



Greenhouse Gas Analysis for the EDI Master Plan, Escondido, California

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TABLE OF CONTENTS

Acronyms	iii
Executive Summary	1
1.0 Introduction	3
1.1 Understanding Global Climate Change	3
1.2 Greenhouse Gases of Primary Concern	4
2.0 Project Description	5
3.0 Environmental Setting	14
3.1 State and Regional GHG Inventories	14
3.2 Project Site Emissions	16
4.0 Regulatory Setting	17
4.1 Federal	17
4.2 State	18
4.2.3 Local	27
5.0 Significance Criteria	27
5.1 Definition of Impacts	27
5.2 Significance Thresholds	28
6.0 Assessment Methodology	30
6.1 Construction Emissions	30
6.2 Vehicle Emissions	32
6.3 Energy Use Emissions	32
6.4 Area Source Emissions	33
6.5 Water and Wastewater Emissions	34
6.6 Solid Waste Emissions	34

TABLE OF CONTENTS (cont.)

7.0	GHG Impact Analysis	35
7.1	Project Emissions	35
7.2	Consistency Analysis	36
8.0	Conclusions and Recommendations	37
9.0	References Cited	37

FIGURES

1:	Regional Location	6
2:	Project Location on Aerial Photograph	7
3:	Existing Site Plan	9
4:	Proposed Site Plan	11
5:	Escondido GHG Impact Significance Determination Process	29

TABLES

1:	Global Warming Potentials and Atmospheric Lifetimes	4
2:	Proposed On-site Changes	8
3:	California GHG Emissions by Sector in 1990, 2008, and 2011	14
4:	San Diego County GHG Emissions by Sector in 2010	15
5:	Escondido 2010 Community Wide GHG Emissions by Source	16
6:	Existing Facility Emissions in 2020	16
7:	CARB Scoping Plan – Recommended GHG Reduction Measures	20
8:	Construction Equipment Parameters	31
9:	Anaerobic Digester Facility GHG Emissions	34
10:	Proposed Facility Emissions in 2020	35

ATTACHMENT

1:	CalEEMod – Existing Project Site Emissions
2:	CalEEMod – Project Construction GHG Emissions
3:	CalEEMod – Project Operational GHG Emissions
4:	Emissions Estimate for the Anaerobic Digestion Facility
5:	CalEEMod – Project GHG Offsets

Acronyms

AB	Assembly Bill
AD	anaerobic digestion
APN	Assessor's Parcel Number
BAU	Business As Usual
C&D	construction and demolition
CAFE	Corporate Average Fuel Economy
CalEEMod	California Emissions Estimator Model
CalGreen	California Green Building Standards Code
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CH ₄	methane
CNG	compressed natural gas
CO ₂	carbon dioxide
CUP	Conditional Use Permit
dge	diesel gallon equivalent
E-CAP	City of Escondido Climate Action Plan
EDI	Escondido Disposal, Inc.
EO	Executive Order
EPA	Environmental Protection Agency
EPIC	University of San Diego Energy Policy Initiatives Center
GHG	Greenhouse Gas
GWh	gigawatt hours
GWP	global warming potential
HHW	household hazardous waste
kw/hr	kilowatt hours
LCFS	Low Carbon Fuel Standard
LIC	Legacy International Center
MMTCO ₂ E	Million metric tons of CO ₂ equivalent
mpg	miles per gallon
MRF	material recovery facility
MTCO ₂ E	Metric tons of CO ₂ equivalent
N ₂ O	nitrous oxide
RPS	Renewables Portfolio Strategy
SCAQMD	South Coast Air Quality Management District
SDAPCD	San Diego Air Pollution Control District
Title 24	California Code of Regulations, Title 24 (i.e., California Building Code)
TPY	tons per year

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Executive Summary

This report evaluates potential greenhouse gas (GHG) impacts associated with the EDI Master Plan (project) in the city of Escondido. The project would reorganize the existing EDI Recycling Facility at 1044 W. Washington Avenue and incorporate the north-adjacent parcel, 1021 W. Mission Avenue. The goal of the project is to facilitate a more effective separation of waste streams and thereby increase waste diversion rates. Additionally, the project would construct an anaerobic digestion (AD) facility that would recycle food waste and green waste into compressed natural gas (CNG).

The project was assessed against significance criteria identified in the California Environmental Quality Act (CEQA) Guidelines and the City of Escondido's (City) *CEQA Thresholds and Screening Tables*. Following these criteria, the project would have impacts related to GHG if it would generate GHG emissions that may have a significant impact on the environment or if it would conflict with applicable plans, policies, or regulations intended to reduce GHG emissions.

Project emission sources would include construction (off-road vehicles), mobile (on-road vehicles), area (fireplaces, consumer products, landscape equipment, architectural coatings, and the project AD facility), water and wastewater, and solid waste sources. The GHG emissions associated with the construction and operation of the reorganized EDI Recycling Facility were calculated using California Emissions Estimator Model. Emission modeling for this analysis is considered conservative because it accounts for all emissions from the EDI Recycling Facility, including emission sources that the project does not alter.

The project would generate approximately 2,088 metric tons of carbon dioxide equivalent (MTCO₂E) per year. According to City guidelines, projects that would generate less than 2,500 MTCO₂E per year would not result in significant impact to the environment as a result of GHG emissions. Thus, the project emissions are less than significant.

Applicable plans, policies, or regulations intended to reduce GHG emissions include the Escondido Climate Action Plan (E-CAP) and the California Air Resources Board's (CARB) Scoping Plan for achieving GHG emission levels mandated by Assembly Bill (AB) 32. The project would support E-CAP Measure R2-S1, which aims to improve community wide recycling rates. Additionally, the project would generate less than 2,500 MTCO₂E per year. Thus, the project would generate a low amount of GHG emissions and would be consistent with the E-CAP.

The purpose of the project is to accommodate separate sorting lines required to meet the state-level diversion requirements set forth in AB 341. As AB 341 is identified in the

Scoping plan as a key action for achieving GHG emission reductions in the waste sector, the project supports Scoping Plan waste reduction goals.

Furthermore, CNG generated by the AD facility would be used to annually generate either 5.0 gigawatt hours (GWh) of electricity or 420,000 diesel gallon equivalent of CNG to fuel waste collection vehicles. This analysis conservatively (from a GHG standpoint) models CNG as being used to generate electricity. If CNG is used to generate electricity, this would potentially offset an approximate annual emission of 1,637 MTCO₂E by San Diego Gas & Electric. This reduction is not considered in the significance determination of the project's GHG emissions; however, it would support Scoping Plan policies that promote diversification of the state's electricity supply and decreased reliance on fossil fuel energy sources. Thus, the project would not conflict with the Scoping Plan. As the project is consistent with all applicable plans, policies, and regulations intended to reduce GHG emissions, impacts would be less than significant.

1.0 Introduction

This report evaluates the significance of the EDI Master Plan (project), in the city of Escondido, and its contribution of greenhouse gas (GHG) emissions to statewide GHG emissions and GHG reduction targets. To evaluate the incremental effect of project development on statewide emissions and global climate change, it is important to have a basic understanding of the nature of global climate change.

1.1 Understanding Global Climate Change

Global climate change is a change in the average weather of the earth, which can be measured by wind patterns, storms, precipitation, and temperature. The earth's climate is in a state of constant flux with periodic warming and cooling cycles. Extreme periods of cooling are termed "ice ages," which may then be followed by extended periods of warmth. For most of the earth's geologic history, these periods of warming and cooling have been the result of many complicated interacting natural factors that include: volcanic eruptions that spew gases and particles (dust) into the atmosphere; the amount of water, vegetation, and ice covering the earth's surface; subtle changes in the earth's orbit; and the amount of energy released by the sun (sun cycles). However, since the beginning of the Industrial Revolution around 1750, the average temperature of the earth has been increasing at a rate that is faster than can be explained by natural climate cycles alone.

With the Industrial Revolution came an increase in the combustion of carbon-based fuels such as wood, coal, oil, natural gas, and biomass. Industrial processes have also created emissions of substances not found in nature. This in turn has led to a marked increase in the emissions of gases shown to influence the world's climate. These gases, termed "greenhouse" gases, influence the amount of heat trapped in the earth's atmosphere. Because recently observed increased concentrations of GHGs in the atmosphere are related to increased emissions resulting from human activity, the current cycle of "global warming" is generally believed to be largely due to human activity. Of late, the issue of global warming or global climate change has arguably become the most important and widely debated environmental issue in the United States and the world. Because it is the collective of human actions taking place throughout the world that contributes to climate change, it is quintessentially a global or cumulative issue.

1.2 Greenhouse Gases of Primary Concern

There are numerous GHGs, both naturally occurring and manmade. Table 1 summarizes some of the most common. Each GHG has variable atmospheric lifetime and global warming potential (GWP).

**TABLE 1
GLOBAL WARMING POTENTIALS AND ATMOSPHERIC LIFETIMES
(YEARS)**

Gas	Atmospheric Lifetime	100-year GWP	20-year GWP	500-year GWP
Carbon dioxide (CO ₂)	50–200	1	1	1
Methane (CH ₄) ¹	12	25	72	7.6
Nitrous oxide (N ₂ O)	114	298	289	153
HFC-23	270	14,800	12,000	12,200
HFC-32	4.9	675	2,330	205
HFC-125	29	3,500	6,350	1,100
HFC-134a	14	1,430	3,830	435
HFC-143a	52	4,470	5,890	1,590
HFC-152a	1.4	124	437	38
HFC-227ea	34.2	3,220	5,310	1,040
HFC-236fa	240	9,810	8,100	7,660
HFC-43-10mee	15.9	1,640	4,140	500
CF ₄	50,000	7,390	5,210	11,200
C ₂ F ₆	10,000	12,200	8,630	18,200
C ₃ F ₈	2,600	8,830	6,310	12,500
C ₄ F ₁₀	2,600	8,860	6,330	12,500
c-C ₄ F ₈	3,200	10,300	7,310	14,700
C ₅ F ₁₂	4,100	9,160	6,510	13,300
C ₆ F ₁₄	3,200	9,300	6,600	13,300
SF ₆	3,200	22,800	16,300	32,600

SOURCE: IPCC 2007

¹ The methane GWP includes the direct effects and those indirect effects due to the production of tropospheric ozone and stratospheric water vapor. The indirect effect due to the production of CO₂ is not included.

The atmospheric lifetime of the gas is the average time a molecule stays stable in the atmosphere. Most GHGs have long atmospheric lifetimes, staying in the atmosphere hundreds or thousands of years. GWP is a measure of the potential for a gas to trap heat and warm the atmosphere. Although GWP is related to its atmospheric lifetime, many other factors including chemical reactivity of the gas also influence GWP. GWP is reported as a unitless factor representing the potential for the gas to affect global climate relative to the potential of carbon dioxide (CO₂). Because CO₂ is the reference gas for establishing GWP, by definition its GWP is 1. Although methane (CH₄) has a shorter atmospheric lifetime than CO₂, it has a 100-year GWP of 25; this means that CH₄ has 25 times more effect on global warming than CO₂ on a molecule-by-molecule basis.

The GWP is officially defined as (U.S. Environmental Protection Agency [EPA] 2010):

The cumulative radiative forcing—both direct and indirect effects—integrated over a period of time from the emission of a unit mass of gas relative to some reference gas.

All of the gases in Table 1 are produced by both biogenic (natural) and anthropogenic (human) sources. These are the GHGs of primary concern in this analysis. CO₂ would be emitted by the project due to the combustion of fossil fuels in vehicles (including construction), from electricity generation and natural gas consumption, water use, and from solid waste disposal. Smaller amounts of CH₄ and nitrous oxide (N₂O) would be emitted from the same project operations.

2.0 Project Description

The project site is located between West Washington Avenue and West Mission Avenue in Escondido, California (Figures 1 and 2). The project site consists of four parcels: Assessor's Parcel Number (APN) 228-250-77, APN 228-250-16, APN 228-250-17, and APN 228-250-78. The first three parcels total approximately 6.3 acres and contain the existing EDI Recycling Facility at 1044 West Washington Avenue. The fourth parcel is approximately 4.7 acres and contains a vacant 69,850-square-foot office building. The West Washington Avenue parcels are zoned General Industrial (M-2) and have a General Plan Land Use Designation of General Industry (GI). The West Mission Avenue parcel is zoned light industrial (M-1) and has a General Plan Land Use Designation of light industrial (LI).

Waste diversion, commonly referred to as recycling, is an important practice to reduce excessive landfilling and greenhouse gas emissions from waste. The existing EDI Recycling Facility separates solid waste streams so that recyclable waste materials are not disposed at a landfill. The facility is permitted to accept a maximum of 3,223 tons of solid waste per day. To reduce potential odors from organic matter (organics), the maximum allowable hold time for all mixed solid waste, green waste, and food waste is restricted to 48 hours. If an odor is detected, the site operator investigates the source of the odor and determines whether the odor is travelling beyond the site and whether onsite practices could remedy the problem. Roll-up doors to waste handling and separation areas are closed when the facility is not in operation.

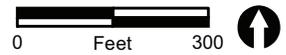
The goal of the project is to expand and reorganize the existing EDI Recycling Facility to facilitate a more effective separation of waste streams. This would increase waste diversion without changing the facility's daily throughput of waste. Additionally, the project would construct an anaerobic digester (AD) facility that would recycle food waste and green waste into natural gas. The AD facility would be capable of processing up to 31,200 tons of organic waste per year. Natural gas would be used to either generate 5.0 gigawatt hours (GWh) of electricity or 420,000 diesel gallon equivalent (dgc) of



***** Project Location

FIGURE 1

Regional Location



 Project Boundary

FIGURE 2
Project Location
on Aerial Photograph

compressed natural gas (CNG) annually. This is enough fuel for 40 to 50 CNG fueled collection vehicles.

The project would reorganize the existing EDI Recycling Facility on the West Washington Avenue parcel and incorporate the adjacent West Mission Avenue parcel to the north. Buildings would be demolished, renovated, and built as shown in Table 1 (Figures 3 and 4). Demolition would include 57,182 square feet of building area including the parts of the existing transfer station and the plant addition. Renovation would include 105,297 square feet of building area including parts of the existing transfer station, offices, and the manufacturing plant. Newly constructed building area would total 114,033 square feet and would include a new visitor entry, break room, vehicle maintenance canopy, material recovery facility (MRF), and AD facility. The reorganized EDI Recycling Facility would result in a total of 10,372 square feet of office space and 210,524 square feet of recycling facilities.

