Sources and Emission Data. All emission sources associated with the proposed project were included in the criteria pollutant modeling. These include combustion-related emission sources located within the MRF and AD Facility buildings as well as vehicular, material handling, and fugitive emission sources located near these buildings, the landfill, composting area, and the connecting roads. Point sources modeled included the CHP engines, tipping floor bio-filter stack, flare and fuel storage tank. Volume (road) sources were developed to represent vehicular traffic related to the project on landfill property, represented by lines of volume sources. Area sources modeled included the two AD Facility bio-filters, composting area windrows and material handling, and compost delivery area.

Sources used in the health risk assessment air dispersion modeling also included existing landfill sources such as the existing engine, flare, fuel tanks, on-site roads and operating areas (MSW fill, green-waste processing, daily cover, landfill fugitives, equipment fueling).

Ambient Air Dispersion Modeling - NO_2 Modeling. On March 1, 2011, USEPA released a memorandum with final guidance for the modeling of the new 1-hour NO_2 NAAQS. The memorandum presents a tiered approach for modeling NO_2 from NO_x emissions that provides for increased levels of refinement. The ISCST3 model cannot perform the Tier 3 refinement or produce results in the proper form of the standard. As a result, for all 1-hour and annual NO_2 NAAQS and CAAQS modeling for normal operations, the Tier 2 refinement approach was applied.

Additionally, because the model cannot output the results in the form of the 1-hour NO_2 standard, and because only one year of meteorological data was provided by the SBCAPCD, the 98th percentile of the hourly modeled concentrations, rather than the 3-year average of the 98th percentile daily maxima, is reported.

Ambient Air Dispersion Modeling - Representative Ambient Background Concentrations. For this project, the appropriate ambient background concentration for each pollutant was added to the modeled project contribution to account for impacts from non-project sources since there were no other sources in the immediate vicinity of the project. The background concentrations for the years 2010 through 2012 used in this analysis are summarized in Table 4.2-3. CO, 1-hour NO_2 and SO_2 (CAAQS), 3-hour and 24-hour SO_2, annual NO_2 and SO_2, 24-hour and annual PM_{10} and annual $PM_{2.5}$ values are the maximum concentration over the three year period. The 1-hour NO_2 and 24-hour $PM_{2.5}$ (NAAQS) values are the 98th percentile for each year averaged over the three year period. The 1-hour SO_2 (NAAQS) values are the 99th percentile for each year averaged over the 3-year period.

Health Risk Assessment – Overview. The health risk assessment prepared for the project involves estimates of TAC emissions, modeling and risk estimation. TACs would be emitted from the CHP engines, flare, diesel fuel storage tanks, diesel-fueled engines in equipment, motor vehicles and compost windrows.

Health Risk Assessment – Estimation of TAC Emissions from the CHP Engines. TACs contained in the bio-gas that are not completely combusted to carbon dioxide in the engines would be emitted in the engines’ exhausts. Additionally, ammonia, produced from urea, would be used as a reactant in the SCR systems controlling NO_x emissions from the engines. Excess ammonia would be used in the system to achieve adequate NO_x reduction, which would result in unreacted ammonia being emitted in the SCR systems’ exhausts. Hourly TAC emissions in the engines’ exhausts from incomplete bio-gas combustion were estimated based on the emission factors presented in the SBCAPCD-approved emission factors for landfill gas-fired internal combustion engines equipped with an oxidation catalyst. Hourly ammonia emissions in the SCR systems’ exhausts were estimated from the ammonia concentration in the exhaust specified by the SCR system manufacturer and the SCR system exhaust flow rate.

Annual ammonia emissions from the CHP engines were estimated by multiplying the hourly emissions (lb/hour) by the estimated annual hours of operation (hours/year), which in turn were calculated as the ratio of annual bio-gas combusted in the engines to the hourly bio-gas combustion rate in the engines.

Table 4.2-3. Ambient Background Concentrations used in Air Dispersion Modeling

Pollutant	Averaging Period	Concentration (ppb)			Concentration (µg/m^3)			Background (µg/m^3)
		2010	2011	2012	2010	2011	2012	
CO	1 hour	0.6	0.6	0.6	689.7	689.7	689.7	689.7
	8 hour	0.5	0.3	0.5	574.7	344.8	574.7	574.7
NO_2	1 hour (NAAQS)	0.011	0.013	0.014	20.7	24.5	26.3	23.8
	1 hour (CAAQS)	0.035	0.023	0.024	65.8	43.3	45.1	65.8
	Annual	0.002	0.002	0.002	3.6	3.9	3.6	3.9
SO_2	1 hour (NAAQS)	0.005	0.007	0.063	13.1	18.3	165.1	65.5
	1 hour (CAAQS)	0.006	0.014	0.073	15.7	36.7	191.3	191.3
	3 hour	0.005	0.008	0.061	12.2	21.8	158.9	158.9
	24 hour	0.003	0.004	0.024	7.9	10.5	62.9	62.9
	Annual	0.001	0.001	0.002	3.0	1.7	4.0	4.0
PM_{10}	24 hour	---	---	---	29.0	32.0	34.0	34.0
	Annual	---	---	---	13.0	13.3	13.3	13.3
$PM_{2.5}$	24 hour (NAAQS)	---	---	---	12.0	19.0	17.0	16.0
	Annual	---	---	---	7.7	11.0	9.0	9.0

All values are from the LFC #1 monitoring station in Los Flores Canyon, except 24-hour and annual $PM_{2.5}$ which are taken from 700 E. Canon Perdido, Santa Barbara, and Goleta – Fairview, respectively. Santa Barbara was used for 24-hour $PM_{2.5}$ because it was the only monitor nearby with data in the form of the $PM_{2.5}$ 24-hour NAAQS (98th percentile). The LFC #1 station does not **monitor** $PM_{2.5}$ data.

Health Risk Assessment – Estimation of TAC Emissions from the Flare. TACs contained in the bio-gas that are not completely combusted to carbon dioxide in the flare would be emitted in the flare exhaust. TAC emissions from the flare were estimated based on emission factors from a source test of a flare combusting LFG at the Santa Maria Landfill from September 9 to 11, 2010 and from emission factors presented in the California Air Toxic Emission Factor (CATEF) database, updated December 7, 2000 for flares fired on LFG. This choice of emission factors is based on the assumption that bio-gas is similar in composition to landfill gas. The CATEF database presents mean, median and maximum emission factors for all California air toxics emitted by LFG-fired IC engines. The maximum CATEF emission factors were used for TACs that were not measured during the source test at the Santa Maria Landfill. Hourly TAC emissions were estimated by multiplying the emission factors (lb/MMscf) by the maximum hourly rating of the flare (MMscf).

Annual TAC emissions from the flare were estimated by multiplying the emission factors by the annual flare bio-gas use. The annual flare bio-gas use was calculated by adding the annual bio-gas use during AD vessel purging (1/16 of flow to both CHP engines x number of annual vessel purges) to the annual bio-gas use when CHP engines are offline (flow to each CHP engine at 100 percent load x hours each engine is offline x 2 engines).

Health Risk Assessment – Estimation of TAC Emissions from Proposed Diesel-Fueled Engines (including motor vehicles). Combustion of diesel fuel in compression ignition engines would generate emissions of DPM, which is used to represent overall TAC emissions with potential cancer and chronic non-cancer health effects from diesel-fueled engines for health risk assessments. DPM is smaller than 10 micrometers in diameter; therefore, PM_{10} emissions from the diesel-fueled engines were used to represent DPM emissions. Emission factors for speciated exhaust TACs (individual compounds are treated separately) with potential acute effects were determined based on the factors presented in the document entitled “AB 2588 Emission Factors for Diesel Fuel Internal Combustion” by the Ventura County APCD (2001). Hourly emissions were determined by multiplying the emission factors (lb/gallon) by the hourly fuel consumption rate of the engines (gallons/hour). The hourly emissions from these sources are limited to the periods of 7:00 a.m. to 5:00 p.m. during a day.

Health Risk Assessment – Estimation of TAC Emissions from Diesel and Gasoline Fuel Storage Tanks. Fugitive emissions from existing and proposed fuel storage tanks would contain TACs that are present in the diesel fuel. Annual TAC emissions from each storage tank were calculated using the USEPA TANKS program, version 4.0.9d (USEPA, 2006c) and SBCAPCD Gasoline Station Health Risk Assessment Application Form 25T. Hourly TAC emissions from each storage tank were calculated by dividing annual emissions by 8,760 hours per year.

Health Risk Assessment – Estimation of TAC Emissions from Composting Windrows. The composting windrows would produce fugitive ammonia emissions. Hourly and annual fugitive ammonia emissions were estimated using the same procedures used to estimate fugitive ROC emissions from the windrows with emission factors for ammonia emissions from composting instead of emission factors for ROC. Emissions of organic TACs from composting windrows were based on speciation of the ROC emissions. ROC emission factors for speciated TACs (individual compounds treated separately) with potential acute effects were determined based on the factors presented in Kumar et al. (2011).

Health Risk Assessment – Methodology for TAC Emissions from Existing LFG-Fired Internal Combustion Engine. An existing engine (Caterpillar model 3616) is used to produce electricity from LFG with a rated capacity of 3.1 MW. Hourly TACs from the combustion of LFG were calculated by multiplying emission factors in pounds per million standard cubic feet (lb/MMscf) by the maximum rated hourly capacity flow rate in standard cubic feet per hour (scf/hour). The emissions were determined based on the maximum combustion emissions factors for engines fired on LFG from the CATEF database. Annual TAC emissions from the existing engine were estimated by multiplying emission factors in pounds per million standard cubic feet by the annual fuel usage reported for the year 2013.

Health Risk Assessment – Methodology for Fugitive TAC Fugitive Emissions from Organic Waste in the AD Facility Building. Hourly and annual fugitive TAC emissions from organic waste in the AD Facility building were estimated by multiplying hourly and annual fugitive ROC emissions by speciation factors for emissions from composting windrows presented in Kumar, et al. (2011).

Health Risk Assessment – Methodology for TAC Emissions from Existing Diesel-Fueled Engines. Combustion of diesel fuel in compression ignition engines would generate emissions of DPM, which is used to represent overall TAC emissions with potential cancer and chronic non-cancer health effects from diesel-fueled engines for health risk assessments. DPM is smaller than 10 micrometers in diameter. Therefore, PM_{10} emissions from the diesel-fueled engines were used to represent DPM emissions.

RRWMD provided records of on-site diesel-fueled off-road equipment and motor vehicle use during 2013. The records included equipment type and model, model year, horsepower (for off-road equipment), annual fuel use and annual hours of use (for off-road equipment) or VMT (for motor vehicles). Since the TRRP would reduce the quantity of materials disposed at the landfill from 2013 levels, RRWMD estimated the post-project hours of use and VMT based on a 35 percent reduction from 2013 values.

PM_{10} emission factors, in grams/brake-horsepower-hour, for the off-road equipment were estimated as the emission standards corresponding to the equipment model year and engine horsepower rating. Annual horsepower produced by each piece of equipment was estimated by multiplying the engine horsepower rating by a load factor from the CARB OFFROAD2011 off-road equipment emissions model and the projected annual hours of operation after implementation of the TRRP. The annual horsepower ratings were multiplied by the PM_{10} emission factors to estimate annual PM_{10} emissions.

PM_{10} emission factors, in grams/mile, for the motor vehicles were estimated as the emission factors from the CARB EMFAC2011 on-road motor vehicle emissions model for T7 tractors for the vehicle model year traveling at 15 miles per hour in Santa Barbara County. These emission factors were multiplied by the projected annual VMT after implementation of the TRRP to estimate annual PM_{10} emissions.

Emission factors for speciated exhaust TACs with potential acute effects were determined based the factors developed by the Ventura County APCD (2001) for AB2588 for diesel fueled internal combustion engines. Hourly emissions were determined by multiplying the emission factors in pounds per gallons by the hourly fuel consumption rate of the engines. The hourly consumption rates of the engines were estimated by dividing annual fuel use in 2013 by the annual operating hours in 2013.

Health Risk Assessment – Methodology for TAC Emissions from Existing Flare. TACs from the existing flare were estimated using the same emission factors used for the proposed new flare. Hourly TAC emissions were estimated by multiplying the emission factors in lb/MMscf by the maximum hourly flow rate provided in scf/hour from actual one-minute flow data provided by SBCAPCD. Annual TAC emissions from the flare were estimated by multiplying emission factors in lb/MMscf by the annual fuel usage reported for the year 2013.

Health Risk Assessment – Methodology for TAC Emissions from Existing Landfill Gas Fugitives. Existing landfill TACs are determined using site-specific sampling and analysis results. These data were collected from a period of 2009 to 2013; samples were analyzed for individual TACs. A single speciation of the sample result was developed using the maximum values measured in the period; pollutants below detection levels were included at their detection limits. Toxic pollutants included in USEPA (2008a) (default concentrations for LFG constituents for landfills with waste in place on or after 1992) but not included in the sampling results were included in the speciation profile at the levels shown in USEPA (2008a).

Fugitive TAC emission rates were calculated from the speciation profile and the landfill fugitive LFG emission rate. The fugitive LFG emission rate was calculated by first estimating the methane production rate using Equation HH-1 from 40 CFR 98, Subpart HH. The estimated methane production rate was then divided by the fraction of methane in LFG (50 percent from the USEPA LandGEM model) to calculate the estimated LFG production rate. The LFG production rate was then reduced by the estimated landfill gas collection system capture efficiency, estimated using Equation HH-3 from 40 CFR 98, Subpart HH, to calculate the fugitive LFG emission rate.

Health Risk Assessment – Methodology for Evaluating Cancer Risk and Non-Cancer Health Hazards. The health risk assessment evaluates the potential for project TAC emissions to increase cancer risk and non-cancer health hazards at adjacent land uses. Figure 4.2-2 identifies receptors used in the health risk assessment, including the Point of Maximum Impact (see "Acute" in Figure 4.2-2), and Maximum Exposed Individual (MEIR) and Maximum Exposed Worker (MEIW). The health risk methodology is based on the State Office of Environmental Health Hazard Assessment (OEHHA) Guidance Manual. Carcinogenic risks and potential non-carcinogenic chronic health effects were calculated using modeled annual ground-level concentrations, while the acute non-cancer health hazards were determined using the predicted maximum 1-hour ground-level concentrations. The latest OEHHA cancer potency factors and chronic and acute RELs for each TAC were used. The approved health values are incorporated into the HARP model (version 1.4f). The HARP software performs the necessary risk calculations following the OEHHA Risk Assessment Guidelines and the CARB Interim Risk Management Policy for risk management decisions.

The following HARP modeling options were used for the health risk analysis to estimate cancer and non-cancer impacts at the maximum impact location on the same receptor grid as the criteria pollutant air dispersion modeling.

- 70-year Resident Cancer Risk – Derived (Adjusted) method;
- 9-year (Child Resident) Cancer Risk – Derived (OEHHA) method;
- 40-year Worker Cancer Risk – point estimate;
- Chronic Hazard Index – Derived (OEHHA) method; and
- Acute Hazard Index – simple acute hazard index.

The Derived (OEHHA) risk analysis method uses the high-end point-estimates of exposure for the two dominant (driving) exposure pathways, while the remaining exposure pathways use average point estimates. The Derived (Adjusted) method is identical to the Derived (OEHHA) method but uses the breathing rate at the 80th percentile of exposure rather than the high-end point-estimate when the inhalation pathway is one of the dominant exposure pathways. The adult cancer risk estimates using the Derived equations/methods are based on a 70-year exposure (resident). The point-estimate analysis uses a single value rather than a distribution of values in the dose equation for each exposure pathway. Child cancer risk was evaluated for a 9-year residential exposure scenario.

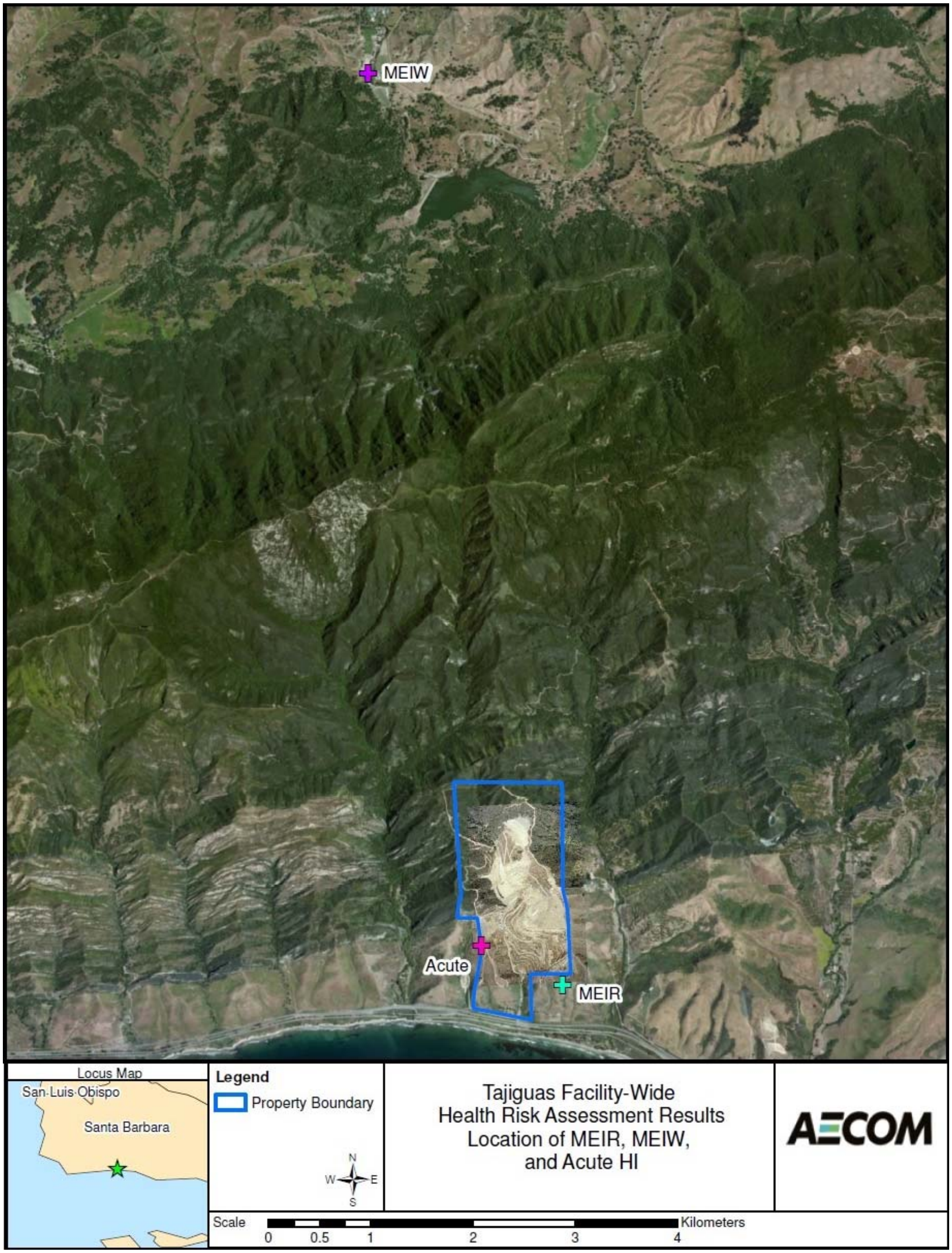


Figure 4.2-2. Receptor Locations for the Health Risk Assessment

The off-site worker exposure duration assumed a standard work schedule since the facility would operate full time, per OEHHA guidance. For the cancer and chronic hazard impacts for workers, the HARP modeling option “modeled ground level concentration and default exposure assumptions” was used. This includes the highly conservative 40-year exposure duration for the worker receptors along with an OEHHA-defined 95th percentile breathing rate of 393 liters of air per kilogram per day (L/kg-day).

The simple acute hazard index method is a conservative approach where the maximum concentrations from each emission source are superimposed to impact receptors at the same time, irrespective of wind direction and/or atmospheric stability, and is a health protective approach to assess acute impacts.

The modeled exposure pathways consisted of all pathways recommended for a health risk assessment. Exposure pathways that were enabled include homegrown produce (using urban default ingestion fractions), dermal absorption, soil ingestion, consumption of locally grown pigs, eggs and poultry and mother’s milk, in addition to the inhalation pathway. Cancer risks modeled for the facility-wide health risk assessment (including existing Tajiguas Landfill sources) extended well to the north before dropping to below a 1.0 in-one-million risk isopleth. Since the area with impacts greater than 1.0 in-one-million cancer risk includes Alisal Lake and the Alisal Guest Ranch Resort that keeps cows on its property, the fishing and beef/dairy pathways were added to the facility-wide health risk assessment. Long-term risks (i.e., cancer and chronic non-carcinogenic hazard index) and short-term risk (acute hazard index) were calculated at the identified off-site receptors.

The chief exposure assumptions are continuous exposure to the modeled TAC concentrations produced by continuous emissions at the maximum emission rates over a 70-year period at each receptor location to estimate lifetime residential cancer risks and over a 40-year period to estimate worker cancer risks. Although the landfill would only have approximately 20 years (2016 to approximately 2036) of capacity left if extended by the proposed project, SBCAPCD required these long exposure periods (40 and 70 years) to be assessed. The actual risks are not expected to be any higher than the predicted risks and are likely to be substantially lower.