**TABLE 2
PROPOSED ON-SITE CHANGES**

Identified Space	Existing Area (square feet)	Proposed Change	Proposed Use	Proposed Area (square feet)
<i>W. Mission Avenue Parcel</i>				
Office	10,372	Renovate	Office	10,372
Manufacturing Plant	18,330	Renovate	Bale Storage	14,977
Plant Addition	40,520	Demolish & Rebuild	Single-Stream MRF/ Self-Haul/C&D	74,436
		Build	Vehicle Maintenance Canopy	4,615
<i>W. Washington Avenue Parcel</i>				
Transfer Station	104,955	Renovate	Mixed Tipping Area	36,798
		Renovate	Mixed MRF Area	43,150
		Build	Future AD	30,037
HHW Canopy	1,566	No Change	HHW	1,566
		Build	Break Room/Visitor Center*	4,420
		Build	Visitor Entry	525
TOTAL	175,743	-	-	216,476*

AD = anaerobic digester

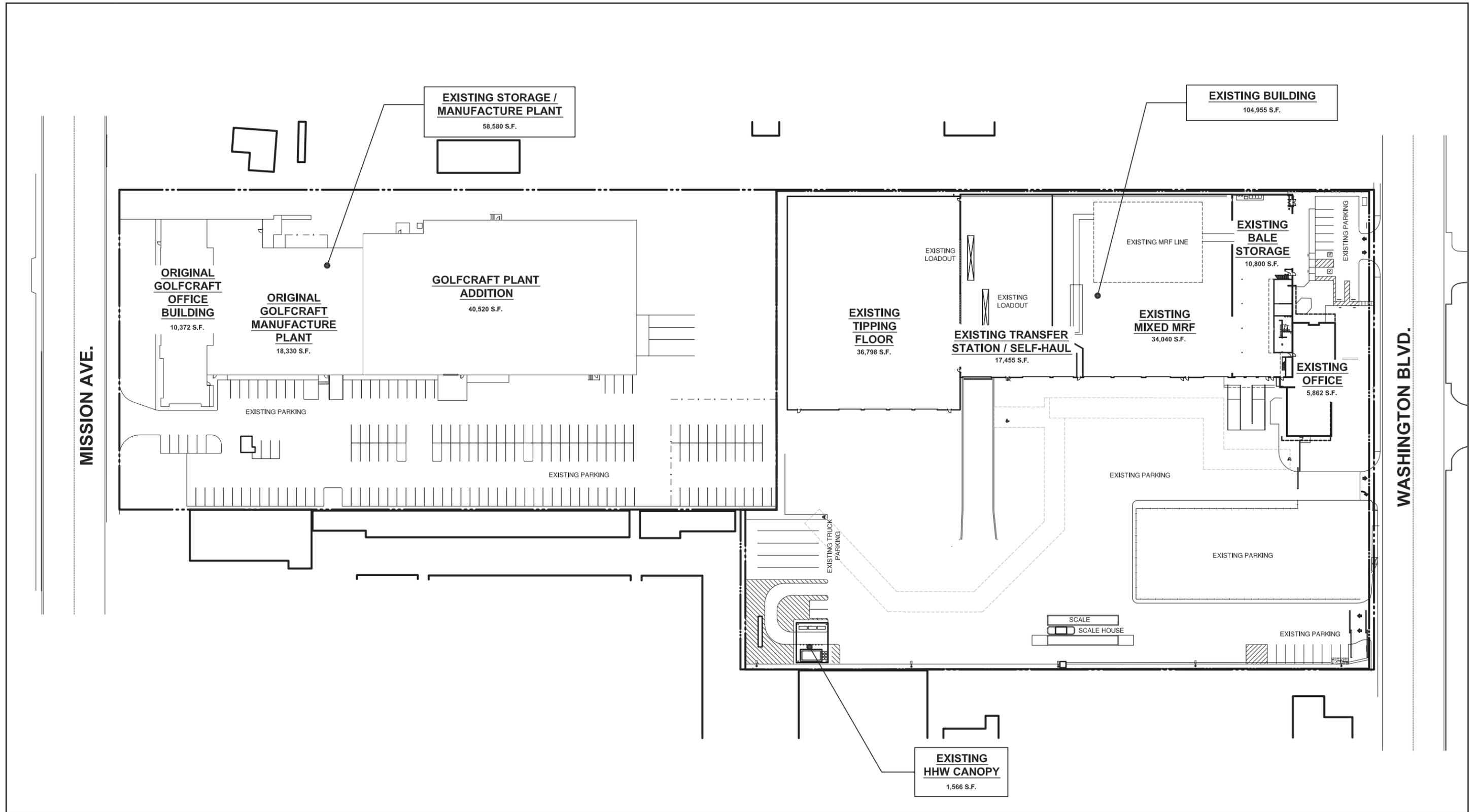
HHW = hazardous household waste

MRF = material recovery facility

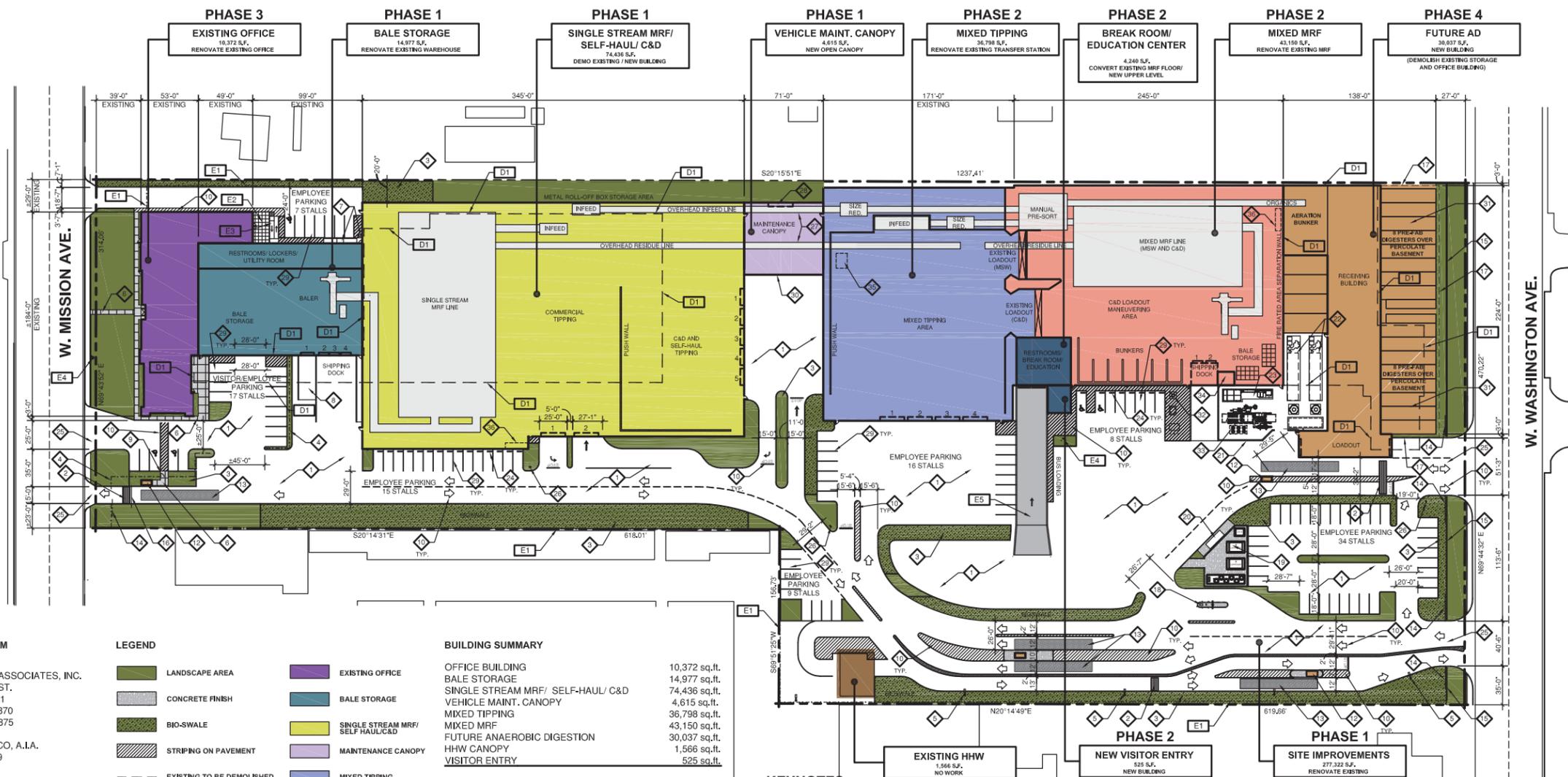
C&D = construction and demolition

*The total building envelop is 216,476 square feet. The Break Room/Visitor Center would be constructed within the envelope of the existing structure. For the purposes of this analysis, the effective building area is 220,896 square feet.

The project would be implemented over four primary phases. The project would be phased over a period of approximately 5 years. Phase 1 would include the renovation of the Golfcraft manufacturing plant, demolition of the existing Golfcraft manufacturing plant addition, construction of onsite circulation improvements, installation of new scales at the W. Mission Avenue and W. Washington Avenue access points, and construction of a



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LEGEND

- LANDSCAPE AREA
- CONCRETE FINISH
- BIO-SWALE
- STRIPING ON PAVEMENT
- EXISTING TO BE DEMOLISHED
- EXISTING OFFICE
- BALE STORAGE
- SINGLE STREAM MRF/ SELF-HAUL/C&D
- MAINTENANCE CANOPY
- MIXED TIPPING
- MIXED MRF
- FUTURE AD
- VISITOR ENTRY
- EXISTING HHW

SITE COVERAGE

TOTAL LOT SITE	495,469 sq.ft.
TOTAL BUILDING COVERAGE	214,910 sq.ft.
TOTAL LANDSCAPE COVERAGE	61,335 sq.ft.
TOTAL HARDSCAPE COVERAGE	219,224 sq.ft.
PERCENTAGE BUILDING COVERAGE	43.4%
PERCENTAGE LANDSCAPE COVERAGE	12.3%
PERCENTAGE HARDSCAPE COVERAGE	44.3%

BUILDING SUMMARY

OFFICE BUILDING	10,372 sq.ft.
BALE STORAGE	14,977 sq.ft.
SINGLE STREAM MRF/ SELF-HAUL/ C&D	74,436 sq.ft.
VEHICLE MAINT. CANOPY	4,615 sq.ft.
MIXED TIPPING	36,798 sq.ft.
MIXED MRF	43,150 sq.ft.
FUTURE ANAEROBIC DIGESTION	30,037 sq.ft.
HHW CANOPY	1,566 sq.ft.
VISITOR ENTRY	525 sq.ft.
TOTAL	216,476 sq.ft.

PARKING ANALYSIS

OFFICE BUILDING	(1:300)	35 STALLS
BALE STORAGE	(1:3,000)	5 STALLS
SINGLE STREAM MRF/ SELF-HAUL / C&D	(1:3,000)	25 STALLS
VEHICLE MAINT. CANOPY	4,615 sq.ft. / 3,000	2 STALLS
MIXED TIPPING FLOOR	(1:3,000)	12 STALLS
MIXED MRF	(1:3,000)	15 STALLS
FUTURE ANAEROBIC DIGESTION	(1:3,000)	10 STALLS
TOTAL REQUIRED		104 STALLS
PROVIDED		106 STALLS

KEYNOTES

- ◆ CONCRETE PAVING
- ◆ STEEL TRENCH COVER CONCRETE PIT
- ◆ BIO-SWALE/LANDSCAPE AREA. SEE CIVIL & LANDSCAPE PLANS
- ◆ 8'-0" HIGH CHAIN LINK FENCE
- ◆ 25'-0" HIGH LIGHT POLE
- ◆ DECORATIVE PEDESTRIAN CONCRETE WALK
- ◆ ACCESSIBILITY CONCRETE STAIR & RAMP
- ◆ VEHICLE CONCRETE RAMP
- ◆ CHAIN LINK SWING GATE
- ◆ PAVEMENT MARKING PAINT CAUTION YELLOW
- ◆ CHAIN LINK SLIDING GATE
- ◆ PRE-FABRICATED SCALE HOUSE
- ◆ TRUCK SCALE OVER CONCRETE PIT. SEE CIVIL PLANS
- ◆ 8'-0" HIGH WROUGHT IRON SLIDING GATE
- ◆ 8'-0" HIGH DECORATIVE CMU WALL
- ◆ MOTORIZED SECURITY ARM GATE
- ◆ METAL SCREEN WALL ABOVE. SEE ELEVATIONS
- ◆ CNG FUELING AREA
- ◆ CNG EQUIPMENT AREA
- ◆ AT GROUND DIESEL STORAGE TANK (CAPACITY: 1,500 GALLONS)
- ◆ EQUIPMENT CMU SCREEN WALL
- ◆ BIO-FILTER
- ◆ BIO-GAS/CHILLER SKID
- ◆ CONCRETE WHEEL STOP
- ◆ DRIVEWAY APPROACH
- ◆ FIRE HYDRANT
- ◆ OVERHEAD CONVEYOR WITH 17' MIN CLEARANCE BELOW CONVEYOR
- ◆ 20' WIDE X 17' HIGH ROLL-UP DOOR FOR EASEMENT ACCESS
- ◆ 9' X 18' PARKING SPACE
- ◆ 30' CLEAR AT UNDERSIDE OF CANOPY
- ◆ PERCOLATE BASEMENT (APPROXIMATELY 8'-0" DEEP)
- ◆ BIOGAS COMBUSTION FLARE
- ◆ COMBINE HEAT & POWER UNIT
- ◆ ELECTRICAL ROOM
- ◆ MOBILE GRINDER
- ◆ HAZARDOUS WASTE STORAGE W/ INTEGRAL CONTAINMENT

EXISTING KEYNOTES

(EXISTING ITEMS TO REMAIN, UNLESS OTHERWISE NOTED)

- E1 CHAIN LINK FENCE/GATE
- E2 RAISED COVER PATIO
- E3 WOOD STAIR & RAMP
- E4 FIRE HYDRANT
- E5 CONCRETE RAMP

DEMOLITION KEYNOTES

D1 DASHED LINES INDICATE EXISTING BUILDING/AREA TO BE DEMOLISHED PRIOR TO START CONSTRUCTION PHASES



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maintenance canopy. The renovated Golfcraft manufacturing building would be used to house a 14,977-square-foot baling facility and temporary storage warehouse for bales. The demolished Golfcraft manufacturing plant addition would be replaced with a 74,436-square-foot building connected to the baling facility. This building would house a single stream MRF line, a commercial and recyclable tipping area, and a self-haul/construction and demolition (C&D) materials receiving area. A 4,615-foot maintenance canopy would also be constructed between the new building and the existing transfer station building.

Phase 2 would involve the renovation of the existing transfer station. While the activities occurring within these building would largely remain the same as the existing operation, the removal of the self-haulers and separation of the commercial waste and recyclables would allow for the existing tipping floor and mixed MRF line area to be expanded. The existing mixed tipping area would be expanded to 36,798 square feet and the mixed MRF line area would be expanded to 43,150 square feet. The existing household hazardous waste (HHW) canopy would remain on-site and unchanged. Additionally, as part of Phase 2, an employee break room and visitors center would be constructed inside the existing transfer station.

During Phase 3, the project would renovate the Golfcraft office building and reconfigure part of the manufacturing plant to provide 10,372 square feet of office space. During Phase 3, the existing EDI offices would be relocated to the renovated Golfcraft office building.

Phase 4 would include the demolition of the existing baling and bale storage area and EDI office building and construction of a 30,037-square-foot AD facility. The AD facility would be capable of processing up to 31,200 tons per year (TPY) of food waste and green waste into biogas (gaseous product generated by the degradation of organic matter under anaerobic conditions) that would be cleaned and converted into renewable energy or into biogenic CNG. The resulting digestate from the AD process would be reduced 30 percent by volume, would be considered compostable, and would be transferred within 24 hours to a designated composting facility in the area. The project would also include a mechanical grinder for processing the green waste. The AD facility is expected to generate 5.0 million kilowatt hours (kw/hr) per year, enough to power the entire EDI facility, or produce 420,000 dge per year of CNG, enough fuel for 40 to 50 CNG-fueled collection vehicles annually. The AD facility would be fully enclosed.

3.0 Environmental Setting

3.1 State and Regional GHG Inventories

3.1.1 State GHG Inventory

The California Air Resources Board (CARB) performs statewide GHG inventories. The inventory is divided into nine broad sectors of economic activity: agriculture, commercial, electricity generation, forestry, high GWP emitters, industrial, recycling and waste, residential, and transportation. Emissions are quantified in million metric tons of CO₂ equivalent (MMTCO₂E). Table 3 shows the estimated statewide GHG emissions for the years 1990, 2008, and 2011.

**TABLE 3
CALIFORNIA GHG EMISSIONS BY SECTOR IN 1990, 2008, AND 2011**

Sector	1990 ¹ Emissions in MMTCO ₂ E (% total) ²	2008 ³ Emissions in MMTCO ₂ E (% total) ²	2011 Emissions in MMTCO ₂ E (% total) ²
Sources			
Agriculture	23.4 (5%)	33.9 (7%)	32.2 (7%)
Commercial	14.4 (3%)	15.6 (3%)	15.6 (3%)
Electricity Generation	110.6 (26%)	120.1 (25%)	86.6 (19%)
High GWP	--	11.5 (2%)	15.2 (3%)
Industrial	103.0 (24%)	89.3 (18%)	93.2 (21%)
Recycling and Waste	--	6.7 (1%)	7.0 (2%)
Residential	29.7 (7%)	29.0 (6%)	29.9 (7%)
Transportation	150.7 (35%)	177.2 (37%)	168.4 (38%)
Forestry (Net CO ₂ flux) ⁴	-6.7	--	--
Not Specified	1.3	--	--
TOTAL	426.6	483.2	448.1

SOURCE: California Energy Commission 2014, CARB 2007, CARB 2013a

¹ 1990 data was retrieved from the CARB 2007 source.

² Percentages may not total 100 due to rounding.

³ 2008 and 2011 data was retrieved from the CARB 2013a source.

⁴ The inventory totals for 2008 and 2011 did not include Forestry or Not Specified sources.

As shown in Table 3, statewide GHG source emissions totaled approximately 427 MMTCO₂E in 1990, 483 MMTCO₂E in 2008, and 448 MMTCO₂E in 2011. Many factors affect year-to-year changes in GHG emissions, including economic activity, demographic influences, environmental conditions such as drought, and the impact of regulatory efforts to control GHG emissions. According to CARB, most of the reductions since 2008 have been driven by economic factors (recession), previous energy efficiency actions, and the renewable portfolio standard (RPS; CARB 2013a). Transportation-related

emissions consistently contribute the most GHG emissions, followed by electricity generation and industrial emissions.