Greenhouse Gas Emissions – Landfill Emissions after Waste Diversion. A landfill produces GHG emissions through aerobic and anaerobic breakdown of waste. Multiple factors including regional climate as well as quantity and type of waste determine the quantity and time release of these GHG emissions. The Code of Federal Regulations (40 CFR 98 Subpart HH) provides a methodology to calculate the annual release of CH_4 and CO_2 from a landfill. However, biogenic CO_2 emissions are excluded as they are generated by natural decomposition of organic materials that would occur regardless of any waste management activities.

The Tajiguas Landfill is required to calculate and report GHG emissions to the USEPA on an annual basis. It is necessary to expand on this effort and estimate GHG emissions based on a future scenario in which no project would be undertaken to assess the true impacts of the proposed project. A scenario projecting the annual GHG emissions into the future would demonstrate the additive effects of waste diversion over an extended time period. A first-order decay model is the most widely used scientific methodology for predicting the GHG emissions from the decomposition of waste, and was used in this analysis.

The landfill GHG emissions projection is based on 75,461 metric tons of waste disposed of annually until 2036, and a project-related reduction of the degradable organic carbon of 95 percent. The annual waste disposal quantity was based on the average annual disposal over the last ten years, and the project-related 60 percent diversion rate. The 95 percent reduction in degradable organic carbon is based on engineering estimates that the MRF would separate and divert 95 percent of organic material to the AD Facility.

Greenhouse Gas Emissions – Mobile Equipment. Daily GHG emissions from mobile equipment were calculated by multiplying emission factors from CARB's OFFROAD 2007 model, by daily equipment operating hours. Since the OFFROAD 2007 model does not estimate N_2O emissions, N_2O emission factors were estimated using the default emission factor for N_2O emissions from diesel-fueled construction equipment in Table 13.7 of the 2013 Climate Registry Default Emission Factors (Climate Registry, 2013).

Greenhouse Gas Emissions - Motor Vehicles. Daily CO_2 and CH_4 emissions from on-site and off-site motor vehicle travel were calculated using CARB's EMFAC2011 model and daily VMT. N_2O emissions for gasoline-fueled vehicles were estimated by multiplying the NO_x emission factors by 0.0416. N_2O emissions for diesel-fueled vehicles were estimated using an emission factor of 0.3316 grams per gallon recommended by CARB.

Greenhouse Gas Emissions - CHP Engines and Flare. Hourly CO_2, CH_4 and N_2O emissions from bio-gas combustion in the two CHP engines and flare were estimated using default emission factors for natural gas/propane combustion from Tables C-1 and C-2 of Title 40, Code of Federal Regulations, Subpart 98 for natural gas combustion. Additionally, CO_2 present in the bio-gas would not be combusted, and emitted in the CHP and flare exhaust. These "pass-through" CO_2 emissions were estimated from the vendor's estimate of the CO_2 volume fraction in the bio-gas (60 percent) and the estimated bio-gas consumption rate, provided by the manufacturer. CO_2 emissions from bio-gas combustion (86.5 percent of CHP exhaust) are considered biogenic, and estimated but excluded from the final analysis.

Greenhouse Gas Emissions - Emergency Generator. Hourly CO_2, CH_4 and N_2O emissions from the standby emergency generator were estimated by multiplying emission factors, in grams/gallon, by the generator hourly fuel consumption, in gallons per hour, and the amount of time during an hour that the engine is anticipated to be operated during testing and maintenance. Default CO_2, CH_4 and N_2O emission factors for diesel fuel combustion from Tables C-1 and C-2 of Title 40, Code of Federal Regulations, Subpart 98 for No. 2 distillate fuel combustion were used. Hourly fuel consumption was taken from the manufacturer's specifications. Annual emissions were estimated by multiplying emissions during the 30 minute weekly testing and maintenance period by 52 such periods per year.

Greenhouse Gas Emissions - Indirect Offset from Export of Electricity. The project would generate renewable energy, in the form of electricity from solar photo-voltaic panels on the roofs of the MRF and AD Facility, and electrical generators mounted on the two CHP engines burning bio-gas. These sources would provide enough electricity to operate the site and any excess electricity generated on site would be exported to the Southern California Edison (SCE) grid. The difference between the electricity generated on site and the electricity consumed is equal to the energy exported. According to the Climate Action Reserve, SCE has an average emissions intensity of 630.9 lbs CO_2e/MWh (megawatt hour). Multiplying this factor by the gross electricity exported provides the GHG reduction associated with offsetting GHG emissions associated with producing electricity by SCE.

Greenhouse Gas Emissions - Fugitive Methane Emissions from Composting Windrows. CH_4 emissions from the compost windrows were estimated using an emission factor from source tests conducted by the South Coast Air Quality Management District at San Joaquin Composting, Inc. in Lost Hills, California in February and March 1996 is 1.23 pounds CH_4/1,000 square feet per hour (SCAQMD, 1996). The facility tested composted 50 percent digested sewage sludge and 50 percent green waste by weight. The CH_4 emission factor for composting digestate was estimated by the vendor to be three percent of the source test report emissions due to an estimated 97 percent capture of the feedstock's bio-methane potential and related emissions during the two 28-day in-vessel anaerobic digestion phases.

Odor Assessment – Overview and Sources. The potential for an objectionable odor response depends on several other factors besides the magnitude of the odor. These other factors are the frequency, duration, location and offensiveness of the odor. For this assessment, the modeling of odor unit emissions provides a means to accomplish a quantitative odor impact assessment. Based on the current understanding of the MRF and AD Facility, the odor control strategy would be to enclose the process(es) where possible, maintain negative air pressure inside the buildings, and treat potentially odorous air in bio-filters.

Odors would be generated at the MRF, AD Facility, and composting and finishing operations areas. The proposed odor control strategy is to enclose processes where possible, maintain negative air pressure in buildings, and treat building exhaust air with bio-filters. ~~with~~ The exhaust of the four ~~three~~ bio-filters would comprise ~~ing~~ the primary sources. Gaseous products from the anaerobic digestion process (bio-gas) are sent to the CHP engines and flare for combustion, and odors are assumed to be oxidized and odorous emissions would be insignificant. The composting area would not be enclosed; however, odors from composting are expected to be minimized as the materials would have already gone through the anaerobic digestion process. Best management practices and standard operating procedures would limit the amount of fugitive odor emissions from the facilities and digestate composting area.

The MRF bio-filter would extract internal air from the organics recovery, recyclable sorting and recyclable storage areas inside the MRF building. The most odorous area is expected to be the organics recovery area which would be ventilated at 5 air changes per hour. The recycling sorting and storage areas would be ventilated at 4 and 3 air changes per hour, respectively. Residual material would cause odors in the separated recycled streams, but they would not be as odorous as the organics recovery stream.

The AD Facility bio-filters would extract internal building air from the mixed organics, central mixing, Source Separated Organics mixing and Source Separated Organics delivery areas. These sources are expected to be the most odorous due to the amount of stockpiling, physical mixing/agitation, and age of material. The air changes per hour would range from 3 to 4 for each of the areas, and some re-circulated air may be introduced from the MRF. Based on a pressurized bladder seal door system, the AD vessels are assumed to be completely isolated from the AD Facility working space. However, a small portion of the purge air from the anaerobic digesters may be released into the general building ventilation or it will be directly exhausted to the bio-filters. This release will increase the odor loading for short durations. The odor loading of the AD Facility bio-filters would be greater than the tipping floor bio-filter since the material is older and has higher organic content.

Based on a review of sampling results from a similar composting facility in a German study by Bekon (BUB, 2010), typical bio-filter odor inlet loadings can average 3,300 OU/m^3. Although the review of sampling results indicates a high odor removal efficiency range of 95 to 98 percent, the Bekon study shows the odor removal efficiency to be approximately 90 percent or 339 OU/m^3 outlet concentration.

The tipping floor bio-filter would extract ventilation air from the tipping floor. This area would be ventilated at 5 air changes per hour; however, some of the supply air may be re-circulated from the MRF area. The tipping floor would stockpile MSW, which will start to decompose and release odors. If material is stockpiled for longer periods and left undisturbed, odor emissions can increase. Based on the Bekon test data (BUB, 2010), the tipping floor bio-filter is estimated to have an average outlet loading of 436 OU/m^3.

MSW- and SSOW-derived digestate would be separately laid down into windrows at the composting area. Literature review shows that odors in concentrations of 600 to 1,000 OU/m^3 were released from MSW windrows, and odors emitted from organic waste and food waste windrows were found to be around 410 OU/m^3. Based on the Bekon study (BUB, 2010), a value of 1,005 OU/m^3 was measured at a similar landfill in Germany. For the TRRP odor impact modeling, 1,005 OU/m^3 is assumed for odor emitted from the undisturbed (pre-turning) MSW- and SSOW-derived digestate windrows with BACT measures equaling a control efficiency of 90 percent (same as for ROC emissions).

Windrow turning (and other means of agitation) causes release of intense odors which are typically experienced following turning. Windrow turning increases odor emission by opening the interior of windrows and releasing trapped odorants. Odors are greatest with the first turning and subside quickly with subsequent turnings. Based on the Bekon test data (BUB, 2010), odor release from the windrow immediately after turning is approximately 3,633 OU/m^3 on average.

Odor release from the cured compost storage area is expected to be relatively low. The Bekon study (BUB, 2010) measured odor concentrations for yard waste, MSW and organic waste curing piles of 27 OU/m^3 on average. It has been assumed that odor released from the cured compost storage area would be approximately 27 OU/m^3 with mitigation measures similar to those employed for the compost windrows area.

<u>Odor Assessment – Air Dispersion Model Inputs</u>. The SBCAPCD Modeling Guidance requires that the Industrial Short Term model (ISCST3) be used for all air dispersion modeling assessments. Therefore, the latest version of ISCST3 was used for the modeling of odor emissions. Only one pollutant, odor, was modeled. Sources modeled included the three bio-filter exhausts, windrow group 1 undisturbed), windrow group 2 (recently disturbed) and cured piles. All sources were modeled as area sources with an odor flux rate in OU/sec/m^2. All guidelines for odor-based contaminants are expressed in a 10-minute averaging period; however, the dispersion model estimates concentration for a 1-hour averaging time period. Modeled odor concentrations were converted to a 10 minute average concentration by dividing the modeled 1-hour concentration by (10/60)$^{\wedge 0.28}$.

Figure 4.2-3. Receptor Locations for Odor Modeling

Odor Assessment – Receptors. A standard receptor grid was placed around the landfill site, along with receptors spaced evenly along the property line, similar to the criteria pollutant impact analysis. In addition, three single point receptors were chosen for frequency analysis (see Table 4.2-4), which included determining the number of hours per year the 5 OU/m^3 odor guideline concentration was exceeded. The locations of these receptors are shown in Figure 4.2-3.

Table 4.2-4. Odor Assessment Receptors

Receptor Name	Type	Exposure Duration
Baron Ranch Trail	Nearest recreational use	Short-term, a few hours per year
Hart residence (planned)	Nearest residential use	Long-term, virtually year-round
Arroyo Quemada community	Next nearest residential use	Long-term, virtually year-round

Construction Emissions Impacts

Impact TRRP AQ-1: Construction of project facilities would result in criteria air pollutant emissions that would not significantly affect regional air quality – Class III Impact.

Construction activities would involve sources of air pollutants, including heavy equipment, heavy-duty trucks and worker vehicles. Table 4.2-5 provides a summary of criteria air pollutant emissions for the peak 12 month period during construction of project facilities. SBCAPCD Rule 202 D.16 applies to projects that include a stationary source that requires an Authority to Construct permit, and includes a 25 tons per year threshold for criteria pollutant emissions, except carbon monoxide. If pollutants exceed the 25 tons per year threshold, the owner of the stationary source is required to provide offsets and must demonstrate that no ambient air quality standard will be violated. This threshold is used to determine the significance of construction emissions of the proposed project. As shown in Table 4.2-5, the maximum construction emissions during a 12-month time period would not exceed this threshold, and are considered a less than significant impact.

Table 4.2-5. Summary of Construction Air Pollutant Emissions

	Maximum Annual Emissions (tons/12 months)					
	ROC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Maximum 12-Month Total	1.71	11.35	8.38	<0.005	11.77	1.69
SBCAPCD Threshold	25	25	--	25	25	25
Significant Impact (Yes/No)	No	No	No	No	No	No

The following standard emissions reduction measures recommended by the SBCAPCD would be implemented during project construction and are assumed in the emissions calculations.

- During construction, use water trucks or sprinkler systems to keep all areas of vehicle movement damp enough to prevent dust from leaving the site. At a minimum, this should include wetting down such areas in the late morning and after work is completed for the day. Increased watering frequency should be required whenever the wind speed exceeds 15 mph. Reclaimed water should be used whenever possible.
- Minimize the amount of disturbed area and reduce on-site vehicle speed to 15 mph or less.
- If importation, exportation and stockpiling of fill material is involved, soil stockpiled for more than two days shall be covered, kept moist, or treated with soil binders to prevent dust generation. Trucks transporting fill material to and from the site shall be tarped from the point of origin.
- Gravel pads shall be installed at all access points to prevent tracking of mud onto public roads.
- After clearing, grading, earthmoving or excavation is completed, treat the disturbed area by watering, or revegetating, or by spreading soil binders until the area is paved or otherwise developed so that dust generation does not occur.
- The contractor or builder shall designate a person or persons to monitor the dust control program and to order increased watering as necessary, to prevent transport of dust off-site. Their duties shall include holiday and weekend periods when work may not be in progress. The name and telephone number of such persons shall be provided to the Air Pollution Control District prior to the initiation of construction.
- All portable diesel-powered construction equipment shall be registered with the State’s portable equipment registration program or shall obtain an APCD permit.
- Fleet owners of mobile construction equipment are subject to the California Air Resources Board (CARB) Regulation for In-use Off-Road Diesel Vehicles, which regulates diesel particulate matter and criteria pollutant emissions from existing off-road diesel-fueled vehicles.
- All commercial diesel vehicles are subject to State regulations limiting engine idling time. Idling of heavy-duty diesel construction equipment and trucks during loading and unloading shall be limited to five minutes; electric auxiliary power units should be used whenever possible.
- Diesel construction equipment meeting CARB Tier 1 emission standards for off-road heavy-duty diesel engines shall be used. Equipment meeting CARB Tier 2 or higher emission standards should be used to the maximum extent feasible.

- Diesel-powered equipment should be replaced by electric equipment whenever feasible.
- If feasible, diesel construction equipment shall be equipped with selective catalytic reduction systems, diesel oxidation catalysts and diesel particulate filters certified and/or verified by USEPA or CARB.
- Catalytic convertors shall be installed on gasoline-powered equipment, if feasible.
- All construction equipment shall be maintained in tune per the manufacturer's specifications.
- The engine size of construction equipment shall be the minimum practical size.
- The number of construction equipment operating simultaneously shall be minimized through efficient management practices to ensure the smallest practical number are operating at any one time.
- Construction worker trips should be minimize by requiring carpooling and by providing lunch on-site.

Operation Emissions Impacts

Impact TRRP AQ-2: Operation of project facilities would result in criteria air pollutant emissions that would not significantly affect regional air quality – Class III Impact.

Project operation would generate air pollutant emissions from on-site equipment used to handle, sort and process solid waste, on-site motor vehicles used to transport solid waste, and off-site motor vehicles to transport employees, solid waste and recyclables. Table 4.2.6 provides a summary of maximum daily criteria pollutant emissions generated during operation of the project, including emissions associated with the optional CSSR component.

Table 4.2-7 provides a summary of emissions from on-site and off-site vehicles and compares emissions to Santa Barbara County's threshold of 25 pounds per day of NO_x or ROC for motor vehicle trips only. Note that NO_x emissions for vehicles would be less under the CSSR option because the trip distance for trucks carrying CSSR would be shorter (from SCRTS to the landfill, instead of to Gold Coast in Ventura) and trucks used to transport recovered recyclables to market would be fueled by compressed natural gas. Overall, project operations emissions would not exceed any County thresholds, and would have less than significant impacts to regional air quality.

Table 4.2-6. Summary of Air Pollutant Emissions associated with Project Operation

Source	**Maximum Daily Emissions (pounds/day)**					
	ROC	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Proposed Project without CSSR Option						
On-site equipment and vehicles	~~43.98~~ 39.89	~~44.79~~ 45.18	~~151.79~~ 143.32	~~27.01~~ 13.53	~~37.86~~ 39.87	~~22.86~~ 23.01
Off-site vehicles	4.42	6.87	23.76	0.07	4.33	1.30
Total Emissions	**~~48.40~~** **44.32**	**~~51.66~~** **52.04**	**~~175.55~~** **167.08**	**~~27.08~~** **13.61**	**~~42.19~~** **44.20**	**~~24.16~~** **24.31**
Proposed Project with CSSR Option						
On-site equipment and vehicles	~~44.01~~ 39.91	~~44.86~~ 37.21	~~151.86~~ 125.87	~~27.01~~ 12.26	~~44.20~~ 46.12	~~23.49~~ 23.56
Off-site vehicles	5.73	4.98	30.71	0.09	5.45	1.62
Total Emissions	**~~49.74~~** **45.64**	**~~49.84~~** **42.91**	**~~182.57~~** **156.58**	**~~27.10~~** **12.35**	**~~49.65~~** **51.57**	**~~25.11~~** **25.71**
Santa Barbara County CEQA Threshold[1]	55	55	--	--	80	--
Significant Impact (without CSSR/with CSSR)	No/No	No/No	No/No	No/No	No/No	No/No

[1] Thresholds are from the County's *Environmental Thresholds and Guidelines Manual,* based on SBCAPCD's New Source Review Rule.

Table 4.2-7. Summary of Motor Vehicle Emissions associated with Project Operation

Source	**Maximum Daily Emissions (pounds/day)**					
	ROC	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Proposed Project without CSSR Option						
On-site vehicles	0.03	0.06	0.12	<0.005	13.11	1.31
Off-site vehicles	4.42	6.87	23.76	0.07	4.33	1.30
Total	**4.45**	**6.93**	**23.88**	**0.07**	**17.44**	**2.61**
Proposed Project with CSSR Option						
On-site vehicles	0.06	0.14	0.19	<0.005	19.44	1.94
Off-site vehicles	5.73	4.98	30.71	0.09	5.45	1.62
Total	**5.79**	**5.12**	**30.90**	**0.09**	**24.89**	**3.56**
Santa Barbara County CEQA Threshold[1]	25	25	--	--	--	--
Significant Impact (without CSSR/with CSSR)	No/No	No/No	No/No	No/No	No/No	No/No

[1] Thresholds are from the County's *Environmental Thresholds and Guidelines Manual*.

Impact TRRP AQ-3: Normal operation of project facilities would result in criteria air pollutant emissions that would not cause or contribute to exceedances of ambient air quality standards – Class III Impact.

An air dispersion model (ISCST3) was used with one year of meteorological data to determine ground level concentrations of pollutants emitted by the project for comparison to the NAAQS and CAAQS. The results of the NAAQS analysis are shown in Table 4.2-8, and provide a comparison of the modeled concentrations (project contribution + background) to the "design value" concentration based on the form of the standard:

- For all annual modeling periods, the NAAQS concentration is the highest modeled annual average impact.
- For 1-hour NO_2 and SO_2, the NAAQS concentration is the highest 98th and 99th percentile modeled impact respectively.
- For 24-hour $PM_{2.5}$, the form of the standard is the 3-year average of the 98th percentile impact. However, because USEPA guidance recommends adding the 3-year average of the highest modeled concentration at each receptor to the 98th percentile background, that is what is reported.
- For all other standards, the form of the standard is "not to be exceeded more than once per year;" therefore, the highest value is reported.

Tables 4.2-8 and 4.2-9 include two sets of modeling results separated by a slash (/), with the first value representing the operating scenario with the CHP engines exhausting through the engine stack, and the second value representing the operating scenario with the CHP engines exhausting through RBD stack.

As shown in Table 4.2-8, the modeled project contribution (from all sources), when combined with the appropriate ambient background concentration, are below the NAAQS for all pollutants. Therefore, project-related emissions would not cause or contribute to an exceedance of the NAAQS, and air quality impacts are considered less than significant.

The results of the CAAQS analysis are provided in Table 4.2-9. For the CAAQS analysis, the representative ambient background concentration was added to the modeled ground level concentration and compared to the CAAQS. In all cases, the form of the CAAQS is "not to be exceeded", so the maximum modeled concentrations are reported. As shown in Table 4.2-9, the modeled project contribution (from all sources), when combined with the appropriate ambient background concentration, are below the CAAQS for all pollutants. Therefore, project-related emissions would not cause or contribute to an exceedance of the CAAQS, and air quality impacts are considered less than significant.