3.1.2 Regional GHG Inventory

The San Diego County regional GHG emissions inventory was prepared by the University of San Diego School of Law, Energy Policy Initiatives Center (EPIC). The inventory takes into account the unique characteristics of the region. Their 2010 emissions inventory for San Diego is duplicated in Table 4. The sectors included in this inventory are somewhat different from those in the statewide inventory, which is based on the 2008 Scoping Plan categories.

**TABLE 4
SAN DIEGO COUNTY GHG EMISSIONS BY SECTOR IN 2010**

Sector	2010 Emissions	
	MMTCO ₂ E	% total ¹
Agriculture/Forestry/Land Use	0.05	0.2%
Waste	0.6	1.8%
Electricity	8.3	25.0%
Natural Gas Consumption	2.9	8.7%
Industrial Processes & Products	1.8	5.4%
On-Road Transportation	14.4	43.4%
Off-Road Equipment & Vehicles	1.4	4.2%
Civil Aviation	1.9	5.7%
Rail	0.32	1.0%
Water-Borne Navigation	0.1	0.3%
Other Fuels/Other	1.58	4.8%
Land Use Wildfires	0.28	0.8%
Development (Loss of Vegetation)	0.18	0.5%
Sequestration from Land Cover	-0.66	-0.5%
TOTAL	33.15	100%

SOURCE: University of San Diego Energy Policy Initiatives Center 2013.

¹ Percentages may not total 100 due to rounding.

Similar to the statewide emissions, transportation-related GHG emissions contributed the most countywide, followed by emissions associated with energy use.

3.1.3 Local GHG Inventory

The City's 2010 Community-wide Emissions Inventory was prepared adopted in 2013 as a part of the Escondido Climate Action Plan (see Section 4.2.3). Table 5 summarizes the inventory. As shown, the primary sources of GHG emissions in Escondido are energy (electricity and natural gas) and transportation.

**TABLE 5
ESCONDIDO 2010 COMMUNITY WIDE GHG EMISSIONS BY SOURCE**

Category	2010 Emissions	
	MTCO ₂ E	% total
Energy	395,565	44.6%
Transportation	368,622	41.6%
Area Sources	52,559	5.9%
Solid Waste	41,724	4.7%
Water and Wastewater	25,360	2.9%
Construction	2,288	0.3%
TOTAL	886,118	100%

SOURCE: Escondido 2013

3.2 Project Site Emissions

Current sources of on-site GHG emissions from the EDI Recycling Facility are associated with the vehicle use, energy use, water use, area sources (landscaping and other equipment use, stoves, and fireplaces) and waste disposal practices of existing land uses.

Based on the methodology summarized in Section 6.0, Assessment Methodology, a baseline analysis of the existing GHG emissions from the project site and associated traffic was performed. An operational year of 2020 was modeled to provide for an equivalent comparison between the existing and proposed facility and to reflect Assembly Bill (AB) 32 GHG reduction targets. Table 6 summarizes direct and indirect GHG emissions associated with the existing facility. Attachment 1 includes the complete CalEEMod output files for existing facility operations.

**TABLE 6
EXISTING FACILITY EMISSIONS IN 2020
(MTCO₂E PER YEAR)**

Emission Source	Facility Emissions
Vehicles	208
Energy Use	390
Area Sources	0
Water Use	131
Solid Waste Disposal	57
Construction	-
Total Emissions	786

SOURCE: CalEEMod Version 2013.2.2 (Attachment 1)

NOTE: Totals may vary due to independent rounding

4.0 Regulatory Setting

In response to rising concern associated with increasing GHG emissions and global climate change impacts, several plans and regulations have been adopted at the international, national, and state levels with the aim of reducing GHG emissions. The following is a discussion of the federal, state, and local plans and regulations most relevant to the project.

4.1 Federal

The federal government, EPA, and other federal agencies have many federal level programs and projects to reduce GHG emissions.

4.1.1 Environmental Protection Agency

The EPA has many federal level programs and projects to reduce GHG emissions. The EPA provides technical expertise and encourages voluntary reductions from the private sector.

Energy Star is a joint program of EPA and the U.S. Department of Energy, which promotes energy-efficient products and practices. Tools and initiatives include the Energy Star Portfolio Manager, which helps track and assess energy and water consumption across an entire portfolio of buildings, and the Energy Star Most Efficient 2013, which provides information on exceptional products that represent the leading edge in energy-efficient products in the year 2013 (EPA 2013).

The EPA also partners with the public sector, including states, tribes, localities, and resource managers, to encourage smart growth, sustainability preparation, and renewable energy and climate change preparation. These initiatives include the Clean Energy–Environment State Partnership Program, the Climate Ready Water Utilities Initiative, the Climate Ready Estuaries Program, and the Sustainable Communities Partnership (EPA 2014).

4.1.2 Corporate Average Fuel Economy Standards (CAFE)

The federal Corporate Average Fuel Economy (CAFE) standards determine the fuel efficiency of certain vehicle classes in the U.S. While the standards had not changed since 1990, as part of the Energy and Security Act of 2007, the CAFE standards were increased for new light-duty vehicles to achieve the equivalent of 35 miles per gallon (mpg) by 2020. In May 2009, plans were announced to further increase CAFE standards

to require light-duty vehicles to meet an average fuel economy of 35.5 mpg by 2016. In October 2012, the EPA and National Highway Traffic Safety Administration issued a final rule for new light-duty vehicles for model years 2017 to 2025 to achieve an equivalent of 54.5 mpg (Federal Register 2011). With improved gas mileage, fewer gallons of transportation fuel would be combusted to travel the same distance, thereby reducing nationwide GHG emissions associated with vehicle travel.

4.2 State

The State of California has adopted a number of plans and regulations aimed at identifying statewide and regional GHG emissions caps, GHG emissions reduction targets, and actions and timelines to achieve the target GHG reductions.

4.2.1 Executive Order S-3-05—Statewide GHG Emission Targets

This executive order (EO) established the following GHG emission reduction targets for the state of California:

- by 2010, reduce GHG emissions to 2000 levels;
- by 2020, reduce GHG emissions to 1990 levels;
- by 2050, reduce GHG emissions to 80 percent below 1990 levels.

This EO also directs the Secretary of the California EPA to oversee the efforts made to reach these targets, and to prepare biannual reports on the progress made toward meeting the targets and on the impacts to California related to global warming, including impacts to water supply, public health, agriculture, the coastline, and forestry. With regard to impacts, the report shall also prepare and report on mitigation and adaptation plans to combat the impacts. The first Climate Action Team Assessment Report was produced in March 2006 and has been updated every two years.

4.2.2 Assembly Bill 32—California Global Warming Solutions Act

In response to EO S-3-05, the California Legislature passed AB 32, the California Global Warming Solutions Act of 2006, and thereby enacted Sections 38500–38599 of the California Health and Safety Code. The heart of AB 32 is its requirement that CARB establish an emissions cap and adopt rules and regulations that would reduce GHG emissions to 1990 levels by 2020. AB 32 also required CARB to adopt a plan by January 1, 2009 indicating how emission reductions would be achieved from significant GHG sources via regulations, market mechanisms, and other actions.

Relevant to the project, AB 32 also contains a Mandatory Commercial Recycling Measure, which focuses on increased commercial waste diversion as a method to reduce GHG emissions. It is designed to achieve a reduction in GHG emissions of 5 MMTCO₂E. To achieve the measure's objective, an additional 2 to 3 million tons of materials annually will need to be recycled from the commercial sector by the year 2020 and beyond.

4.2.3 Climate Change Scoping Plan

As directed by AB 32, in 2008, CARB adopted the Climate Change Scoping Plan: A Framework for Change (Scoping Plan), which identifies the main strategies California will implement to achieve the GHG reductions necessary to reduce forecasted business-as-usual (BAU) emissions in 2020 to the state's historic 1990 emissions level. As indicated in Table 7, the reduction strategies identified in the Scoping Plan are directed at the sectors with the largest GHG emissions contributions—transportation and electricity generation—and involve statutory mandates affecting vehicle or fuel manufacture, public transit, and public utilities.

In 2008, as part of its adoption of the Scoping Plan, CARB estimated that annual statewide GHG emissions were 427 MMTCO₂E in 1990 and would reach 596 MMTCO₂E by 2020 under a BAU condition (CARB 2008). To achieve the mandate of AB 32, CARB determined that a 169 MMTCO₂E (or approximate 28.5 percent) reduction in BAU emissions was needed by 2020. The 2020 emissions estimate used in the Scoping Plan was developed using pre-recession data and reflects GHG emissions expected to occur in the absence of any reduction measures in 2010 (CARB 2011a).

In 2011, CARB revised its 2020 BAU projections to account for the economic downturn and to account for laws that had taken effect but were not included in the 2008 calculations. Based on that effort, CARB updated the projected 2020 emissions to 507 MMTCO₂E (CARB 2011a). With respect to the new economic data alone, CARB determined that the economic downturn reduced the 2020 BAU by 55 MMTCO₂E; as a result, achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of 21.7 (not 28.5) percent from the 2020 BAU. And, with the additional implementation of two reduction measures not previously included in the BAU calculations, Pavley I and the Initial RPS, achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of 15.8 (not 28.5) percent (CARB 2011a).

**TABLE 7
CARB SCOPING PLAN-RECOMMENDED GHG REDUCTION MEASURES**

Recommended Reduction Measures	Reductions Counted Towards 2020 Target	
	MMTCO ₂ E	% total ²
REDUCTIONS FROM CAPPED SECTORS AND COMPLEMENTARY MEASURES	146.7	
California Light-duty Vehicle Greenhouse Gas Standards <ul style="list-style-type: none"> Implement Pavley Standards Develop LEV III light-duty vehicle standards 	31.7	22%
Energy Efficiency <ul style="list-style-type: none"> Building/appliance efficiency, new programs, etc. Increase combined heat and power generation by 30,000 gigaWatt hours (GWh) Solar Water Heating (AB 1470 goal) 	26.3	18%
Renewables Portfolio Standard (RPS) (33% by 2020)	21.3	14%
Low Carbon Fuel Standard	15.0	10%
Regional Transportation-related GHG Targets ¹	5.0	4%
Vehicle Efficiency Measures	4.5	3%
Goods Movement <ul style="list-style-type: none"> Ship Electrification at Ports System-wide Efficiency Improvements 	3.7	3%
Million Solar Roofs	2.1	2%
Medium/Heavy Duty Trucks <ul style="list-style-type: none"> Heavy-duty Vehicle Greenhouse Gas Emissions Reduction (Aerodynamic Efficiency) Medium- and Heavy-duty Vehicle Hybridization 	1.4	<1%
High Speed Rail	1.0	<1%
Industrial Measures (for sources covered under cap & trade program) <ul style="list-style-type: none"> Refinery Measures Energy Efficiency and Co-Benefits Audits 	0.3	<.5%
Additional Reductions Necessary to Achieve the Cap	34.4	23%
REDUCTIONS FROM UNCAPPED SECTORS	27.3	
Industrial Measures (for sources not covered under cap & trade program) <ul style="list-style-type: none"> Oil and Gas Extraction and Transmission 	1.1	
High Global Warming Potential Gas Measures	20.2	
Sustainable Forests	5.0	
Recycling and Waste (landfill methane capture)	1.0	
TOTAL REDUCTIONS COUNTED TOWARDS 2020 TARGET	174.0³	

SOURCE: Table 2 of CARB 2008.

¹ This number represents an estimate of what may be achieved from local land use changes. It is not the Senate Bill 375 regional target. CARB will establish regional targets for each Metropolitan Planning Organization following input of the Regional Targets Advisory Committee and a public stakeholders' consultation process per Senate Bill 375.

² Percentages are relative to the capped sector subtotal of 146.7 MMTCO₂E, and may not total 100 due to rounding.

³ The total reduction for the recommended measures slightly exceeds the 169 MMTCO₂E of reductions estimated in the BAU 2020 Emissions Forecast. This is the net effect of adding several measures and adjusting the emissions reduction estimates for some other measures.

Most recently, in 2014, CARB adopted the First Update to the Climate Change Scoping Plan: Building on the Framework (First Update). The stated purpose of the First Update is to “highlight [...] California’s success to date in reducing its GHG emissions and lay [...] the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050” (CARB 2014b). The First Update found that California is on track to meet the 2020 emissions reduction mandate established by AB 32, and noted that California could reduce emissions further by 2030 to levels squarely in line with those needed to stay on track to reduce emissions to 80 percent below 1990 levels by 2050 if the state realizes the expected benefits of existing policy goals (CARB 2014). The First Update to the Scoping Plan contains key actions to drive the State toward developing and deploying the most appropriate options to achieve long-term GHG emission reductions. Relevant to this project are recommended actions for the waste and energy sectors.

The key recommended actions for the waste sector include policies to eliminate the disposal of organic materials at landfills, development of waste management goals, and improve recycled-content procurement. According to the Scoping Plan, “meeting the AB 341 mandate 75 percent recycling goal is the best path forward to maximizing GHG emissions reductions from the Waste management Sector.” AB 341 is further discussed in Section 4.2.5.5, AB 32 and project consistency with AB 341 is discussed further in Section 7.2, Consistency Analysis.

The key recommended actions for the energy sector includes bring more energy from renewable sources into the state’s electricity mix. Goals include providing 33 percent of the state’s electricity needs through renewable energy sources by 2020. Renewable energy includes (but is not limited to) wind, solar, geothermal, small hydroelectric, biomass, AD, and landfill gas. Potential renewable energy associated with the project is discussed in Section 7.2, Consistency Analysis.

4.2.4 Transportation-related Emissions Reductions

Transportation accounts for the largest share of the state’s GHG emissions. Accordingly, a large share of the reduction of GHG emissions from the recommended measures addresses this sector. CARB’s method is a comprehensive, three-prong strategy: reducing GHG emissions from vehicles, reducing the carbon content of the fuel these vehicles burn, and reducing the miles these vehicles travel.

4.2.4.1 AB 1493—Pavley GHG Vehicle Standards

AB 1493 (Pavley), enacted in 2002, directed CARB to adopt vehicle standards that lowered GHG emissions from passenger vehicles and light-duty trucks to the maximum extent technologically feasible, beginning with the 2009 model year. CARB adopted these regulations (termed “Pavley I”) as a discrete early action measure pursuant to AB

32 and estimates that full implementation of Pavley I will reduce GHG emissions from California passenger vehicles by about 26 MMTCO₂E (CARB 2011a and 2011b).

CARB has also adopted a second phase of the Pavley regulations that covers model years 2017 to 2025. These regulations were originally termed “Pavley II” but are now referred to as either the “Low Emission Vehicle III” (LEV III) standards or the “Advanced Clean Cars Program.” In this report, they are referred to as the LEV III standards. CARB estimates that LEV III will reduce vehicle GHGs by an additional 4.0 MMTCO₂E for a 2.4 percent reduction over Pavley I (CARB 2011a). These reductions come from improved vehicle technologies such as smaller engines with superchargers, continuously variable transmissions, and hybrid electric drives. On August 7, 2012, the final regulation for the adoption of LEV III became effective. It is expected that Pavley I and LEV III regulations will reduce GHG emissions from California passenger vehicles by about 22 percent in 2012 and about 30 percent in 2016, while improving fuel efficiency and reducing motorists’ costs (CARB 2013b).

CARB has adopted a new approach to passenger vehicles—cars and light trucks—by combining the control of smog-causing pollutants and GHG emissions into a single coordinated package of standards, which includes efforts to support and accelerate the numbers of plug-on hybrids and zero-emission vehicles in California (CARB 2013b).

4.2.4.2 EO S-01-07—Low Carbon Fuel Standard

EO S-01-07 directed that a statewide goal be established to reduce the carbon intensity of California’s transportation fuels by at least 10 percent by 2020 through a Low Carbon Fuel Standard (LCFS). CARB adopted the LCFS as a discrete early action measure pursuant to AB 32 and includes the LCFS as a reduction measure in its Scoping Plan (see Table 7). The LCFS is a performance standard with flexible compliance mechanisms intended to incentivize the development of a diverse set of clean low-carbon transportation fuel options. Its aim is to accelerate the availability and diversity of low-carbon fuels such as biofuels, electricity, and hydrogen by taking into consideration the full life cycle of GHG emissions.

In 2013, an ethanol company obtained a court order compelling CARB to remedy substantive and procedural defects under California Environmental Quality Act (CEQA) of the LCFS adoption process [POET, LLC v. CARB (2013) 217 Cal.App.4th 1214]. However, the court allowed implementation of the LCFS to continue pending correction of the identified defects. Consequently, this analysis assumes that the LCFS will remain in effect during construction and operation of the project.

4.2.4.3 Regional Transportation-related GHG Targets

The Regional Transportation-related GHG Targets measure included in the Scoping Plan identifies policies to reduce transportation emissions through changes in future land

use patterns and community design, as well as through improvements in public transportation that reduce vehicle miles traveled. Improved planning and the resulting development are seen as essential for meeting the 2050 emissions target (CARB 2008). CARB expects that this measure will reduce transportation-related GHG emissions by about 5 MMTCO₂E, or 4 percent of the total statewide reductions attributed to the capped sectors (see Table 7).

4.2.4.4 Senate Bill 375—Regional Emissions Targets

Senate Bill 375 requires CARB to set regional targets for reducing passenger vehicle GHG emissions in accordance with the Scoping Plan measure described above. Its purpose is to align regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation to reduce GHG emissions by promoting high-density mixed-use developments around mass transit hubs.

4.2.4.5 Tire Pressure Program

The purpose of this regulation is to reduce GHG emissions from vehicles operating with inflated tires by inflating them to the recommended tire pressure rating. Automotive service providers, among other requirements, must check and inflate each vehicle's tires to the recommended tire pressure rating at the time of performing any automotive maintenance or repair service; indicate on the vehicle service invoice that a tire inflation service was completed and the tire pressure measurements after the service were performed; and keep a copy of the service invoice for a minimum of three years, and make the vehicle service invoice available to the CARB or its authorized representative upon request.

4.2.5 Non-transportation-related Emissions Reductions

In the energy sector, Scoping Plan measures aim to provide better information and overcome institutional barriers that slow the adoption of cost-effective, energy-efficiency technologies. They include enhanced energy-efficiency programs to provide incentives for customers to purchase and install more efficient products and processes, and building and appliance standards to ensure that manufacturers and builders bring improved products to market. Over the long term, the recommended measures will increase the amount of electricity from renewable energy sources and improve the energy efficiency of industries, homes, and buildings. While energy efficiency accounts for the largest emissions reductions from this sector, other applicable land development measures, such as water conservation, materials use and waste reduction, and green building design and development practices, achieve additional emissions reduction.

4.2.5.1 Renewables Portfolio Standard

The Renewables Portfolio Standard (RPS) promotes diversification of the state's electricity supply and decreased reliance on fossil fuel energy sources. Originally adopted in 2002 with a mandate to achieve a 20 percent renewable energy mix by 2020 (referred to as the "Initial RPS"), the mandate has been accelerated and increased to 33 percent by 2020. The purpose of the RPS, upon full implementation, is to provide 33 percent of the state's electricity needs through renewable energy sources by 2020 (CARB 2008). Renewable energy includes (but is not limited to) wind, solar, geothermal, small hydroelectric, biomass, anaerobic digestion, and landfill gas.

The RPS is included in CARB's Scoping Plan list of GHG reduction measures to reduce energy sector emissions (see Table 7). As part of the 2008 Scoping Plan original estimates, CARB estimated that full achievement of the RPS would decrease statewide GHG emissions by 21.3 MMTCO₂E (CARB 2008). In 2011, CARB revised this number upwards to 24.0 MMTCO₂E (CARB 2011a).

4.2.5.2 California Code of Regulations, Title 24, Part 6— California Energy Code

The California Code of Regulations, Title 24, Part 6 is the California Energy Code. This code establishes energy-efficiency standards for residential and non-residential buildings in order to reduce California's energy consumption. The Energy Code is updated periodically to incorporate and consider new energy-efficiency technologies and methodologies as they become available. The most recent amendments to the Energy Code, known as 2013 Title 24, or the 2013 Energy Code, became effective January 1, 2014. The 2013 Energy Code provides mandatory energy-efficiency measures as well as voluntary tiers for increased energy efficiency. The 2008 Title 24 was more energy efficient than the former 2005 Title 24 Energy Code. The 2013 Energy Code is anticipated to result in 25 percent energy savings over the 2008 Title 24 standards (Imperial Valley Economic Development Corporation 2013; California Energy Commission 2014). The reference to 2005 Title 24 is relevant in that many of the state's long-term energy and GHG reduction goals identify energy-saving targets relative to 2005 Title 24.

New construction and major renovations must demonstrate their compliance with the current Energy Code through submission and approval of a Title 24 Compliance Report to the local building permit review authority and the California Energy Commission. The compliance reports must demonstrate a building's energy performance through use of California Energy Commission-approved energy performance software that shows iterative increases in energy efficiency given selection of various heating, ventilation, and air conditioning; sealing; window glazing; insulation; and other components related to the building envelope. Title 24 governs energy consumed by the major building envelope

systems such as space heating, space cooling, water heating, some aspects of the fixed lighting system, and ventilation. Non-building energy use, or “plug-in” energy use (such as appliances, equipment, electronics, plug-in lighting), are independent of building design and are not subject to Title 24.

4.2.5.3 California Code of Regulations, Title 24, Part 11— California Green Building Standards Code (CalGreen)

The California Green Building Standards Code (CalGreen) instituted mandatory minimum environmental performance standards for all ground-up new construction of commercial and low-rise residential buildings, state-owned buildings, schools, and hospitals. It also includes voluntary tiers (I and II) with stricter environmental performance standards for these same categories of residential and non-residential buildings. Local jurisdictions must enforce the minimum mandatory requirements and may adopt CalGreen with amendments for stricter requirements.

The mandatory standards require:

- 20 percent mandatory reduction in indoor water use relative to specified baseline levels;
- 50 percent construction/demolition waste diverted from landfills;
- mandatory inspections of energy systems to ensure optimal working efficiency; and
- requirements for low-pollutant emitting exterior and interior finish materials such as paints, carpets, vinyl flooring, and particleboards.

The voluntary standards require:

- Tier I – 15 percent improvement in energy requirements, stricter water conservation requirements for specific fixtures, 65 percent reduction in construction waste, 10 percent recycled content, 20 percent permeable paving, 20 percent cement reduction, cool/solar reflective roof; and
- Tier II – 30 percent improvement in energy requirements, stricter water conservation requirements for specific fixtures, 75 percent reduction in construction waste, 15 percent recycled content, 30 percent permeable paving, 30 percent cement reduction, cool/solar reflective roof.

Similar to the compliance reporting procedure described above for demonstrating code compliance under Title 24, Part 6, in new buildings and major renovations, compliance with the CalGreen water reduction requirements must be demonstrated through completion of water use reporting forms for new low-rise residential and non-residential buildings. The water use compliance form must demonstrate a 20 percent reduction in indoor water use by either showing a 20 percent reduction in the overall baseline water use as identified in CalGreen or a reduced per-plumbing-fixture water use rate.

The CARB Scoping Plan includes a Green Building Strategy with the goal of expanding the use of green building practices to reduce the carbon footprint of new and existing buildings. Consistent with CalGreen, the Scoping Plan recognized that GHG reductions would be achieved through buildings that exceed minimum energy-efficiency standards, decrease consumption of potable water, reduce solid waste during construction and operation, and incorporate sustainable materials. Green building is thus a vehicle to achieve the Scoping Plan's statewide electricity and natural gas efficiency targets, and lower GHG emissions from waste and water transport sectors.

In the Scoping Plan, CARB projects that an additional 26.3 MMTCO₂E could be reduced through expanded green building standards (CARB 2008). However, this reduction is not counted toward the BAU 2020 reduction goal to avoid any double counting, as most of these reductions are accounted for in the electricity, waste, and water sectors. Because of this, CARB has assigned all emissions reductions that occur because of green building strategies to other sectors for meeting AB 32 requirements, but will continue to evaluate and refine the emissions from this sector.

4.2.5.4 AB 939 – The Integrated Waste Management Act

AB 939 requires each city or county plan to include an implementation schedule that shows: diversion of 25 percent of all solid waste from landfill or transformation facilities by January 1, 1995 through source reduction, recycling, and composting activities; and diversion of 50 percent of all solid waste by January 1, 2000 through source reduction, recycling, and composting activities.

4.2.5.5 AB 341 – Solid Waste Diversion

The Commercial Recycling Requirements mandate that businesses (including public entities) that generate 4 cubic yards or more of commercial solid waste per week and multi-family residential with five units or more arrange for recycling services. Businesses can take one or any combination of the following in order to reuse, recycle, compost, or otherwise divert solid waste from disposal.

Additionally, AB 341 mandates that 75 percent of the solid waste generated be reduced, recycled, or composted by 2020.

4.2.5.6 AB 1826 – Solid Waste: Organic Waste

AB 1826 requires each city or county plan to include an implementation schedule which shows: diversion of 25 percent of all solid waste from landfill or transformation facilities by January 1, 1995 through source reduction, recycling, and composting activities; and diversion of 50 percent of all solid waste by January 1, 2000 through source reduction, recycling, and composting activities.

4.2.3 Local

4.2.3.1 Escondido General Plan

The City General Plan was last updated in May 2012. The Resource Conservation Element contains air quality and climate protection policies aimed at reducing GHG emissions. The overall intent of these policies is to support climate protection actions, while retaining flexibility in the design of implementation measures, which could be influenced by new scientific research, technological advances, environmental conditions, or state and federal legislation. As such, these measures are unspecific and include policies such as “implementing land use patterns that reduce automobile dependence” and “promoting local agriculture.”

4.2.3.2 Escondido Climate Action Plan

On December 4, 2013, the City adopted the Escondido Climate Action Plan (E-CAP) (City of Escondido 2013). The E-CAP includes GHG inventories for 2010 and GHG forecasts for 2020 and 2035. The E-CAP identifies local measures to reduce transportation, energy, area source, water, solid waste, and construction emissions in 2020. Local GHG reductions would come from improvements to residential and commercial building energy efficiency (45.8 percent), revised land use policies and increased public transportation (33.9 percent), and implementation of a Waste Disposal Program (18.1 percent).

This project is relevant to the Escondido Waste Disposal Program. The goal of the program is to reduce the waste disposal rate to 5 pounds per resident and 14 pounds per employee by 2020. In 2009, the waste disposal rates in Escondido were 5.3 pounds per resident and 16.5 pounds per employee. The E-CAP states that this target would be achieved by “allocating points to new development projects that incorporate strategies to reduce the amount of waste disposed at landfills.”

5.0 Significance Criteria

5.1 Definition of Impacts

CEQA Guidelines, Appendix G Environmental Checklist, includes the following two questions regarding assessment of GHG emissions:

- 1) Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

- 2) Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emission of GHGs?

As stated in the CEQA Guidelines, these questions are “intended to encourage thoughtful assessment of impacts and do not necessarily represent thresholds of significance” (Title 14, Division 6, Chapter 3 Guidelines for Implementation of the CEQA, Appendix G, VII Greenhouse Gas Emissions).

CEQA Guidelines require Lead Agencies to adopt GHG significance thresholds. When adopting these thresholds, the amended Guidelines allow Lead Agencies to consider thresholds of significance adopted or recommended by other public agencies, or recommended by experts, provided that the thresholds are supported by substantial evidence, and/or to develop their own significance threshold.

5.2 Significance Thresholds

Adopted December 4, 2013, the City’s *CEQA Thresholds and Screening Tables* provides guidance on how to assess the significance of GHG emissions (City of Escondido 2013). City guidance recognizes that individual projects do not generate enough GHG emissions to have a significant direct impact to the environment; however, projects do contribute to cumulative emissions that may have a significant effect on the environment. Thus, the City guidance follows the 90th percentile capture-rate concept. Guidance identifies a threshold for GHG emissions such that 90 percent of the emissions from all projects would exceed that threshold and be required to be reduced. Figure 5 below is a flow chart from that guidance which summarizes how projects are evaluated.

The City’s guidance uses 2,500 MTCO₂E as the threshold to determine when a cumulatively significant contribution of GHGs may occur. City guidance further identifies project sizes that typically generate less than 2,500 MTCO₂E annually. Projects that are less intense than those identified would therefore be determined to have a less than significant GHG emissions.

Projects that exceed the 2,500 MTCO₂E threshold must demonstrate consistency with GHG reductions anticipated by the City’s E-CAP. Projects may demonstrate consistency using Screening Tables from the City guidance or an alternative method that includes detailed analysis of project consistency with the E-CAP. The Screening Table method assigns points for project design features and project mitigation measures (collectively referred to as “feature”). Point values correspond to the minimum emissions reduction expected from each feature. Projects that garner at least 100 points would be considered consistent with the reduction quantities anticipated in the City’s E-CAP. As such, those projects would be determined to have a less than significant impact for GHG emission.

CEQA THRESHOLDS AND SCREENING TABLES

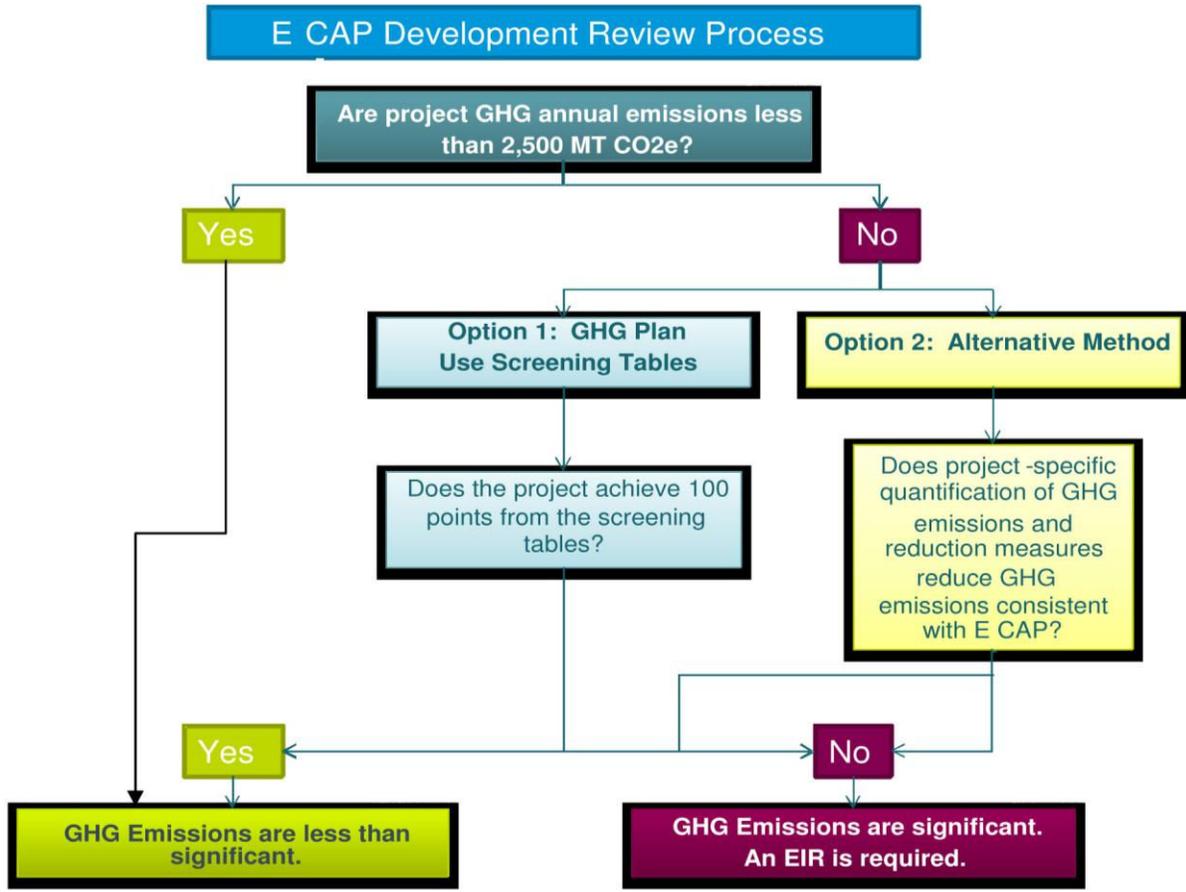


FIGURE 5

Escondido GHG Impact
Significance Determination Process

6.0 Assessment Methodology

To evaluate the project's GHG emissions, emissions were calculated using the California Emissions Estimator Model (CalEEMod) Version 2013.2.2 (California Air Pollution Control Officers Association [CAPCOA] 2013). CalEEMod program is a tool used to estimate air quality and GHG emissions resulting from land development projects in the state of California. CalEEMod was developed with the participation of several state air districts including the South Coast Air Quality Management District (SCAQMD) and the San Diego Air Pollution Control District (SDAPCD). Emissions sources modeled by CalEEMod include construction (off-road vehicles), mobile (on-road vehicles), area (fireplaces, consumer products [cleansers, aerosols, solvents], landscape maintenance equipment, architectural coatings), water and wastewater, and solid waste sources. Although the project would only renovate and construct part of the EDI Recycling Facility, operational emissions were calculated for the entire EDI Recycling Facility, which includes 10,372 square feet of office space and 210,524 square feet of recycling facilities.