Table 4.2-8. Air Dispersion Modeling Results – NAAQS (µg/m^3)

Pollutant	Averaging Period	NAAQS Concentration	Ambient Background	Total Concentration	NAAQS	Less than NAAQS?
SO_2	1-hour	~~55.3~~ 5.7/5.6[2]	65.5	~~120.8~~ 71.2/71.1	196.5	Yes
	3-hour	~~7.8~~ 2.8/2.9	158.9	~~166.7~~ 161.7/161.8	1,300	Yes
	24-hour	~~1.5~~ 0.9/0.9	62.9	~~64.4~~ 63.8/62.9	356	Yes
	Annual	~~0.04~~ 0.08/0.05	4.0	~~4.0~~ 4.1/4.0	80	Yes
CO	1-hour	~~262.5~~ 1127.5/1127.5	689.7	~~952.1~~ 1817.1/1817.1	40,000	Yes
	8-hour	~~34.2~~ 140.9/140.9	574.7	~~608.9~~ 715.6/715.6	10,000	Yes
NO_2[1]	1-hour	~~42.5[3]~~ 80.9/80.9	23.8	~~66.4~~ 104.7/104.7	188	Yes
	Annual	~~0.3~~ 1.4/1.4	3.9	~~4.3~~ 5.3/5.3	100	Yes
PM_{10}	24-hour	~~7.8~~ 11.2/11.2	34.0	~~41.8~~ 45.5/45.2	150	Yes
$PM_{2.5}$	24-hour	~~6.8~~ 8.2/8.2	16.0	~~22.8~~ 24.2/24.2	35	Yes
	Annual	~~0.6~~ 0.3/.03	9.0	~~9.6~~ 9.3/9.3	12	Yes

[1] 1-hour NO_2 impacts multiplied by 0.8 and annual NO_2 impacts multiplied by 0.75 to represent Tier 2 NO_x/NO_2 conversion.

[2] 99th percentile modeled concentration. Proper form of standard is 3-year average of the 99th percentile of the daily maxima.

[3] 98th percentile modeled concentration. Proper form of standard is 3-year average of the 98th percentile of the daily maxima.

Table 4.2-9. Air Dispersion Modeling Results – CAAQS (µg/m3)

Pollutant	Averaging Period	CAAQS Concentration	Ambient Background	Total Concentration	CAAQS	Less than CAAQS?
SO_2	1-hour	~~60.4~~ 6.1/6.8	191.3	~~196.7~~ 197.3/198.0	655	Yes
	24-hour	~~1.7~~ 1.1/0.9	62.9	~~63.8~~ 64.0/63.8	105	Yes
CO	1-hour	~~278.7~~ 1141.8/1141.8	689.7	~~1041.8~~ 1831.4/1831.4	23,000	Yes
	8-hour	~~44.8~~ 169.7/169.7	574.7	~~626.5~~ 744.4/744.4	10,000	Yes
NO_2	1-hour	~~53.0~~ 150.8/150.8	65.8	~~115.1~~ 216.6/216.6	339	Yes
	Annual	~~0.3~~ 1.4/1.4	3.9	~~4.3~~ 5.3/5.3	57	Yes
PM_{10}	24-hour	~~8.2~~ 12.9/12.9	34.0	~~45.0~~ 46.9/46.9	50	Yes
	Annual	~~0.7~~ 0.5/0.5	13.3	13.8/13.8	20	Yes
$PM_{2.5}$	Annual	~~0.6~~ 0.3/0.3	9.0	9.3/9.3	12	Yes

[1] All short term results are the highest modeled value, annual results are the highest annual average.

Impact TRRP AQ-4: Short-term operational scenarios of the flare and CHP engines would result in criteria pollutant emissions that would not cause or substantially contribute to exceedances of air quality standards – Class III Impact.

Hourly emissions were estimated for three short-term scenarios as requested by the SBCAPCD to represent unusual circumstances that would produce greater emissions for short periods. An air dispersion model (ISCST3) was used with one year of meteorological data to determine ground level pollutant concentrations for comparison to the NAAQS and CAAQS. This analysis used the same background pollutant concentrations listed in Tables 4.2-8 and 4.2-9. Table 4.2-10 indicates that the NAAQS and CAAQS would not be exceeded.

Table 4.2-10. Results of Short-Term Scenario Modeling

Parameter	Flare Combusting Bio-gas with One ~~while the~~ CHP Engine~~s~~ ~~are~~ Offline	One CHP Engine Start-up on Propane While the Second is in Normal Operating Mode	SCR Burn-in ~~on~~ One CHP Engine on Propane While the Second is in Normal Operating Mode
Hourly Emissions			
Pounds/Hour NO$_x$	0.79 ~~1.19~~	1.25 ~~1.67~~	1.25 ~~1.67~~
Pounds/Hour CO	1.98 ~~3.95~~	5.72 ~~6.76~~	1.04 ~~6.76~~
Pounds/Hour SO$_2$	0.05 ~~1.12~~	0.15 --	0.11--
NAAQS[1]			
Highest Modeled 1-hour NO$_x$ Concentration	~~66.4~~ 104.7	~~68.3~~ 104.7	~~68.3~~ 104.7
Highest Modeled Annual NO$_x$ Concentration	~~4.3~~ 5.3	--	--
Highest Modeled 1-hour CO Concentration	~~933.3~~ 1817.1	~~956.5~~ 1871.1	~~956.5~~ 1871.1
Highest Modeled 8-hour CO Concentration	~~627.0~~ 715.6	~~649.4~~ 715.6	~~649.4~~ 715.6
Highest Modeled 1-hour SO$_2$ Concentration	~~101.1~~ 82.9	72.4--	72.4--
Exceed NAAQS?	**No**	**No**	**No**
CAAQS[1]			
Highest Modeled 1-hour NO$_x$ Concentration	~~115.1~~ 216.6	~~121.3~~ 216.6	~~121.3~~ 216.6
Highest Modeled Annual NO$_x$ Concentration	~~4.3~~ 5.3	--	--
Highest Modeled 1-hour CO Concentration	~~1041.8~~ 1831.4	~~1041.8~~ 1831.4	~~1041.8~~ 1831.4
Highest Modeled 8-hour CO Concentration	~~630.0~~ 744.4	~~653.6~~ 744.4	~~653.6~~ 744.4
Highest Modeled 1-hour SO$_2$ Concentration	~~226.9~~ 208.7	-- 198.6	-- 198.6
Exceed CAAQS?	**No**	**No**	**No**

[1] All values include background concentrations

Impact TRRP AQ-5: Operation of project facilities would result in emissions of toxic air contaminants, but emissions would not result in significant health risks at adjacent land uses – Class III Impact.

An air dispersion model (ISCST3) was used with one year of meteorological data to determine ground level concentrations of toxic air contaminants emitted by the project. The HARP model was then used to identify cancer risk and non-cancer health hazards at the nearest residence (planned Hart residence), which represents the maximum exposed residence (MEIR) and the Alisal Resort and Ranch which represents the maximum exposed worker (MEIW) (see Figure 4.2-2). A summary of cancer risk and non-cancer health impact risk values are presented in Table 4.2-11 for the TRRP only. Project-related cancer risk and health hazard index values are less than the SBCAPCD thresholds, and are considered a less than significant impact.

A facility-wide summary of cancer risk and non-cancer health impact risk values are presented in Table 4.2-12 for existing and proposed sources of TAC emissions at the landfill. Acute hazard risk is a short-term health risk and based on maximum 1-hour toxic air contaminant concentrations estimated by air dispersion modeling. As a short-term risk, persons could be exposed to this risk at the property line and not necessarily while residing or working at adjacent land uses. Therefore, a property line receptor was used as a worst-case exposure scenario (see Figure 4.2-2). While the facility-wide health risk assessment indicates the acute hazard index threshold would be exceeded at the property boundary, this area is uninhabited, inaccessible (steep terrain with dense vegetation) and the area is not reasonably accessible by the public and individuals would not be exposed to this risk. Therefore, facility-wide TAC emissions would not result in a significant health risk impact.

Table 4.2-11. Summary of the Results of the Health Risk Assessment (TRRP Only)

Receptor Type		Maximum Cancer Risk (per million)	Maximum Acute Hazard Index	Maximum Chronic Hazard Index
PMI[1]	Adult	--	~~0.55~~ 0.49	--
MEIR[2]	Adult	~~1.66~~ 0.92	0.14	~~0.03~~ 0.02
	Child	~~0.40~~ 0.22	--	--
MEIW[3]		0.03	~~0.02~~ 0.01	< 0.01
~~SBCAPCD Significance Threshold~~		~~10~~	~~1~~	~~1~~
~~Exceed Thtesholds (Yes/No)?~~		~~No~~	~~No~~	~~No~~

[1] PMI: Point of maximum impact, property boundary receptor

[2] MEIR: Maximum exposed individual at an existing residential receptor; 70-year adult exposure scenario and 9-year child exposure scenario for cancer risk

[3] MEIW: Maximum exposed individual at an existing occupational worker receptor; 40-year adult worker exposure

Table 4.2-12. Summary of the Results of the Health Risk Assessment (Facility-Wide)

Receptor Type		Maximum Cancer Risk (per million)	Maximum Acute Hazard Index	Maximum Chronic Hazard Index
PMI[1]	Adult	--	**~~1.27~~** **1.56**	--
MEIR[2]	Adult	~~6.91~~ 5.86	~~0.66~~ 0.62	~~0.13~~ 0.11
	Child	~~1.59~~ 1.35	--	--
MEIW[3]		~~0.23~~ 0.24	0.06	0.03
SBCAPCD Significance Threshold		10	1	1
Exceed Threshold (Yes/No)?		No	**Yes[4]**	No

[1] PMI: Point of maximum impact, property boundary receptor

[2] MEIR: Maximum exposed individual at an existing residential receptor; 70-year adult exposure scenario and 9-year child exposure scenario for cancer risk

[3] MEIW: Maximum exposed individual at an existing occupational worker receptor; 40-year adult worker exposure

[4] Not considered significant since the receptor location is not reasonably accessible to the public

Greenhouse Gas Emissions

Impact TRRP AQ-6: Construction of project facilities would generate greenhouse gas emissions that would result in a less than significant contribution to global climate change – Class III Impact.

GHGs would be emitted during project construction prior to the realization of any benefits associated with the project (diversion of organic waste). Table 4.2-13 provides a summary of total project-related GHG emissions during construction. Construction greenhouse gas emissions are included in the overall project summary of GHG emissions (see Table 4.2-15), and not subject to the 1,000 MTCO$_2$e/year significance threshold adopted for industrial stationary sources.

Table 4.2-13. Total Greenhouse Gas Emissions during Construction (metric tons)

Pollutant	Total Emissions	GWP Factor	Peak 12 Month CO$_2$e Emissions
CO$_2$	2,152	1	2,152
CH$_4$	0.58	25	14.5
N$_2$O	0.07	298	20.9
Total	--	--	**~~2,188~~ 2,190**

Impact TRRP AQ-7: Implementation of the TRRP would reduce GHG emissions associated with landfill disposal by diversion of organic waste that would produce landfill gas emissions, and export of electricity that would offset GHG emissions associated with electricity generation – Class IV Impact (Beneficial).