GHG emissions are estimated in terms of total MTCO₂E. The analysis methodology and input data are described in the following sections. Where project-specific data was not available, model inputs were based on information provided in the CalEEMod User's Guide (CAPCOA 2013). Attachments 2 and 3 include the complete CalEEMod output files for construction and operations, respectively.

6.1 Construction Emissions

Construction-related activities are temporary, short-term sources of GHG emissions. Sources of construction-related air emissions include:

- Construction equipment exhaust;
- Construction-related trips by workers, delivery trucks, and material-hauling trucks; and
- Construction-related power consumption.

As discussed in Section 2.0, Project Description, the project includes 57,182 square feet of demolition, 105,297 square feet of renovation, and 114,033 square feet of new construction. Building renovations were not included in construction emission calculations because renovations do not require substantial off-road construction equipment.

CalEEMod estimates the required construction activities and equipment based on surveys performed by the SCAQMD and the SMAQMD of typical construction projects and scales schedule and equipment needs and with a project's size. Emission estimates in CalEEMod are based on the duration of construction phases; construction equipment type, quantity, and usage; grading area; season, and ambient temperature, among other parameters. Construction equipment and duration of construction activities are summarized in Table 8 below.

As shown in Table 8, GHG emission modeling assumes a very conservative of 269 day for construction. However, the development of the site may occur over a longer period of time depending on financing and market forces. Therefore, the analysis is considered conservative as construction equipment and diesel fuel is anticipated to emit less GHG emissions in the future as technology advances. GHG emissions associated with project construction are calculated by multiplying the total fuel consumed by the construction equipment and worker trips by applicable emission factors. The number and pieces of construction equipment for all phases of construction is estimated based on the size of the land use.

**TABLE 8
CONSTRUCTION EQUIPMENT PARAMETERS**

Activity	Length (Days)	Equipment	Horsepower	Load Factor
Demolition	20	1 Concrete/Industrial Saw	81	0.73
		1 Rubber Tired Dozer	255	0.4
		3 Tractors/Loaders/Backhoes	97	0.37
Site Preparation	3	1 Grader	174	0.41
		1 Scraper	361	0.48
		1 Tractor/Loader/Backhoe	97	0.37
Grading	6	1 Grader	174	0.41
		1 Rubber Tired Dozer	255	0.4
		2 Tractors/Loaders/Backhoes	97	0.37
Building Construction	220	1 Crane	226	0.29
		2 Forklifts	89	0.2
		1 Generator Set	84	0.74
		1 Tractor/Loader/Backhoe	97	0.37
		3 Welders	46	0.45
Paving	10	1 Cement and Mortar Mixer	9	0.56
		1 Paver	125	0.42
		1 Paving Equipment	130	0.36
		2 Roller	80	0.38
		1 Tractor/Loader/Backhoe	97	0.37
Architectural Coating	10	1 Air Compressor	78	0.48

SOURCE: CalEEMod Version 2013.2.2

Project construction activities would occur in four phases. Due to the nature of construction, emissions are intense, short-term, and vary substantially between phases of construction. To account for this variability, the SCAQMD has recommended that total

construction GHG emissions resulting from a project be amortized over 30 years and added to operational GHG emissions (SCAQMD 2009).

6.2 Vehicle Emissions

Transportation-related GHG emissions comprise the largest sector contributing to both inventoried and projected statewide GHG emissions, accounting for 38 percent of the projected total statewide 2020 BAU emissions (CARB 2008). On-road vehicles alone account for 35 percent of forecasted 2020 BAU emissions. GHG emissions from vehicles come from the combustion of fossil fuels in vehicle engines. Vehicle emissions are estimated by first calculating trip rate, trip length, trip purpose, and trip type percentages (e.g., home to work, home to shop, home to other) for each land use type.

The vehicle emissions are calculated based on the vehicle type, the trip rate, and trip length for each land use. The vehicle emission factors and fleet mix used in CalEEMod are derived from CARB's Emission Factors 2011 model, which includes GHG reducing effects from the implementation of Pavley I (Clean Car Standards) and the Low Carbon Fuel Standard.

Trips generated by the entire proposed EDI Recycling Facility were estimated based on Institute of Transportation Engineers Trip Generation, 8th Edition, trip rates for office space and heavy duty industrial land uses. Trip lengths were based on statewide averages. Vehicle emission factors and fleet mix are derived from the CARB's 2011 Emission Factors Model. Vehicle emission factors include GHG-reducing effects from the implementation of Pavley I (Clean Car Standards) and the LCFS. Although the AD facility proposed by this project may be used to fuel CNG-fueled vehicles, GHG emissions from CNG-fueled vehicles are typically less than their diesel-fueled counterpart emissions. This analysis conservatively assumes all vehicles are diesel-fueled.

6.3 Energy Use Emissions

GHGs are generated as a result of activities in buildings for which electricity and natural gas are used as energy sources. GHGs are generated during the generation of electricity from fossil fuels off-site in power plants. These emissions are considered indirect but are calculated as associated with a building's operation. Electric power generation accounts for the second largest sector contributing to both inventoried and projected statewide GHG emissions, comprising 24 percent of the projected total 2020 statewide BAU emissions (CARB 2008). Combustion of fossil fuel emits criteria pollutants and GHGs directly into the atmosphere. When this occurs in a building this is considered a direct emissions source associated with that building.

Building energy use is typically divided into energy consumed by the built environment and energy consumed by uses that are independent of the construction of the building such as plug-in appliances. In California, Title 24 governs energy consumed by the built environment, mechanical systems, and some types of fixed lighting. Non-building energy use, or plug-in energy use, can be further subdivided by specific end-use (refrigeration, cooking, office equipment, etc.).

Energy use associated with the entire proposed EDI Recycling Facility was calculated. Energy values are based on the California Energy Commission-sponsored California Commercial End Use Survey and Residential Appliance Saturation Survey studies, which identify energy use by building type and climate zone. CalEEMod energy emission factors are based on 2008 Title 24 buildings code. All proposed land use changes would be subject to 2013 Title 24 regulations; therefore, energy use rates incorporate a 30 percent energy use reduction.

6.4 Area Source Emissions

Area sources include GHG emissions that would occur from the use of fireplaces and landscaping equipment, as well as from the use of consumer products and architectural coatings. In addition, the AD facility is an area source of emissions. The use of fireplaces directly emits CO₂ from the combustion of natural gas, wood, or biomass, some of which are classified as biogenic. However, the project would not include fireplaces. Emissions from landscaping equipment, consumer product, and architectural coatings were calculated using CalEEMod default assumptions, which are based on project size and land use.

An Emissions Estimate, Organics Management report was prepared for the facility to assess the potential air quality and GHG emissions from the AD facility (Edgar & Associates 2014) (Attachment 4). Emissions of CH₄ and N₂O would result from composting from anaerobic pockets in waste. According to the report, processes and associated emissions would vary depending on whether natural gas from the AD facility is used to produce electricity or produce CNG for collection vehicles. If natural gas from the AD facility is used for electricity production, natural gas would be flared (burned) to produce electricity. If natural gas is used for CNG-fueled collection vehicles, GHG emissions would result from flaring of waste gas and heating of the AD facility and combustion of CNG as a vehicle fuel (mobile emission). Table 9 summarizes GHG emissions that would occur under each AD facility output scenario.

TABLE 9
ANAEROBIC DIGESTER FACILITY GHG EMISSIONS
(MTCO₂E per year)

GHG	Facility Generation	
	Electricity	Vehicle-Fuel
CH ₄	471.9	399.3
N ₂ O	9.6	9.6

SOURCE: Edgar & Associates 2014 (Attachment 4)

This analysis assumes natural gas from the AD facility would be used for generation of electricity, as it is the more conservative approach.

6.5 Water and Wastewater Emissions

The amount of water used and wastewater generated by a project has indirect GHG emissions associated with it. These emissions are a result of the energy used to supply, distribute, and treat the water and wastewater. In addition to the indirect GHG emissions associated with energy use, wastewater treatment can directly emit both CH₄ and N₂O.

GHG emissions associated with supplying and treating the water and wastewater are calculated for this project. The indoor and outdoor water use consumption data for each land use subtype, office space and general heavy industrial, comes from the Pacific Institute's *Waste Not, Want Not: The Potential for Urban Water Conservation in California* 2003 (as cited in CAPCOA 2013). Based on that report, a percentage of total water consumption was dedicated to landscape irrigation. This percentage was used to determine outdoor water use. Wastewater generation was similarly based on a reported percentage of total indoor water use (CAPCOA 2013). BAU water use calculations do not consider any reduction in water use from these estimates. However, the project will be subject to 2013 Title 24 Part 11 standards, also known as the California Green Building Standards. Thus, in order to demonstrate compliance with the 2013 Title 24 Part 11 standards, a 20 percent increase in water use efficiency was included in the water consumption calculations for the project.

6.6 Solid Waste Emissions

The disposal of solid waste produces GHG emissions from anaerobic decomposition in landfills, incineration, and transportation of waste. To calculate the GHG emissions generated by disposing of solid waste for the project, the total volume of solid waste was calculated using waste disposal rates identified by California Department of Resources Recycling and Recovery. The methods for quantifying GHG emissions from solid waste are based on the Intergovernmental Panel on Climate Change method, using the

degradable organic content of waste. GHG emissions associated with the project's waste disposal were calculated using these parameters.

Solid waste emissions are defined as emission from waste generated by the project. Thus, facility GHG emissions from solid waste only includes waste produced on-site and does not include waste throughput.

7.0 GHG Impact Analysis

7.1 Project Emissions

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

Project construction and operational GHG emissions were calculated as described in Section 6.0, Calculation Methodology. Table 10 below summarizes the GHG emissions associated with the project.

**TABLE 10
PROPOSED FACILITY EMISSIONS IN 2020
(MTCO₂E PER YEAR)**

Emission Source	Facility Emissions
Vehicles	434
Energy Use	775
Area Sources	482
Water Use	266
Solid Waste Disposal	119
Construction ¹	12
Total Emissions	2,088

SOURCE: CalEEMod Version 2013.2.2 (Attachments 2 & 3)
Edgar & Associates 2014 (Attachment 4)

As shown in Table 10, the project would generate 2,088 MTCO₂E. This conservatively includes all emissions associated with the entire EDI Recycling Facility even though the project would only renovate and construct part of the EDI Recycling Facility. According to the City's *CEQA Thresholds and Screening Tables*, discussed in Section 5.2, Significance Thresholds, projects that generate less than 2,500 MTCO₂E per year would not have a significant impact on the environment as a result of GHG emissions. Therefore, project emissions would result in less than significant impacts.

7.2 Consistency Analysis

Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emission of GHGs?

The City E-CAP Reduction Measure R2-S1 is implementation of a Waste Disposal Program. The measure sets target disposal rates of 5 pounds per resident and 14 pounds per employee in the Escondido. The measure identifies potential methods of achieving this goal as “expanded recycling facilities and increased recycling pickups.” Consistent with the measure, this project would expand the EDI Recycling Facility. Additionally, the project would generate less than 2,500 MTCO₂E per year. According to the E-CAP, projects that generate less than 2,500 MT CO₂E would be considered to have a “less than significant GHG emissions impact because of the low amount of GHG emissions generated” (City of Escondido, 2013). Thus, the project would be consistent with local plans to reduce GHG emissions.

The project would support the Scoping Plan’s Key Recommended Actions for the waste and energy sectors. As discussed in Section 4.2, State Regulations, the Scoping Plan states “meeting the AB 341 mandate 75 percent recycling goal is the best path forward to maximizing GHG emissions reductions from the Waste management Sector.” The purpose of the project is to accommodate the separate sorting lines required to meet the state-level diversion requirements (AB 341). Thus, the project supports AB 341 and the Scoping Plan waste reduction goals.

As discussed in Section 4.2, State Regulations, the Scoping Plan promotes diversification of the state’s electricity supply and decreased reliance on fossil fuel energy sources. The project would incorporate an AD facility capable of converting 31,200 tons of organic waste into 5.0 GWh per year of renewable energy or 420,000 dge per year of CNG, a renewable vehicle fuel source. As discussed in Section 6.4, Assessment Methodology, this analysis conservatively assumes natural gas from the AD facility would be used for generation of electricity. This generation of electricity would offset GHGs that would have been generated by the San Diego Gas & Electric (SDG&E) to produce this amount of energy.

Emissions offsets were modeled using CalEEMod, which calculates emissions based on current SDG&E intensity factors. The project would potentially offset annual emission of 1,637 MTCO₂E from SDG&E using fossil fuel energy sources. Therefore, as the project would support SDG&E’s efforts to achieve RPS requirements, the project is consistent with the Scoping Plan. The project would result in less than significant impacts to applicable plans, policies, and regulations.

8.0 Conclusions and Recommendations

The project would reorganize the existing EDI Recycling Facility and incorporate the north-adjacent parcel. The goal of the project is to facilitate increased waste diversion and construction an AD facility that would recycle food waste and green waste into natural gas.

Project GHG emissions were assessed using the City's *CEQA Thresholds and Screening Tables*. Conservatively including all emissions associated with the EDI Recycling Facility and excluding potential GHG offsets, the project would generate 2,088 MTCO₂E per year. As the project would generate less than the City's significance threshold, 2,500 MTCO₂E, project GHG emissions would not result in a significant impact to the environment.

As discussed in Section 7.2, Consistency Analysis, the project would support E-CAP Measure R2-S1, which aims to improve community wide recycling rates, and supports the Scoping plan by helping achieve the AB 341 mandate of 75 percent recycling by 2020. Additionally, as the project would generate 2,088 MTCO₂E per year, project emissions would be considered less than significant under the E-CAP thresholds. Thus, the project would be consistent with all applicable plans, policies, or regulations intended to reduce GHG emissions and impacts would be less than significant.

This analysis concludes that the project would not have significant impacts under CEQA and no mitigation is required. Furthermore, the AD facility would potentially offset annual emission of 1,637 MTCO₂E from energy from fossil fuels.