GHG emissions associated with disposal of MSW at the Tajiguas Landfill would be reduced by removal of organic waste at the proposed MRF and anaerobic digestion of this waste at the proposed AD Facility to generate bio-gas, which would be combusted in the CHP engines to produce heat and power to operate the facility. These actions would avoid GHG emissions associated with landfill gas that would be produced if the organic waste was buried, and reduce the disposal rate at the landfill active face which would reduce GHG emissions associated with heavy equipment. The project-related reduction in landfill GHG emissions over time as compared to baseline conditions is graphically represented in Figure 4.2-4. Table 4.2-14 provides a summary of annual GHG emissions from project equipment and motor vehicles, including implementation of the CSSR Option.

Table 4.2-14. Summary of Annual GHG Emissions from Project Sources

Source	Project w/o CSSR Option (CO_2e Metric Tons)	Project with CSSR Option (CO_2e Metric Tons)
CHP engines bio-gas combustion*	1,215 ~~9~~	1,215 ~~9~~
CHP engines pass-through CO_2*	628 ~~0~~	628 ~~0~~
Flare combustion	67 ~~5~~	67 ~~5~~
Flare pass-through CO_2*	40 ~~0~~	40 ~~0~~
Emergency generator	1,174	1,174
MRF mobile equipment	120 ~~1,241~~	120 ~~1,241~~
AD Facility mobile equipment	77 ~~60~~	77 ~~60~~
Composting area mobile equipment	51 ~~180~~	51 ~~180~~
On-site motor vehicles	19	36
Off-site motor vehicles	1,686	2,117
Compost windrows	650	650
Emissions Total[1]	5,727 ~~3,850~~	6,175 ~~4,298~~
Electricity Export Offset	-2,316	-2,316
Overall Net Change	3,411 ~~1,534~~	3,859 ~~1,982~~

[1] Reported GHG emissions do not include biogenic CO_2 emissions (associated with bio-gas combustion and pass-through CO_2)*

Table 4.2-15 provides a summary of lifetime total GHG emissions associated with the Tajiguas Landfill over the period of 2015 through 2066, with a comparison to baseline (No Project). As indicated, the project would reduce GHG emissions associated with waste management at the Tajiguas Landfill by at least 963,876 ~~1,001,440~~ metric tons over the period of 2015 through 2066 resulting in a beneficial GHG impact.

Table 4.2-15. Summary of Lifetime Total GHG Emissions

Source	Project w/o CSSR Option (CO_2e Metric Tons)	Project with CSSR Option (CO_2e Metric Tons)
Project construction (2015-2016)	2,190	2,190
Landfill operations ~~with~~ as modified by the TRRP (2017-2066)*	2,246,000	2,246,000
TRRP operation (2017-~~2046~~ 2036)	101,521 ~~63,960~~	110,484 ~~72,920~~
Compost windrows (CH_4)	13,000	13,000
Energy offset (2017-2036)	-47,550	-47,550
Project Lifetime Total	2,315,161 ~~2,277,600~~	2,324,124 ~~2,286,560~~
Baseline (No Project)	3,288,000	3,288,000
Difference	**-972,839 ~~-1,010,400~~**	**-963,876 ~~-1,001,440~~**

*Includes landfill equipment and transportation emissions through 2036, and landfill gas emissions through 2066

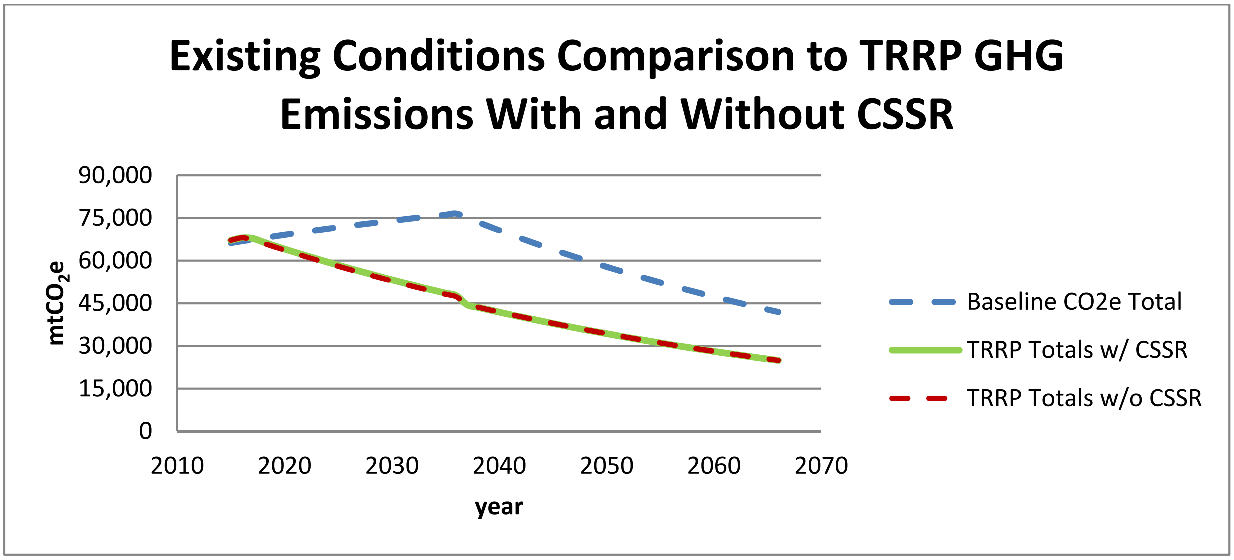


Figure 4.2-4. Lifetime Comparison of Waste Disposal GHG Emissions

Impact TRRP AQ-8: Implementation of the TRRP would reduce GHG emissions by improved recovery and recycling of materials – Class IV Impact (Beneficial).

The GHG analysis provided under **Impact TRRP AQ-7** describes the annual GHG emissions inventories and sums them over time to provide a complete picture of GHG emissions that take place within Santa Barbara County or close to it (e.g., offset electricity generation emissions). However, this analysis does not include a life-cycle assessment. An annual GHG emissions inventory and a life-cycle assessment are two different types of analyses that are not directly comparable, but each serves to provide useful pieces of information. The life-cycle GHG reduction benefits associated with the recycling activities of the proposed MRF offer further benefits that are not reflected in the annual GHG emissions inventory.

A landfill is the end location for resource use. Recycling material (rather than landfill disposal) and reusing it, reduces the need for additional resources (extraction, energy, and production), thereby decreasing emissions in the production system. Using the USEPA's Waste Reduction Model (WARM), the RRWMD in consultation with the TRRP vendor has estimated that the additional GHG reduction benefits of recycling materials recovered by the MRF processing activities would be 67,675 $MTCO_2e$ over the life-cycle of the waste diverted. The WARM Model is a tool designed to help managers and policy-makers understand and compare the life-cycle GHG and energy implications of materials management options (recycling, source reduction, landfilling, combustion with energy recovery, and composting) for materials commonly found in the waste stream.

By comparing a baseline scenario (e.g., landfilling) to an alternate scenario (e.g., recycling), WARM can assess the GHG implications that would occur throughout the material life-cycle. See Appendix P for the RRWMD/vendor's recycling recovery tonnage assumptions and the WARM Model life-cycle GHG emissions reduction estimates for the proposed MRF and the benefits of recycling. As the WARM model calculation of GHG emission reductions uses different assumptions than the annual GHG analysis, primarily related to the geographic boundary of the analysis, the WARM estimates of the GHG emission reduction benefits related to recycling are presented separately from the analysis discussed under **Impact TRRP AQ-7**.

~~The above GHG analysis does not quantify additional life-cycle GHG reduction benefits associated with the recycling activities of the proposed MRF. A landfill is the end location for resource use. Recycling material (rather than landfill disposal) and reusing it, reduces the need for additional resources (extraction, energy, and production), thereby decreasing emissions in the production system. Using the USEPA's Waste Reduction Model (WARM), the RRWMD in consultation with the TRRP vendor has estimated that the additional GHG reduction benefits of recycling materials recovered by the MRF processing activities would be 67,675 MTCO~~~~$_2$~~~~e per year. The WARM Model is a tool designed to help managers and policy-makers understand and compare the life-cycle GHG and energy implications of materials management options (recycling, source reduction, landfilling, combustion with energy recovery, and composting) for materials commonly found in the waste stream. By comparing a baseline scenario (e.g., landfilling) to an alternate scenario (e.g., recycling), WARM can assess the GHG implications that would occur throughout the material life cycle. Please see Appendix P for a copy of the RRWMD/vendor's recycling recovery tonnage assumptions and the WARM Model annual GHG emission reduction estimates for the proposed MRF and the benefits of recycling. As the WARM model calculation of GHG emission reductions uses different assumptions than the GHG analysis presented above, primarily related to the geographic boundary of the analysis, the WARM estimates of the GHG emission reduction benefits related to recycling are presented separately from the analysis discussed under Impact TRRP AQ-7~~.

Odor Impacts

Impact TRRP AQ-9: Odors generated by solid waste processing in the TRRP facilities may create a less than significant nuisance air quality impact – Class III Impact.

The region surrounding the landfill site is primarily zoned and used for agriculture and is sparsely populated, so exposure to potential nuisance odor impacts would be very limited. As noted in Section 4.2.2.1, for purposes of this EIR analysis, a nuisance odor impact is determined by the concentration of the odor (greater than 5 OU/m^3), the frequency (greater than 175 hours per year or 2 percent) and the number of receptors (considerable number).

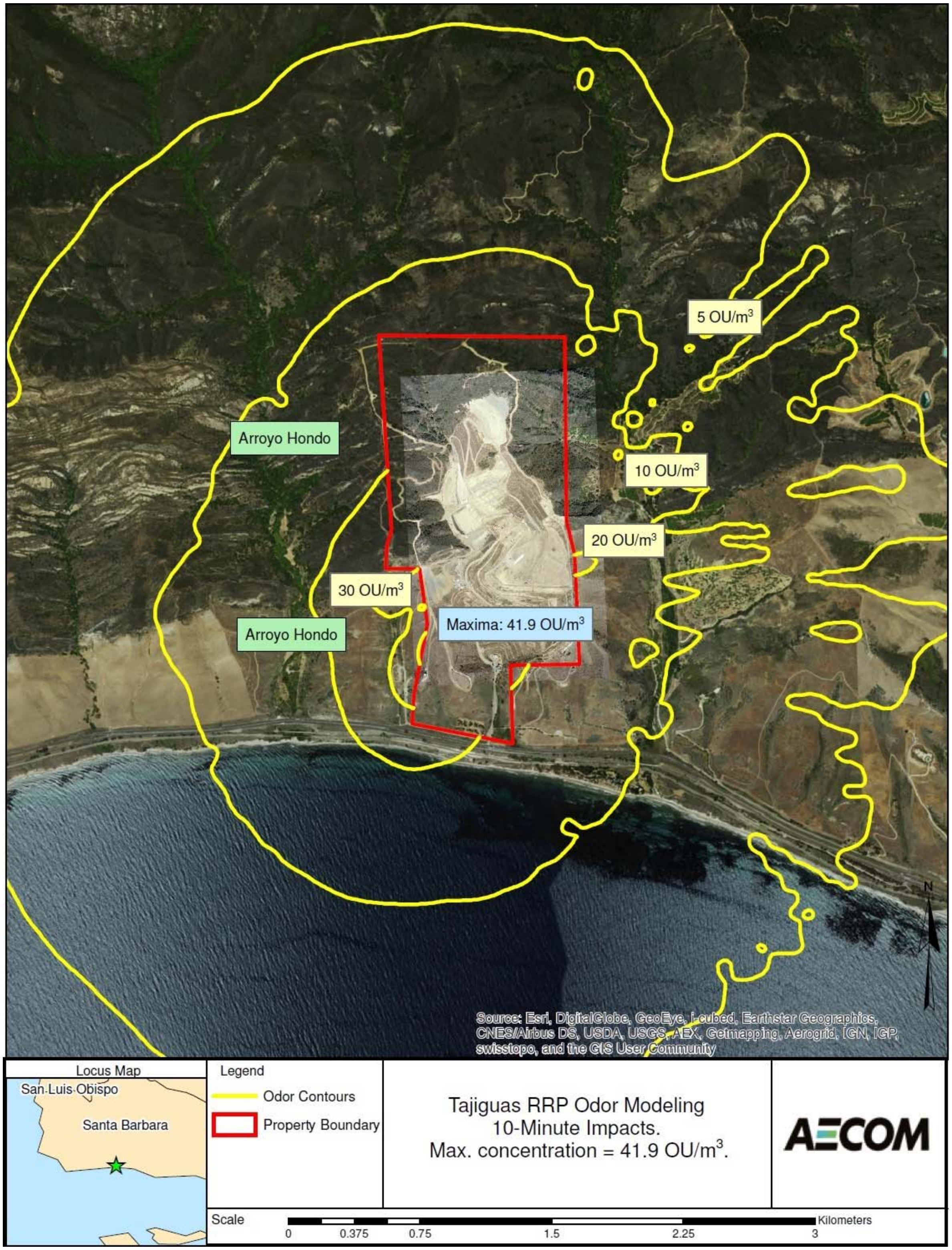
Odor impact modeling was conducted using the ISCST3 air dispersion model and odor emission rates for proposed sources, including the bio-filter exhausts and compost windrows. The results of the odor impact analysis are presented in Table 4.2-16. The maximum modeled 10-minute concentration was 41.9 ~~37.9~~ OU/m^3 at the western landfill property line. The likelihood that a receptor in the sparsely populated, agricultural area surrounding the landfill site would experience the peak odor concentration is low because of the small number of people potentially affected, conservative odor emission assumptions, and the low frequency of occurrence of the meteorological conditions and process conditions that produce the highest odor concentrations.

The modeling results were analyzed to determine odor concentrations at places where receptors could reasonably be expected on a relatively frequent basis (i.e., residences and the Baron Ranch hiking trail). While lower than the peak odor concentration, the modeled odor concentrations at these receptor locations were still above 5 OU/m^3 (see Table 4.2-16). A contour plot of the maximum 10-minute average concentrations (in OU/m^3) in the modeling grid is shown in Figure 4.2-5. Based on the larger contour values present on the east side of the facility adjacent to the composting area and the source contributions to the modeled results, the composting area would be responsible for a larger impact off-site than the AD Facility and the MRF. As shown in Figure 4.2-5, the odor concentrations decline dramatically after 1 mile, decreasing the potential for odor impacts in residentially-zoned areas.

A frequency analysis was conducted of the modeling results at the three receptors to determine the proportion of the year the 5 OU/m^3 odor guideline concentration would be exceeded. Cumulative frequency distributions of the modeled impacts were generated, and the 95th percentile and 98th percentile odor concentrations were determined. For each of these percentile values, the number of hours exceeding the percentile value was also determined (see Table 4.2-16) as well as the number of hours the 5 OU/m^3 odor concentration would be exceeded. For example, the 4.35 ~~4.18~~ OU/m^3 98th percentile at the planned Hart residence means modeled odor values would be 4.35 ~~4.18~~ OU/m^3 or less for 98 percent of the hours in a year – 8,585 out of 8,760 hours.

Table 4.2-16 indicates the 5.0 OU/m^3 odor guideline would be exceeded at the each of the three receptors, but only 15 hours per year at the Baron Ranch hiking trail (<0.1 percent of the year). Note that the hiking trail is not heavily utilized and it is unlikely persons would be present when odor concentrations exceeded 5.0 OU/m^3. Because of the limited frequency exceeding 5.0 OU/m^3 and the limited number of receptors, nuisance odor impacts at this location would be less than significant.

Although a larger number of receptors may be present in the Arroyo Quemada community, at the nearest existing residence, the modeling indicates that the odor concentration of 5.0 OU/m^3 would only be exceeded ~~12~~ 15 hours per year (0.2 ~~<0.1~~ percent of the year). Therefore, nuisance odor impacts at this location would also be less than significant. The modeling indicates that the odor guideline concentration of 5.0 OU/m^3 used in this EIR may be exceeded ~~30~~ 33 hours per year (0.4 ~~0.2~~ percent) at the planned Hart residence, located just south of the landfill (see Figures 4.2-3 and 4.2-5). This value does not exceed the two percent frequency (or 175 hours per year), and the number of receptors at this location would not meet the definition of considerable. Therefore, odor impacts at this location would also be less than significant.



Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Figure 4.2-5. Odor Modeling Contours

Table 4.2-16. Summary of the Odor Impact Analysis

Receptor	Maximum OU/m^3 (10 minute average)	98th% OU/m^3 (10 minute average)	95th% OU/m^3 (10 minute average)	Hours per Year over 5.0 OU/m^3
Baron Ranch hiking trail	~~16.38~~ 16.51	0.01	0.00	15
Nearest residence (Arroyo Quemada community)	~~14.95~~ 13.84	~~1.88~~ 2.00	1.21	~~12~~ 15
Planned Hart residence	~~15.83~~ 14.28	~~4.18~~ 4.35	~~3.00~~ 3.02	~~30~~ 33
Number of Hours Exceeding Percentile Value	--	0	0	--

In addition to the three receptors listed in Table 4.2-16, the Arroyo Hondo Preserve is located west of the landfill property. The Preserve is a 782-acre canyon that includes hiking trails, some of which are close to the Landfill's western boundary. This hiking trail may experience higher odor impacts than the Baron Ranch hiking trail as shown by the contours presented in Figure 4.2-5. However, these impacts would occur infrequently since winds are predominately from the north or south and infrequently blow from the east and west. Additionally, the Preserve is only open to the public by reservation on the first and third full weekends of each month and every Monday and Wednesday for school and community groups. Therefore, individuals would be expected to be present on the trails near the landfill infrequently.

As discussed Section 3.6 of 01-EIR-05 for the Tajiguas Landfill Expansion, potential impacts associated with odors emitted from landfill gas emissions and waste haul trucks were considered to be a potentially significant but mitigable nuisance impact. The current landfill facility has received no public odor complaints over the past 10 years (Joddi Leipner, personal communication, February 7, 2013). The lack of complaints for the current operation (which includes landfilling and green waste chipping operations) serves as an indicator that, with measures listed below that have been incorporated into the project design, odor-related nuisance is not anticipated.

Although Table 4.2-16 indicates project-related odors would be less than significant, the project includes numerous measures to minimize odors and to adaptively manage odor incidents and complaints. In addition, the project-related diversion of organic waste would substantially reduce the amount of potentially odorous materials handled and disposed at the landfill active face, which would reduce odor generation. Therefore, it is anticipated that the actual frequency of exceedances of the odor guideline concentration at off-site land uses would be lower than indicated.

Odor reduction measures identified in the Final EIR for Statewide AD Facilities and project-specific odor reduction measures have been incorporated into the project including:

- Establish time limits for on-site retention of undigested substrates: MSW and SSOW would be placed in the MRF building where liquid discharge and air emissions can be controlled.
- Utilize enclosed, negative pressure buildings for indoor receiving and pre-processing, and bio-filters or an air scrubbing system: the MRF and AD Facility would be enclosed in negative air pressure buildings with bio-filter odor control systems.
- Establish contingency plans for operating downtime (e.g. equipment malfunction, power outage): the project includes staffing for scheduled maintenance and an on-site emergency generator to avoid power outages during processing.
- Manage delivery schedule to facilitate prompt handling of odorous substrates: MSW and SSOW would be tipped and stored in the MRF building to control odors prior to processing.
- Handle fresh unstable digestate within enclosed building, or mix with green-waste and incorporate into a composting operation within the same business day: digestate would be mixed with green-waste and composted.
- Establish a protocol for monitoring and recording odor events: an Odor Impact Mitigation Program (OIMP) would be developed and implemented as part of the project (see Section 3.5.9.3).
- Establish a protocol for reporting and responding to odor events: the facility would develop and implement an OIMP, as discussed above).
- Compost windrows would be watered immediately after turning events to minimize odors generated by exposure of the interior of the windrows.
- Avoid turning compost windrows when the predominant wind direction is from the north (towards populated areas).

In addition, the RRWMD has committed to implementing the following BACT measures for digestate composting to reduce ROC emissions, which would also reduce odors:

- Blending digestate with 20 percent inert dry wood chips;
- Interactive pile management (compost pile turning);
- 20 minutes irrigation after pile turning;
- Large pile size; and
- Application of finished compost to the new compost piles to act as a pseudo bio-filter.

Due to the intermittent nature of nuisance odors, an adaptive approach is recommended for the OIMP. The OIMP would include standard procedures for monitoring and recording any periods of unusual odors, responding to unusual odors, logging any complaints, responding to complaints and documentation of complaint response and any follow-up measures. Additional odor reduction measures that may be considered to address odor issues may include:

- Installation of physical barriers around the facility, such as berms and vegetation, to minimize odor migration.
- Restricting windrow compost turning events based on weather conditions and prevailing winds.
- Ambient odor monitoring and sampling program.
- Application of deodorants or addition of cover material on windrows.