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ATTACHMENTS

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ATTACHMENT 1
CalEEMod – Existing, Proposed, and Construction
GHG Emissions

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Existing EDI Recycling Facility San Diego County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Office Park	5.90	1000sqft	0.14	5,900.00	0
General Heavy Industry	96.80	1000sqft	2.22	96,800.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.6	Precipitation Freq (Days)	40
Climate Zone	13			Operational Year	2020
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MW hr)	720.49	CH4 Intensity (lb/MW hr)	0.029	N2O Intensity (lb/MW hr)	0.006

1.3 User Entered Comments & Non-Default Data

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	150
tblAreaCoating	Area_EF_Nonresidential_Interior	250	150
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	250	150
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	250	150
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	250	150
tblProjectCharacteristics	OperationalYear	2014	2020

2.0 Emissions Summary

2.2 Overall Operational
Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.4723	1.0000e-005	9.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.8400e-003	1.8400e-003	0.0000	0.0000	1.9400e-003
Energy	7.2300e-003	0.0657	0.0552	3.9000e-004		4.9900e-003	4.9900e-003		4.9900e-003	4.9900e-003	0.0000	390.1583	390.1583	0.0142	3.9600e-003	391.6854
Mobile	0.1060	0.2328	1.0917	3.0000e-003	0.2067	3.4400e-003	0.2101	0.0553	3.1800e-003	0.0585	0.0000	208.3887	208.3887	8.0500e-003	0.0000	208.5578
Waste						0.0000	0.0000		0.0000	0.0000	25.3800	0.0000	25.3800	1.4999	0.0000	56.8781
Water						0.0000	0.0000		0.0000	0.0000	7.4051	101.6589	109.0639	0.7647	0.0188	130.9515
Total	0.5855	0.2985	1.1479	3.3900e-003	0.2067	8.4300e-003	0.2151	0.0553	8.1700e-003	0.0634	32.7850	700.2077	732.9927	2.2868	0.0228	788.0748

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.4723	1.0000e-005	9.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.8400e-003	1.8400e-003	0.0000	0.0000	1.9400e-003
Energy	7.2300e-003	0.0657	0.0552	3.9000e-004		4.9900e-003	4.9900e-003		4.9900e-003	4.9900e-003	0.0000	390.1583	390.1583	0.0142	3.9600e-003	391.6854
Mobile	0.1060	0.2328	1.0917	3.0000e-003	0.2067	3.4400e-003	0.2101	0.0553	3.1800e-003	0.0585	0.0000	208.3887	208.3887	8.0500e-003	0.0000	208.5578
Waste						0.0000	0.0000		0.0000	0.0000	25.3800	0.0000	25.3800	1.4999	0.0000	56.8781
Water						0.0000	0.0000		0.0000	0.0000	7.4051	101.6589	109.0639	0.7645	0.0188	130.9397

Total	0.5855	0.2985	1.1479	3.3900e-003	0.2067	8.4300e-003	0.2151	0.0553	8.1700e-003	0.0634	32.7850	700.2077	732.9927	2.2867	0.0227	788.0630
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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.13	0.00

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1060	0.2328	1.0917	3.0000e-003	0.2067	3.4400e-003	0.2101	0.0553	3.1800e-003	0.0585	0.0000	208.3887	208.3887	8.0500e-003	0.0000	208.5578
Unmitigated	0.1060	0.2328	1.0917	3.0000e-003	0.2067	3.4400e-003	0.2101	0.0553	3.1800e-003	0.0585	0.0000	208.3887	208.3887	8.0500e-003	0.0000	208.5578

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Heavy Industry	145.20	145.20	145.20	423,913	423,913
Office Park	67.38	9.68	4.48	125,688	125,688
Total	212.58	154.88	149.68	549,601	549,601

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Heavy Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3

General Heavy Industry	1.14127e+006	6.1500e-003	0.0559	0.0470	3.4000e-004		4.2500e-003	4.2500e-003		4.2500e-003	4.2500e-003	0.0000	60.9026	60.9026	1.1700e-003	1.1200e-003	61.2733
Office Park	198712	1.0700e-003	9.7400e-003	8.1800e-003	6.0000e-005		7.4000e-004	7.4000e-004		7.4000e-004	7.4000e-004	0.0000	10.6040	10.6040	2.0000e-004	1.9000e-004	10.6686
Total		7.2200e-003	0.0657	0.0552	4.0000e-004		4.9900e-003	4.9900e-003		4.9900e-003	4.9900e-003	0.0000	71.5067	71.5067	1.3700e-003	1.3100e-003	71.9418

Mitigated

	Natural Gas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Heavy Industry	1.14127e+006	6.1500e-003	0.0559	0.0470	3.4000e-004		4.2500e-003	4.2500e-003		4.2500e-003	4.2500e-003	0.0000	60.9026	60.9026	1.1700e-003	1.1200e-003	61.2733
Office Park	198712	1.0700e-003	9.7400e-003	8.1800e-003	6.0000e-005		7.4000e-004	7.4000e-004		7.4000e-004	7.4000e-004	0.0000	10.6040	10.6040	2.0000e-004	1.9000e-004	10.6686
Total		7.2200e-003	0.0657	0.0552	4.0000e-004		4.9900e-003	4.9900e-003		4.9900e-003	4.9900e-003	0.0000	71.5067	71.5067	1.3700e-003	1.3100e-003	71.9418

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Heavy Industry	871200	284.7158	0.0115	2.3700e-003	285.6915
Office Park	103840	33.9358	1.3700e-003	2.8000e-004	34.0521
Total		318.6516	0.0128	2.6500e-003	319.7436

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Heavy Industry	871200	284.7158	0.0115	2.3700e-003	285.6915
Office Park	103840	33.9358	1.3700e-003	2.8000e-004	34.0521
Total		318.6516	0.0128	2.6500e-003	319.7436

6.0 Area Detail

6.1 Mitigation Measures Area

- Use Low VOC Paint - Residential Interior
- Use Low VOC Paint - Residential Exterior
- Use Low VOC Paint - Non-Residential Interior
- Use Low VOC Paint - Non-Residential Exterior
- No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.4723	1.0000e-005	9.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.8400e-003	1.8400e-003	0.0000	0.0000	1.9400e-003
Unmitigated	0.4723	1.0000e-005	9.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.8400e-003	1.8400e-003	0.0000	0.0000	1.9400e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0711					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.4011					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	9.0000e-005	1.0000e-005	9.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.8400e-003	1.8400e-003	0.0000	0.0000	1.9400e-003
Total	0.4723	1.0000e-005	9.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.8400e-003	1.8400e-003	0.0000	0.0000	1.9400e-003

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0711					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.4011					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	9.0000e-005	1.0000e-005	9.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.8400e-003	1.8400e-003	0.0000	0.0000	1.9400e-003
Total	0.4723	1.0000e-005	9.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.8400e-003	1.8400e-003	0.0000	0.0000	1.9400e-003

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	109.0639	0.7645	0.0188	130.9397
Unmitigated	109.0639	0.7647	0.0188	130.9515

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Heavy Industry	22.2925 / 0	101.9354	0.7302	0.0179	122.8320
Office Park	1.04863 / 0.642708	7.1286	0.0344	8.6000e-004	8.1195
Total		109.0639	0.7647	0.0188	130.9515

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Heavy Industry	22.2925 / 0	101.9354	0.7301	0.0179	122.8207
Office Park	1.04863 / 0.642708	7.1286	0.0344	8.6000e-004	8.1190

Total		109.0639	0.7645	0.0188	130.9397
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8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	25.3800	1.4999	0.0000	56.8781
Unmitigated	25.3800	1.4999	0.0000	56.8781

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Heavy Industry	119.54	24.2655	1.4341	0.0000	54.3806
Office Park	5.49	1.1144	0.0659	0.0000	2.4975
Total		25.3800	1.4999	0.0000	56.8781

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Heavy Industry	119.54	24.2655	1.4341	0.0000	54.3806
Office Park	5.49	1.1144	0.0659	0.0000	2.4975
Total		25.3800	1.4999	0.0000	56.8781

9.0 Operational Offroad

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

ATTACHMENT 2
CalEEMod – Project Construction GHG Emissions

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Proposed Project Construction San Diego County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Heavy Industry	114.03	1000sqft	2.62	114,030.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.6	Precipitation Freq (Days)	40
Climate Zone	13			Operational Year	2015
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MW hr)	720.49	CH4 Intensity (lb/MW hr)	0.029	N2O Intensity (lb/MW hr)	0.006

1.3 User Entered Comments & Non-Default Data

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	150.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	150.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	150.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	150.00
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	250	150
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	250	150
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	250	150
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	250	150
tblGrading	MaterialExported	0.00	7,000.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	1/28/2016	5	20	
2	Site Preparation	Site Preparation	1/29/2016	2/2/2016	5	3	
3	Grading	Grading	2/3/2016	2/10/2016	5	6	
4	Building Construction	Building Construction	2/11/2016	12/14/2016	5	220	
5	Paving	Paving	12/15/2016	12/28/2016	5	10	
6	Architectural Coating	Architectural Coating	12/29/2016	1/11/2017	5	10	

Acres of Grading (Site Preparation Phase): 4.5

Acres of Grading (Grading Phase): 3

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 148,170; Non-Residential Outdoor: 49,390 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	255	0.40
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Site Preparation	Graders	1	8.00	174	0.41
Site Preparation	Scrapers	1	8.00	361	0.48
Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Cranes	1	8.00	226	0.29
Building Construction	Forklifts	2	7.00	89	0.20

Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pavers	1	8.00	125	0.42
Paving	Paving Equipment	1	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	260.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	41.00	16.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Fugitive Dust					0.0285	0.0000	0.0285	4.3200e-003	0.0000	4.3200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0291	0.2826	0.2150	2.4000e-004		0.0175	0.0175		0.0163	0.0163	0.0000	22.5629	22.5629	5.7000e-003	0.0000	22.6827
Total	0.0291	0.2826	0.2150	2.4000e-004	0.0285	0.0175	0.0459	4.3200e-003	0.0163	0.0207	0.0000	22.5629	22.5629	5.7000e-003	0.0000	22.6827

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.7200e-003	0.0378	0.0311	1.0000e-004	2.2200e-003	5.0000e-004	2.7200e-003	6.1000e-004	4.6000e-004	1.0700e-003	0.0000	8.8797	8.8797	6.0000e-005	0.0000	8.8810
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.5000e-004	5.9000e-004	5.6100e-003	1.0000e-005	1.0400e-003	1.0000e-005	1.0500e-003	2.8000e-004	1.0000e-005	2.8000e-004	0.0000	0.9715	0.9715	5.0000e-005	0.0000	0.9726
Total	3.1700e-003	0.0383	0.0367	1.1000e-004	3.2600e-003	5.1000e-004	3.7700e-003	8.9000e-004	4.7000e-004	1.3500e-003	0.0000	9.8512	9.8512	1.1000e-004	0.0000	9.8536

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0111	0.0000	0.0111	1.6800e-003	0.0000	1.6800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0291	0.2826	0.2150	2.4000e-004		0.0175	0.0175		0.0163	0.0163	0.0000	22.5628	22.5628	5.7000e-003	0.0000	22.6826
Total	0.0291	0.2826	0.2150	2.4000e-004	0.0111	0.0175	0.0286	1.6800e-003	0.0163	0.0180	0.0000	22.5628	22.5628	5.7000e-003	0.0000	22.6826

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.7200e-003	0.0378	0.0311	1.0000e-004	2.2200e-003	5.0000e-004	2.7200e-003	6.1000e-004	4.6000e-004	1.0700e-003	0.0000	8.8797	8.8797	6.0000e-005	0.0000	8.8810
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.5000e-004	5.9000e-004	5.6100e-003	1.0000e-005	1.0400e-003	1.0000e-005	1.0500e-003	2.8000e-004	1.0000e-005	2.8000e-004	0.0000	0.9715	0.9715	5.0000e-005	0.0000	0.9726
Total	3.1700e-003	0.0383	0.0367	1.1000e-004	3.2600e-003	5.1000e-004	3.7700e-003	8.9000e-004	4.7000e-004	1.3500e-003	0.0000	9.8512	9.8512	1.1000e-004	0.0000	9.8536

3.3 Site Preparation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.3900e-003	0.0000	2.3900e-003	2.6000e-004	0.0000	2.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.0500e-003	0.0462	0.0271	4.0000e-005		2.2700e-003	2.2700e-003		2.0900e-003	2.0900e-003	0.0000	3.3749	3.3749	1.0200e-003	0.0000	3.3962
Total	4.0500e-003	0.0462	0.0271	4.0000e-005	2.3900e-003	2.2700e-003	4.6600e-003	2.6000e-004	2.0900e-003	2.3500e-003	0.0000	3.3749	3.3749	1.0200e-003	0.0000	3.3962

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
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Category	tons/yr										MT/yr					
	Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.0000e-005	5.0000e-005	5.2000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0897	0.0897	0.0000	0.0000	0.0898
Total	4.0000e-005	5.0000e-005	5.2000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0897	0.0897	0.0000	0.0000	0.0898

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					9.3000e-004	0.0000	9.3000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.0500e-003	0.0462	0.0271	4.0000e-005		2.2700e-003	2.2700e-003		2.0900e-003	2.0900e-003	0.0000	3.3749	3.3749	1.0200e-003	0.0000	3.3962
Total	4.0500e-003	0.0462	0.0271	4.0000e-005	9.3000e-004	2.2700e-003	3.2000e-003	1.0000e-004	2.0900e-003	2.1900e-003	0.0000	3.3749	3.3749	1.0200e-003	0.0000	3.3962

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.0000e-005	5.0000e-005	5.2000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0897	0.0897	0.0000	0.0000	0.0898

Total	4.0000e-005	5.0000e-005	5.2000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0897	0.0897	0.0000	0.0000	0.0898
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3.4 Grading - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0202	0.0000	0.0202	0.0102	0.0000	0.0102	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.5600e-003	0.0898	0.0589	6.0000e-005	5.0000e-003	5.0000e-003		4.6000e-003	4.6000e-003		0.0000	5.8222	5.8222	1.7600e-003	0.0000	5.8590
Total	8.5600e-003	0.0898	0.0589	6.0000e-005	0.0202	5.0000e-003	0.0252	0.0102	4.6000e-003	0.0148	0.0000	5.8222	5.8222	1.7600e-003	0.0000	5.8590

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-004	1.4000e-004	1.3000e-003	0.0000	2.4000e-004	0.0000	2.4000e-004	6.0000e-005	0.0000	7.0000e-005	0.0000	0.2242	0.2242	1.0000e-005	0.0000	0.2244
Total	1.0000e-004	1.4000e-004	1.3000e-003	0.0000	2.4000e-004	0.0000	2.4000e-004	6.0000e-005	0.0000	7.0000e-005	0.0000	0.2242	0.2242	1.0000e-005	0.0000	0.2244

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					7.8600e-003	0.0000	7.8600e-003	3.9700e-003	0.0000	3.9700e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.5600e-003	0.0898	0.0589	6.0000e-005		5.0000e-003	5.0000e-003		4.6000e-003	4.6000e-003	0.0000	5.8221	5.8221	1.7600e-003	0.0000	5.8590
Total	8.5600e-003	0.0898	0.0589	6.0000e-005	7.8600e-003	5.0000e-003	0.0129	3.9700e-003	4.6000e-003	8.5700e-003	0.0000	5.8221	5.8221	1.7600e-003	0.0000	5.8590

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-004	1.4000e-004	1.3000e-003	0.0000	2.4000e-004	0.0000	2.4000e-004	6.0000e-005	0.0000	7.0000e-005	0.0000	0.2242	0.2242	1.0000e-005	0.0000	0.2244
Total	1.0000e-004	1.4000e-004	1.3000e-003	0.0000	2.4000e-004	0.0000	2.4000e-004	6.0000e-005	0.0000	7.0000e-005	0.0000	0.2242	0.2242	1.0000e-005	0.0000	0.2244

3.5 Building Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Off-Road	0.4068	2.7095	1.8388	2.7400e-003		0.1788	0.1788		0.1713	0.1713	0.0000	234.7292	234.7292	0.0541	0.0000	235.8650
Total	0.4068	2.7095	1.8388	2.7400e-003		0.1788	0.1788		0.1713	0.1713	0.0000	234.7292	234.7292	0.0541	0.0000	235.8650

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0200	0.1720	0.2409	4.2000e-004	0.0115	2.5300e-003	0.0140	3.2800e-003	2.3300e-003	5.6100e-003	0.0000	37.9714	37.9714	3.0000e-004	0.0000	37.9777
Worker	0.0155	0.0204	0.1948	4.5000e-004	0.0362	2.8000e-004	0.0364	9.6100e-003	2.6000e-004	9.8700e-003	0.0000	33.7037	33.7037	1.7800e-003	0.0000	33.7411
Total	0.0355	0.1924	0.4357	8.7000e-004	0.0476	2.8100e-003	0.0504	0.0129	2.5900e-003	0.0155	0.0000	71.6751	71.6751	2.0800e-003	0.0000	71.7188

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.4068	2.7095	1.8388	2.7400e-003		0.1788	0.1788		0.1713	0.1713	0.0000	234.7289	234.7289	0.0541	0.0000	235.8647
Total	0.4068	2.7095	1.8388	2.7400e-003		0.1788	0.1788		0.1713	0.1713	0.0000	234.7289	234.7289	0.0541	0.0000	235.8647

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0200	0.1720	0.2409	4.2000e-004	0.0115	2.5300e-003	0.0140	3.2800e-003	2.3300e-003	5.6100e-003	0.0000	37.9714	37.9714	3.0000e-004	0.0000	37.9777
Worker	0.0155	0.0204	0.1948	4.5000e-004	0.0362	2.8000e-004	0.0364	9.6100e-003	2.6000e-004	9.8700e-003	0.0000	33.7037	33.7037	1.7800e-003	0.0000	33.7411
Total	0.0355	0.1924	0.4357	8.7000e-004	0.0476	2.8100e-003	0.0504	0.0129	2.5900e-003	0.0155	0.0000	71.6751	71.6751	2.0800e-003	0.0000	71.7188

3.6 Paving - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.9100e-003	0.0897	0.0607	9.0000e-005		5.6300e-003	5.6300e-003		5.1800e-003	5.1800e-003	0.0000	8.1867	8.1867	2.4200e-003	0.0000	8.2376
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	8.9100e-003	0.0897	0.0607	9.0000e-005		5.6300e-003	5.6300e-003		5.1800e-003	5.1800e-003	0.0000	8.1867	8.1867	2.4200e-003	0.0000	8.2376

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
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Category	tons/yr										MT/yr					
	Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.6000e-004	3.4000e-004	3.2400e-003	1.0000e-005	6.0000e-004	0.0000	6.1000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.5605	0.5605	3.0000e-005	0.0000	0.5611
Total	2.6000e-004	3.4000e-004	3.2400e-003	1.0000e-005	6.0000e-004	0.0000	6.1000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.5605	0.5605	3.0000e-005	0.0000	0.5611

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.9100e-003	0.0897	0.0607	9.0000e-005		5.6300e-003	5.6300e-003		5.1800e-003	5.1800e-003	0.0000	8.1867	8.1867	2.4200e-003	0.0000	8.2376
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	8.9100e-003	0.0897	0.0607	9.0000e-005		5.6300e-003	5.6300e-003		5.1800e-003	5.1800e-003	0.0000	8.1867	8.1867	2.4200e-003	0.0000	8.2376

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.6000e-004	3.4000e-004	3.2400e-003	1.0000e-005	6.0000e-004	0.0000	6.1000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.5605	0.5605	3.0000e-005	0.0000	0.5611

Total	2.6000e-004	3.4000e-004	3.2400e-003	1.0000e-005	6.0000e-004	0.0000	6.1000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.5605	0.5605	3.0000e-005	0.0000	0.5611
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3.7 Architectural Coating - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1374					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.7000e-004	2.3700e-003	1.8800e-003	0.0000		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004	0.0000	0.2553	0.2553	3.0000e-005	0.0000	0.2560
Total	0.1377	2.3700e-003	1.8800e-003	0.0000		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004	0.0000	0.2553	0.2553	3.0000e-005	0.0000	0.2560

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	4.0000e-005	3.5000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0598	0.0598	0.0000	0.0000	0.0599
Total	3.0000e-005	4.0000e-005	3.5000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0598	0.0598	0.0000	0.0000	0.0599

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e	
Category	tons/yr										MT/yr						
Archit. Coating	0.1374						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Off-Road	3.7000e-004	2.3700e-003	1.8800e-003	0.0000			2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004	0.0000	0.2553	0.2553	3.0000e-005	0.0000	0.2560
Total	0.1377	2.3700e-003	1.8800e-003	0.0000			2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004	0.0000	0.2553	0.2553	3.0000e-005	0.0000	0.2560

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	4.0000e-005	3.5000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0598	0.0598	0.0000	0.0000	0.0599
Total	3.0000e-005	4.0000e-005	3.5000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0598	0.0598	0.0000	0.0000	0.0599

3.7 Architectural Coating - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Archit. Coating	0.5494					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Off-Road	1.3300e-003	8.7400e-003	7.4700e-003	1.0000e-005		6.9000e-004	6.9000e-004		6.9000e-004	6.9000e-004	0.0000	1.0213	1.0213	1.1000e-004	0.0000	1.0236
Total	0.5507	8.7400e-003	7.4700e-003	1.0000e-005		6.9000e-004	6.9000e-004		6.9000e-004	6.9000e-004	0.0000	1.0213	1.0213	1.1000e-004	0.0000	1.0236

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-004	1.3000e-004	1.2500e-003	0.0000	2.6000e-004	0.0000	2.6000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2299	0.2299	1.0000e-005	0.0000	0.2302
Total	1.0000e-004	1.3000e-004	1.2500e-003	0.0000	2.6000e-004	0.0000	2.6000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2299	0.2299	1.0000e-005	0.0000	0.2302

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.5494					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.3300e-003	8.7400e-003	7.4700e-003	1.0000e-005		6.9000e-004	6.9000e-004		6.9000e-004	6.9000e-004	0.0000	1.0213	1.0213	1.1000e-004	0.0000	1.0236
Total	0.5507	8.7400e-003	7.4700e-003	1.0000e-005		6.9000e-004	6.9000e-004		6.9000e-004	6.9000e-004	0.0000	1.0213	1.0213	1.1000e-004	0.0000	1.0236

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-004	1.3000e-004	1.2500e-003	0.0000	2.6000e-004	0.0000	2.6000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2299	0.2299	1.0000e-005	0.0000	0.2302
Total	1.0000e-004	1.3000e-004	1.2500e-003	0.0000	2.6000e-004	0.0000	2.6000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2299	0.2299	1.0000e-005	0.0000	0.2302

ATTACHMENT 3
CalEEMod – Project Operational GHG Emissions

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AD Facility GHG Emissions

Emissions (MTCO2E)	Vehicle Fuel	Electricity
CH4	399.3	471.9
N2O	9.6	9.6
Total	408.9	481.5

Other GHG Emissions

Emission Source	Existing Emissions	Project Emissions	Project Offsets	Difference
Vehicles	208.5578	434	0	-225
Energy Use	391.6854	775	0	-384
Area Sources	0.00194	0	1637	1637
Water Use	130.9397	266	0	-135
Solid Waste Disposal	56.8781	119	0	-63
Construction	0	12	0	-12
Total Emissions	788	1607	1637	818

Total GHG Emissions

Emission Source	Existing Emissions	Project Emissions	Project Offsets	Difference
Vehicles	209	434	0	-225
Energy Use	392	775	0	-384
Area Sources	0	482	1637	1155
Water Use	131	266	0	-135
Solid Waste Disposal	57	119	0	-63
Construction	0	12	0	-12
Total Emissions	788	2088	1637	337

Proposed EDI Recycling Facility San Diego County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Office Park	10.40	1000sqft	0.24	10,400.00	0
General Heavy Industry	210.50	1000sqft	4.83	210,500.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.6	Precipitation Freq (Days)	40
Climate Zone	13			Operational Year	2020
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MW hr)	720.49	CH4 Intensity (lb/MW hr)	0.029	N2O Intensity (lb/MW hr)	0.006

1.3 User Entered Comments & Non-Default Data

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	150.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	150.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	150.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	150.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	150
tblAreaCoating	Area_EF_Nonresidential_Interior	250	150
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	250	150
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	250	150

tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	250	150
tblGrading	MaterialExported	0.00	7,000.00
tblProjectCharacteristics	OperationalYear	2014	2020

2.2 Overall Operational Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.0120	2.0000e-005	2.0400e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.9500e-003	3.9500e-003	1.0000e-005	0.0000	4.1700e-003
Energy	0.0153	0.1388	0.1166	8.3000e-004		0.0106	0.0106		0.0106	0.0106	0.0000	830.0882	830.0882	0.0302	8.4200e-003	833.3346
Mobile	0.2196	0.4839	2.2673	6.2400e-003	0.4299	7.1600e-003	0.4371	0.1150	6.6100e-003	0.1216	0.0000	433.4615	433.4615	0.0167	0.0000	433.8131
Waste						0.0000	0.0000		0.0000	0.0000	53.3115	0.0000	53.3115	3.1506	0.0000	119.4745
Water						0.0000	0.0000		0.0000	0.0000	15.5529	212.7266	228.2795	1.6060	0.0395	274.2473
Total	1.2469	0.6227	2.3859	7.0700e-003	0.4299	0.0177	0.4477	0.1150	0.0172	0.1322	68.8644	1,476.2803	1,545.1447	4.8036	0.0479	1,660.8737

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.0120	2.0000e-005	2.0400e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.9500e-003	3.9500e-003	1.0000e-005	0.0000	4.1700e-003
Energy	0.0133	0.1206	0.1013	7.2000e-004		9.1700e-003	9.1700e-003		9.1700e-003	9.1700e-003	0.0000	772.4485	772.4485	0.0283	7.7500e-003	775.4448

Mobile	0.2196	0.4839	2.2673	6.2400e-003	0.4299	7.1600e-003	0.4371	0.1150	6.6100e-003	0.1216	0.0000	433.4615	433.4615	0.0167	0.0000	433.8131
Waste						0.0000	0.0000		0.0000	0.0000	53.3115	0.0000	53.3115	3.1506	0.0000	119.4745
Water						0.0000	0.0000		0.0000	0.0000	15.5529	204.6633	220.2162	1.6057	0.0394	266.1564
Total	1.2449	0.6045	2.2706	6.9600e-003	0.4299	0.0163	0.4463	0.1150	0.0158	0.1308	68.8644	1,410.5773	1,479.4417	4.8014	0.0472	1,594.8929

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.16	2.92	0.64	1.56	0.00	7.79	0.31	0.00	8.04	1.04	0.00	4.45	4.25	0.05	1.54	3.97

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2196	0.4839	2.2673	6.2400e-003	0.4299	7.1600e-003	0.4371	0.1150	6.6100e-003	0.1216	0.0000	433.4615	433.4615	0.0167	0.0000	433.8131
Unmitigated	0.2196	0.4839	2.2673	6.2400e-003	0.4299	7.1600e-003	0.4371	0.1150	6.6100e-003	0.1216	0.0000	433.4615	433.4615	0.0167	0.0000	433.8131

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Heavy Industry	315.75	315.75	315.75	921,836	921,836
Office Park	118.77	17.06	7.90	221,552	221,552
Total	434.52	332.81	323.65	1,143,388	1,143,388

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C- NW	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Heavy Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Office Park	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.513300	0.073549	0.191092	0.130830	0.036094	0.005140	0.012550	0.022916	0.001871	0.002062	0.006564	0.000586	0.003446

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	641.1134	641.1134	0.0258	5.3400e-003	643.3104
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	678.9583	678.9583	0.0273	5.6500e-003	681.2850
NaturalGas Mitigated	0.0133	0.1206	0.1013	7.2000e-004		9.1700e-003	9.1700e-003		9.1700e-003	9.1700e-003	0.0000	131.3351	131.3351	2.5200e-003	2.4100e-003	132.1343
NaturalGas Unmitigated	0.0153	0.1388	0.1166	8.3000e-004		0.0106	0.0106		0.0106	0.0106	0.0000	151.1299	151.1299	2.9000e-003	2.7700e-003	152.0496

5.2 Energy by Land Use - NaturalGas

Unmitigated

	Natural Gas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Heavy Industry	2.4818e+06	0.0134	0.1217	0.1022	7.3000e-004		9.2500e-003	9.2500e-003		9.2500e-003	9.2500e-003	0.0000	132.4380	132.4380	2.5400e-003	2.4300e-003	133.2440
Office Park	350272	1.8900e-003	0.0172	0.0144	1.0000e-004		1.3000e-003	1.3000e-003		1.3000e-003	1.3000e-003	0.0000	18.6919	18.6919	3.6000e-004	3.4000e-004	18.8056
Total		0.0153	0.1388	0.1166	8.3000e-004		0.0106	0.0106		0.0106	0.0106	0.0000	151.1299	151.1299	2.9000e-003	2.7700e-003	152.0496

Mitigated

	Natural Gas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Heavy Industry	2.19509e+06	0.0118	0.1076	0.0904	6.5000e-004		8.1800e-003	8.1800e-003		8.1800e-003	8.1800e-003	0.0000	117.1386	117.1386	2.2500e-003	2.1500e-003	117.8515
Office Park	266032	1.4300e-003	0.0130	0.0110	8.0000e-005		9.9000e-004	9.9000e-004		9.9000e-004	9.9000e-004	0.0000	14.1965	14.1965	2.7000e-004	2.6000e-004	14.2829
Total		0.0133	0.1206	0.1013	7.3000e-004		9.1700e-003	9.1700e-003		9.1700e-003	9.1700e-003	0.0000	131.3351	131.3351	2.5200e-003	2.4100e-003	132.1343

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Heavy Industry	1.8945e+06	619.1392	0.0249	5.1600e-003	621.2609

Office Park	183040	59.8191	2.4100e-003	5.0000e-004	60.0241
Total		678.9583	0.0273	5.6600e-003	681.2850

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Heavy Industry	1.80104e+006	588.5950	0.0237	4.9000e-003	590.6120
Office Park	160701	52.5184	2.1100e-003	4.4000e-004	52.6984
Total		641.1134	0.0258	5.3400e-003	643.3104

6.0 Area Detail

6.1 Mitigation Measures Area

- Use Low VOC Paint - Residential Interior
- Use Low VOC Paint - Residential Exterior
- Use Low VOC Paint - Non-Residential Interior
- Use Low VOC Paint - Non-Residential Exterior
- No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.0120	2.0000e-005	2.0400e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.9500e-003	3.9500e-003	1.0000e-005	0.0000	4.1700e-003

Unmitigated	1.0120	2.0000e-005	2.0400e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.9500e-003	3.9500e-003	1.0000e-005	0.0000	4.1700e-003
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6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1491					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.8627					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.9000e-004	2.0000e-005	2.0400e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.9500e-003	3.9500e-003	1.0000e-005	0.0000	4.1700e-003
Total	1.0120	2.0000e-005	2.0400e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.9500e-003	3.9500e-003	1.0000e-005	0.0000	4.1700e-003

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1491					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.8627					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.9000e-004	2.0000e-005	2.0400e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.9500e-003	3.9500e-003	1.0000e-005	0.0000	4.1700e-003
Total	1.0120	2.0000e-005	2.0400e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.9500e-003	3.9500e-003	1.0000e-005	0.0000	4.1700e-003

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	220.2162	1.6057	0.0394	266.1564
Unmitigated	228.2795	1.6060	0.0395	274.2473

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Heavy Industry	47.175 / 0	215.7139	1.5453	0.0380	259.9349
Office Park	1.84843 / 1.13291	12.5656	0.0607	1.5200e-003	14.3124
Total		228.2795	1.6060	0.0395	274.2473

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
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Land Use	Mgal	MT/yr			
General Heavy Industry	47.175 / 0	208.7463	1.5450	0.0379	252.9434
Office Park	1.84843 / 0.906327	11.4699	0.0607	1.5100e-003	13.2130
Total		220.2162	1.6057	0.0394	266.1564

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	53.3115	3.1506	0.0000	119.4745
Unmitigated	53.3115	3.1506	0.0000	119.4745

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Heavy Industry	252.96	51.3486	3.0346	0.0000	115.0755
Office Park	9.67	1.9629	0.1160	0.0000	4.3990

Total		53.3115	3.1506	0.0000	119.4746
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Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Heavy Industry	252.96	51.3486	3.0346	0.0000	115.0755
Office Park	9.67	1.9629	0.1160	0.0000	4.3990
Total		53.3115	3.1506	0.0000	119.4746

9.0 Operational Offroad

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

ATTACHMENT 4
**Emissions Estimate for the Anaerobic Digestion
Facility**

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October 13, 2014

Emissions Estimate
Organics Management
Anaerobic Digestion and Biogas Treatment for
Transportation Fuel or Electricity Production
31,200 TPY Unit

Proposed Operations

The Facility will receive an average of 120 tons per day (TPD), up to 31,200 tons per year (TPY), of organic material, consisting of food and green waste from residential and commercial sources. The proposed activities consist of processing organics consisting of about 67% food and 33% green waste, which would be anaerobically digested. The resulting biogas may either be used to produce compressed natural gas (CNG) for vehicle fuel or to generate electricity.

The anaerobic digestion (AD) process results in a by-product called digestate, which is the organic material remaining after anaerobic digestion is complete. This material requires further aerobic composting to produce an organic soil amendment. The digestate will be removed from the AD vessels and transported to an off-site permitted compost facility for further processing.

Proposed Project Emissions

The proposed project would generate emissions from the following sources:

- Short-term storage in the aeration bay.
- Anaerobic digestion and biogas purification.

In the case of CNG production:

- Flaring of waste gas of low Btu content from the biogas purification process and the startup and shutdown of anaerobic digestion bunkers.
- Combustion of natural gas in a boiler for heating percolate for the anaerobic digestion process.

In the case of electricity production:

- Flaring of waste gas of low Btu content from the startup and shutdown of anaerobic digestion bunkers.
- Emissions from the genset for electricity generation.
- Note that thermal energy to heat the percolate would be provided by the combined heat and power system (CHP) unit.

Only anthropogenic greenhouse gas (GHG) emissions are estimated in this report; biogenic GHG emissions are not included.

Some emissions may be generated that would be included in a CEQA analysis but are not estimated in this report; for instance:

- Mobile emissions associated with transport of feedstock to the facility and hauling away finished product.
- Stationary equipment emissions such as grinders and screens.
- Mobile equipment such as front-end loaders.

Emission Factors for Organic Decomposition

Volatile Organic Compounds: VOCs are generated during the decomposition of organic waste. The South Coast Air Quality Management District (SCAQMD) has adopted emission factors for VOC's for aerobic composting.

The SCAQMD has proposed an emission factor of 4.25 lbs.-VOCs/wet ton during active composting, which includes curing (62 days total). The SCAQMD assumes that 90% of compost VOC emissions occur during the 22-day active composting phase and 10% during curing, which is discussed in the SCAQMD Staff Report for the compost emission rule (Rule 1133). Therefore, emission factors used for VOCs are:

- 3.83 lbs.-VOCs/wet ton for composting
- 0.425 lbs.-VOCs/wet ton for compost curing

Methane and Nitrous Oxide: Methane and nitrous oxide are generated during composting from anaerobic pockets in the waste. The California Air Resources Board (CARB) conducted an extensive literature review and published the results in a document entitled "Method for Estimating Greenhouse Gas Emission Reductions from Compost from Commercial Waste". The emission factors for methane and nitrous oxide generation from compost are 0.078 MTCO₂e/ton for methane and 0.025 MTCO₂e/ton for nitrous oxide.