Hydrogen Sulfide (H_2S) and Organic Sulfides

Impact TRRP AQ-10: H_2S and organic sulfides may be produced in the anaerobic digesters and resulting compost but would not result in exceedances of SBCAPCD Rule 310 limits – Class III Impact.

Organic sulfur compounds present in the MSW and SSOW would be converted to H_2S and organic sulfides in the anaerobic digester vessels, and included in the bio-gas. However, these compounds would be captured (in part) by the proposed activated carbon filter pre-treatment of the bio-gas, with the residual concentrations combusted in the CHP engines or in the flare, converting any residual sulfur compounds to SO_2. A very small amount of organic sulfur compounds may remain in the digestate, and could be released during composting of this material. However, aerobic conditions would be maintained in the compost windrows, which would minimize the generation of H_2S and organic sulfides.

Ventilation air from the MRF and AD Facility buildings may contain very low concentrations of H_2S and organic sulfides, but would be treated using bio-filters which provide removal efficiencies of 99 percent for H_2S and 80 percent for organic sulfides.

Based on the project design, fugitive emissions of H_2S and organic sulfides is expected to be below the specified thresholds in Rule 310 (hydrogen sulfide concentrations at or beyond the property line of 0.06 ppm for an averaging time of 3 minutes and 0.03 ppm for an averaging time of 1 hour), and considered less than significant.

Consistency with the Clean Air Plan

The SBCAPCD 2013 ~~2010~~ Clean Air Plan relies on the land use and population projections provided in the Santa Barbara County Association of Governments' Regional Growth Forecast. The proposed project would generate limited employment opportunities and could result in a very small increase in population, but would likely be dispersed over the Goleta, Lompoc and Santa Maria areas. The project would not induce population growth that would cause an exceedance of future growth projections on which the SBCAPCD's 2013 ~~2010~~ Clean Air Plan is based. In addition, the proposed project would be constructed within the boundaries of the existing Tajiguas Landfill and therefore would be consistent with the existing land use of the site and require no change in zoning. The project would not inhibit the effectiveness of transportation control measures established by the Clean Air Plan. Development of the project would extend the operating lifespan of the Tajiguas Landfill, thereby avoiding transportation emissions associated with exporting MSW to landfills farther away. Therefore, the proposed project would be consistent with the 2013 ~~2010~~ Clean Air Plan.

Relocated Landfill Facilities

Operations facilities (primarily portable offices) may be temporarily relocated during the project construction period to an area north of the landfill top deck or to the southern portion of the landfill. Landfill equipment maintenance facilities would be relocated to the area north of the landfill top deck (see Figure 3-4). Air pollutant emissions associated with relocating these facilities were included in the construction impact analysis. However, operating emissions associated with these facilities are existing and considered part of the project baseline.

4.2.2.5 Proposed Tajiguas Resource Recovery Project with Optional Commingled Source Separated Recyclables (CSSR) Component

With respect to air quality, inclusion of the optional CSSR component would involve:

- Additional 10,000 sf of building area for processing the CSSR;
- 14 Additional trips to import CSSR from the SCRTS to the site;
- 10 Additional trips to export the processed CSSR to market; and
- 16 Vehicle trips for the 20 additional employees that would operate the CSSR component of the MRF.

Construction Emissions Impacts

Project construction emissions identified in Table 4.2-5 would be virtually the same for the project with the optional CSSR component (see **Impact TRRP AQ-1**) and considered a less than significant impact.

Operation Emissions Impacts

Project operation emissions with the optional CSSR component are included in Tables 4.2-6 and 4.2-7. Impacts to regional air quality (see **Impact TRRP AQ-2**) would be less than significant.

Air dispersion modeling results of criteria air pollutants identified in Tables 4.2-8 through 4.2-10 would be virtually the same for the project with the optional CSSR component (see **Impact TRRP AQ-3** and **TRRP AQ-4**) and considered a less than significant impact.

Health Risk

Health risk assessment results identified in Tables 4.2-11 and 4.2-12 would be virtually the same for the project with the optional CSSR component (see **Impact TRRP AQ-5**) and considered a less than significant impact.

Greenhouse Gas Emissions

Project construction-related GHG emissions identified in Table 4.2-13 would be virtually the same for the project with the optional CSSR component (see **Impact TRRP AQ-6**).

Project GHG emissions with the optional CSSR component are included in Tables 4.2-14 and 4.2-15. Impacts would be beneficial (see **Impact TRRP AQ-7** and **AQ-8**). A graphical representation of the project-related reduction (virtually the same with CSSR component) in waste management-related GHG emissions over time is provided as Figure 4.2-4.

Odors

Project odor modeling results provided in Table 4.2-16 would be the same for the project with the optional CSSR component (see **Impact TRRP AQ-9**) and considered a less than significant impact.

Hydrogen Sulfide (H_2S) and Organic Sulfides

H_2S and organic sulfide emissions would be the same for the project with the optional CSSR component (see **Impact TRRP AQ-10**) and considered a less than significant impact.

Consistency with the Clean Air Plan

Project emissions and air quality impacts with the optional CSSR component would be virtually the same as identified in Section 4.2.2.4. Therefore, the proposed project with the optional CSSR component would also be consistent with the 2010 Clean Air Plan.

4.2.2.6 Extension of Landfill Life Impacts

Impact TRRP AQ-11: Project-related extension of life of the Tajiguas Landfill would extend the duration of air ~~quality~~ pollutant emissions associated with landfill operations and associated NO_x, NO_2 and 24-hour PM_{10} air quality impacts – Class I Impact.

As discussed in Section 3.4, project-related diversion of recyclable material and organic waste is anticipated to extend the life of the Tajiguas Landfill by about 10 years. Without implementation of the project, waste disposal would continue to approximately 2026. At that time, emissions associated with landfill employee trips would be substantially reduced and emissions associated with active waste disposal activities at the site would end. Upon reaching final capacity, the landfill would be closed and the final cover system installed in the remaining landfill areas. Emissions would occur in association with final closure activities, and following closure, in association with ongoing landfill monitoring and maintenance activities. Although the landfill gas collection system would continue to operate, fugitive landfill gas would be emitted for decades after closure, including greenhouse gases and ROC.

Air quality impacts associated with the approved and ongoing landfill operations were determined to be significant and unavoidable (see Section 4.2.2.2) in the prior Environmental Documents. Extension of landfill life would extend the period during which significant air quality impacts would occur. Project-related solid waste diversion would reduce disposal activity levels at the Tajiguas Landfill, and would reduce associated air quality impacts. However, peak day emissions and associated impacts could be similar to that identified in the prior Environmental Documents. Therefore, it is conservatively assumed that air quality impacts 1 (off-site mobile NO_x), 2 (1-hour NO_2 air quality standard exceedances) and 3 (24-hour PM_{10} air quality standard exceedances) as listed in Section 4.2.2.2 would likely remain significant and unavoidable. It should be noted that existing landfill emissions are part of the regional background setting as recorded in the 2010 to 2012 air quality monitoring data used in the air quality analysis.

4.2.2.7 Decommissioning Impacts

Impact TRRP AQ-12: Decommissioning of project facilities would result in criteria air pollutant emissions that would not significantly affect regional air quality – Class III Impact.

The removal of project facilities (MRF building, AD Facility building, percolate tanks, bio-filters, buried pipelines, etc.) would generate air pollutant emissions by heavy equipment and motor vehicles. These air pollutant emissions would be very similar to that discussed under **Impact TRRP AQ-1**, but are likely to be lower on a peak day and 12 month basis as the intensity and total amount of decommissioning activity would be less than required for project construction. Therefore, decommissioning-related air pollutant emissions are not anticipated to exceed current SBCAPCD thresholds (listed in Table 4.2-5), and are considered a less than significant impact to air quality.

Impact TRRP AQ-13: Decommissioning of project facilities would result in GHG emissions that would not significantly affect the overall GHG reduction associated with the project – Class III Impact.

Decommissioning activities would also generate GHG emissions by heavy equipment and motor vehicles, which be very similar to that listed in Table 4.2-13, but are likely to be lower as the intensity and total amount of decommissioning activity would be less than construction. As a part of the project, decommissioning-related GHG emissions would slightly offset the overall project-related GHG reduction listed in Table 4.2-15. These GHG emissions would represent less than 0.2 percent of the overall project benefit; therefore, decommissioning-related GHG emissions are considered a less than significant impact to global climate change.

4.2.2.8 Cumulative Impacts of the Tajiguas Resource Recovery Project

Criteria Pollutants – Construction

Impact TRRP AQ-CUM-1: Project construction emissions would contribute to construction emissions generated by the cumulative projects and would not significantly affect regional air quality – Class III Cumulative Impact; Project Contribution – Not Considerable (Class III).

As listed in Section 3.6, there are ~~11~~ 14 cumulative projects located within 5 miles of the proposed MRF/AD Facility site, with nine that are anticipated to be constructed. These projects are highly dispersed and few are anticipated to generate construction emissions at the same time as the proposed project. The cumulative construction emissions (including the proposed project) are unlikely to exceed the 25 ton per year ROC and NO_x thresholds under SBCAPCD Rule 202. Therefore, the cumulative impact to regional air quality is considered less than significant.

Criteria Pollutants – Operation

Impact TRRP AQ-CUM-2: Criteria pollutant emissions generated by project operation would contribute to emissions generated by the cumulative projects and would not significantly affect regional air quality – Class III Cumulative Impact; Project Contribution – Not Considerable (Class III).

As listed in Section 3.6, there are ~~11~~ 14 cumulative projects located within 5 miles of the proposed MRF/AD Facility site. These projects do not include any major sources of air pollutants, primarily a few motor vehicle trips per day per project. Significant cumulative air quality impacts are not anticipated. The County's Environmental Thresholds and Guidelines Manual indicates projects that would exceed the long-term threshold for NO_x or ROC (55 pounds per day) would have significant cumulative impacts. Since the project operation emissions would not exceed the long-term threshold, the project's incremental contribution to cumulative impacts would not be considerable.

Odors

Impact TRRP AQ-CUM-3: Odors generated by project operation could contribute to odors generated by the cumulative projects and result in a less than significant nuisance at local land uses – Class III Cumulative Impact; Project Contribution – Not Considerable (Class III).

As listed in Section 3.6, there are ~~11~~ 14 cumulative projects located within 5 miles of the proposed MRF/AD Facility site. These projects do not include any activities or processes that may generate substantial odors. Only the Shell Hercules Remediation project is located in close proximity that odors may be additive with the proposed project. Due to the lack of odor-generating potential, cumulative odors associated with the Shell Hercules Remediation project in combination with the proposed project would be virtually the same as listed in Table 4.2-16. Therefore, cumulative odor-related nuisance is considered less than significant, and the project's contribution would not be cumulatively considerable.