Emissions Capture and Biofiltration

Receiving Building and Aeration Bay

Organic material used for anaerobic digestion would be off-loaded in the receiving building and placed in an aeration bay for mixing prior to being loaded into an enclosed anaerobic digestion bunker within 72 hours of receipt. The aeration bay will be enclosed, subject to negative aeration pressure and designed to capture all emissions generated during short-term storage of the organic feedstock. The ventilation system would then discharge the air to a biofilter for cleaning prior to being emitted to the atmosphere.

Biofiltration is a well known treatment technology that has consistently documented destruction efficiencies of over 90% for VOCs. A pilot-scale experiment done at California State University, Fresno, demonstrated a 99% destruction efficiency for VOCs. Tests conducted at the Inland Empire Regional Compost Facility resulted in a measured VOC destruction efficiency of 94%. Additionally, the South Coast Air Quality Management District (SCAQMD) published a list of operational biofilters and estimated destruction efficiencies that can be found at: http://www.aqmd.gov/rules/doc/r1133/app_c_biofilter.pdf.

Likusta, a manufacturer of odor control/biofilter systems, provides guaranteed control efficiencies of 90% for VOCs.

Additionally, very high destruction efficiencies for methane and nitrous oxide have also been demonstrated. A pilot-scale experiment done at California State University, Fresno, demonstrated a 99.7% destruction efficiency for methane and 97.1% for nitrous oxide.

For this analysis, the following biofilter destruction efficiencies are used:

VOCs:	90%
Methane:	90%
Nitrous Oxide:	90%

Short-term Storage

The organic material may be stored in an aeration bay for up to 72 hours. Based on the background information from CARB (2011) and the SCAQMD (Rule 1133), the following assumptions are made:

- 90% of emissions occur during the phase of active composting, consisting of 22-days. Therefore, emissions generated during a 72-hour storage time in the aeration bay are estimated as:

$$(3 \text{ days}/22 \text{ days})(0.90 \text{ fraction of emissions generated}) = 12\% \text{ of total emissions}$$

- The biofilter will destroy 90% of the emissions:

$$(12\% \text{ of total emissions})(1 - 0.9) = 0.012 \text{ of total emissions}$$

VOC Emissions: $(0.012)(4.25 \text{ lbs./ton})(31,200 \text{ tons})/2000 = 0.82 \text{ TPY}$

Methane: $(0.012)(0.078 \text{ MTCO}_2/\text{ton})(31,200 \text{ tons}) = 29.9 \text{ MTCO}_2\text{e}$

Nitrous Oxide: $(0.012)(0.025 \text{ MTCO}_2/\text{ton})(31,200 \text{ tons}) = 9.6 \text{ MTCO}_2\text{e}$

Anaerobic Digestion

Biogas Generation

Organic waste will be delivered to the AD system, consisting of approximately 33% green waste and 67% food waste. The following parameters are used in the analysis:

- Organic waste digested = 31,200 tons per year
- Biogas recovery for purification or electricity generation (net of flared lean gas) = 3,352 ft³/ton
- Biogas methane content = 60%
- Methane energy content (low heating value) = 930 btu/ft³
- Biogas energy content = 558 btu/ft³

The total amount of biogas generation anticipated is 104,582,400 ft³ per year, which has an energy content of 58,357 MMBtu.

The biogas flows from the anaerobic digester under positive pressure. If the end use is CNG for vehicle fuel, then the biogas is further pressurized for purification to pipeline quality natural gas and then the purified, fuel quality BioCNG fuel is pressurized for vehicle fueling. If the end use is electricity, the biogas is fed into an engine/generator system (genset). The anaerobic digestion process itself occurs in an enclosed, sealed vessel to prevent any air intrusion or leakage over a period of 21 to 28 days.

Digestate Management

Following anaerobic digestion, the digestate is removed from the anaerobic digestion vessel and transported to an off-site, permitted compost facility. Therefore, digestate management will generate no significant on-site emissions.

Biogas Processing for Vehicle Fuel

A BioCNG biogas conditioning system will be installed to process biogas, produced by the anaerobic digesters, into bio-methane to power CNG vehicles. When the biogas is directed to the BioCNG system it will first pass through a condensate sump for initial dewatering. From the sump the biogas goes into the H₂S treatment tank with granular Sulfatreat media. The H₂S treatment system will reduce the inlet H₂S concentration to less than 50 parts per million by volume (ppmv). The biogas is then compressed to approximately 100 pounds per square inch (psi) and then it passes through the inlet moisture removal process where the gas is chilled to 35°F.

The gas then is routed through activated carbon filled vessels where siloxanes and VOCs are removed to non-detect levels. The final gas treatment process includes routing the biogas through membranes where the CO₂ is separated from the product BioCNG fuel gas. The membranes produce a BioCNG product gas with a composition of approximately 95 percent methane (CH₄), 2.5 percent CO₂, and a trace of oxygen (O₂) and nitrogen (N₂). Waste gas leaving the membranes consists of approximately 11 percent CH₄, 89 percent CO₂, O₂ and N₂ and moisture. The BioCNG is a closed loop system which has no outlets of exhaust into the ambient air. The waste gas produced from the process is routed to an enclosed flare for abatement. The purification system recovers about 90% of the biomethane for fuel, while the remaining 10% is included in the “waste gas” flow from the purification system, consisting mostly of carbon dioxide.

Flare Emissions

Anaerobic Digestion – Lean Gas Flaring GHG Emissions

The biogas system is a sealed vessel designed to capture all emissions. No emissions are anticipated from the anaerobic digestion vessel, with the exception of “lean gas” that is drawn from the digesters and flared. During start up and shutdown of the digesters there is a period during which the gas generated is of low methane content and can’t be routed to the purification system. This lean gas flow is instead sent to a flare where it is destroyed. Anthropogenic emissions from the flare consist of the methane pass through emissions from methane that isn’t combusted by the flare, which are estimated at about 2% of total methane, i.e. 98% destruction efficiency, a conservative assumption.

Total lean gas methane flows are estimated at 2,643,643 ft³ CH₄ per year, of which 10% is estimated to be methane and the remainder principally biogenic CO₂.

Methane pass-through emissions from the flare:

$$(264,364 \text{ ft}^3 \text{ CH}_4)(10/100)(\text{m}^3/35.3 \text{ ft}^3)(0.000674 \text{ MTCH}_4/\text{m}^3)(21 \text{ MTCO}_2\text{e}/\text{MTCH}_4)(1-98/100) = 0.21 \text{ MTCO}_2\text{e}$$

Biogas Upgrading – Waste Gas Flaring GHG Emissions

The biogas treatment system that removes carbon dioxide from the biogas does not capture all of the methane in the biogas; about 10% of the methane in the biogas is present in the waste gas stream, which is flared to destroy the methane. About 14.1% of the waste gas stream is methane. The non-combusted pass-through methane emitted from the flare is:

$$(31,200 \text{ tons/year})(3,352 \text{ ft}^3 \text{ biogas/ton})(60\% \text{ CH}_4)(14.1\% \text{ in waste gas})(\text{m}^3/35.3 \text{ ft}^3)(0.000674 \text{ MTCH}_4/\text{m}^3)(21 \text{ MTCO}_2\text{e}/\text{MTCH}_4)(1-98/100) = 71.0 \text{ MTCO}_2\text{e}$$

Flare Emissions with Supplemental Natural Gas

The minimum Btu value for the flare to operate is 220 Btu/ft³. Because the combination of lean gas and waste gas is less than the minimum Btu value, natural gas must be used to supplement the flare.

BIOGAS PURIFICATION - FLARING

The enclosed flare will generate other emissions, as well, which are estimated using emission factors from US EPA AP-42, Section 13.5 – Industrial Flares. The combination of lean and waste gas has an energy content of 129 Btu/ft³ at a flow rate of 89.7 cfm. Another 11.5 cfm of pipeline natural gas must be blended with this flow to achieve the minimum energy content for the flare, assuming the low heat value of methane of 930 Btu/ft³.

Greenhouse Gases

The Climate Registry publishes emission factors to estimate greenhouse gas emissions and provides a value of 53.02 kg CO₂e/MMBtu for natural gas.

$$(11.5 \text{ ft}^3/\text{min})(525,600 \text{ min/year})(930 \text{ Btu/ft}^3)/(1,000,000)(53.02 \text{ kg/MMBtu})/(1,000) = 298.0 \text{ MTCO}_2\text{e}$$

Flare Emissions - Criteria Pollutant Emissions

In the scenario where vehicle fuel is the product, the overall flow rate to the enclosed flare will be 101.2 cfm, of which 11.5 cfm are pipeline natural gas to achieve the minimum energy content of 220 Btu/ft³. The blend of lean gas, waste gas and natural gas provides 11,721 MMBtu per year. Emissions of criteria pollutants are estimated using emission factors from US EPA AP-42, Section 13.5 – Industrial Flares. The methane present in the waste gas will have undergone VOC and H₂S removal prior to discharge to the flare. The lean gas will be raw biogas of low methane content (about 10%) and constitutes less than 5% of the flow to the flare.

Lean gas is assumed to contain approximately 1,000 ppmv of H₂S that would be converted to SO₂ during combustion. The amount of SO₂ generated is calculated using the equation below (SCS Engineers, 2007):

$$\begin{aligned} \text{Mass flow rate (lbs./hour)} &= \\ &((\text{CS}/1,000,000)((1,000 \text{ L/m}^3)(34 \text{ g/mol})(60 \text{ min/hour})(\text{VS})/((35.3 \text{ ft}^3/\text{m}^3)(24.45 \text{ L/mol})(453.59 \text{ g/lb.}) = \\ &= 0.00521*(\text{CS})(\text{VS}) \end{aligned}$$

Where CS = concentration in ppmv and VS = flow rate in scfm

Lean Gas SO₂ Emissions:

Using CS = 1,000 ppmv H₂S and a flow rate of 5 cfm, the H₂S emissions are 0.11 tons per year. Converting to SO₂ using the stoichiometric of SO₂/H₂S of 64/34 yields SO₂ emissions of 0.21 TPY.

Waste Gas SO₂ Emissions:

Using CS = 50 ppmv H₂S and a flow rate of 89.7 cfm, the H₂S emissions are 0.10 tons per year. Converting to SO₂ using the stoichiometric of SO₂/H₂S of 64/34 yields SO₂ emissions of 0.19 TPY.

Flare emissions under the vehicle fuel production scenario are shown in Table 1.

Table 1. Flare Emissions Under the Vehicle Fuel Production Scenario

Constituent	Lbs./MMBtu	Tons per Year
NOx	0.068	0.40
CO	0.37	2.17
THC ¹	0.14	0.82
VOCs ¹	0.055	0.32
SO ₂		0.40

1. Total hydrocarbons is used as a conservative proxy for NMOCs. Per AP-42, VOCs = 0.39*NMOCs.

ELECTRICITY PRODUCTION

In the case of electricity production, there is no waste gas generated from a biogas purification process; the lean gas that is flared must be supplemented by natural gas. In this case, the lean gas flow rate is about 5 cfm at 93 Btu/ft³. This must be supplemented by a flow of natural gas of 0.92 cfm, assuming an energy content of 930 Btu/ft³ (low heat value for methane).

This results in the following GHG emissions:

$$(0.92 \text{ ft}^3/\text{min})(525,600 \text{ min/year})(930 \text{ Btu/ft}^3)/(1,000,000)(53.02 \text{ kg/MMBtu})/(1,000) = 23.8 \text{ MTCO}_2\text{e}$$

Criteria Pollutant Emissions

In this scenario, the overall flow rate to the enclosed flare will be 5.92 cfm, of which 0.92 cfm are pipeline natural gas to achieve the minimum energy content of 220 Btu/ft³. The blend of lean gas and natural gas provides 694 MMBtu per year. Emissions of criteria pollutants are estimated using emission factors from US EPA AP-42, Section 13.5 – Industrial Flares. Flare criteria pollutant emissions under the electricity production scenario are shown in Table 2.

Table 2. Flare Criteria Pollutant Emissions Under the Electricity Production Scenario

Constituent	Lbs./MMBtu	Tons per Year
NOx	0.068	0.02
CO	0.37	0.13
THC ¹	0.14	0.05
VOCs	0.055	0.02
SO ₂		0.21

1. Total hydrocarbons is used as a conservative proxy for NMOCs. Per AP-42, VOCs = 0.39*NMOCs.

Methane Pass-Through Emissions

The AD system will recover about 62,749,440 ft³ of methane (methane produced less lean gas), that would go to the genset for power production. The destruction efficiency of the engine is assumed to be 98.34% (SCS Engineers, 2007).

$$(62,749,440 \text{ ft}^3 \text{ CH}_4/\text{year})(1-98.34)(\text{m}^3/35.3 \text{ ft}^3)(0.000674 \text{ MTCO}_2\text{e}/\text{m}^3)(21) = 418 \text{ MTCO}_2\text{e}$$

Percolate Heating – Natural Gas Combustion: Fuel Production Scenario

The methane present in the lean gas and waste gas is too low in energy content to combust in a standard boiler for heating liquid percolate. In the case of electricity production, the heat would be provided by the CHP system. However, in the case of fuel production, the heat is provided by an industrial boiler. Therefore, the lean gas and waste gas are combusted with a flare and pipeline natural gas is used in an industrial boiler to provide thermal energy to heat the percolate liquid. It is estimated that 9,050 MMBtu/year of natural gas are needed to meet the thermal requirements. The Climate Registry publishes emission factors to estimate greenhouse gas emissions and provides a value of 53.02 kg CO₂e/MMBtu for natural gas.

$$(9,050 \text{ MMBtu})(53.02 \text{ kg CO}_2\text{e}/\text{MMBtu})(\text{MTCO}_2\text{e}/1,000 \text{ kg}) = 480 \text{ MTCO}_2\text{e}$$

Criteria Pollutant Emissions

Emissions of criteria pollutants are estimated using emission factors from US EPA AP-42, Section 13.5 – Industrial Flares. Criteria pollutant emissions from the industrial boiler are shown in Table 3.

Table 3. Criteria Pollutant Emissions from the Industrial Boiler – Vehicle Fuel Production Scenario

Constituent	lb/10⁶ ft³	Lbs./MMBtu	Tons Per Year
NO _x	100	0.09804	0.44
CO	84	0.08235	0.37
PM	7.6	0.00745	0.03
SO ₂	0.6	0.00059	0.00
VOC	5.5	0.00539	0.02
CH ₄ ¹	2.3	0.00225	0.01 = 0.20 MTCO ₂ e

1. Methane is included as a pass-through emission

Electricity Generation

To estimate emissions from the generation of electricity, a 2G Cenergy genset is used as a model. The amount of biogas to be produced is sufficient to produce about 742 kW of electric power, and provide the thermal energy to heat the liquid percolate for the AD system. Emission factors for the 2G Cenergy engine, which assume biogas as the feedstock and generating capacity of up to 800 kW, are provided in Table 4.

Table 4. Engine/Generator System Emission Factors – Electricity Production Scenario

Constituent	No Treatment	Low-NOx	Ultra-Low Emissions
	g/kW-hr	g/kW-hr	g/kW-hr
CO	3.353		1.140
NOx	1.475	1.207	0.134
VOCs	0.268		
SO ₂	0.805		

Overall annual emissions from the engine are shown in Table 5, conservatively assuming no down time for engine maintenance and repair (i.e. 8,760 hours of operation per year) and using the “no treatment” emission factors. Emissions calculations are as shown below.

NOx: $(1.48 \text{ g/kW-hr})(8,760 \text{ hours/year})(742 \text{ BHP})(1 \text{ lb./}453.6 \text{ g})/(2,000 \text{ lbs./ton}) = 10.6 \text{ TPY}$

CO: $(3.35 \text{ g/kW-hr})(8,760 \text{ hours})(742 \text{ BHP})(1 \text{ lb./}453.6 \text{ g})/(2,000 \text{ lbs./ton}) = 24.0 \text{ TPY}$

VOC: $(0.27 \text{ g/kW-hr})(8,760 \text{ hours})(147 \text{ BHP})(1 \text{ lb./}453.6 \text{ g})/(2,000 \text{ lbs./ton}) = 1.9 \text{ TPY}$

SO₂: $(0.81 \text{ g/kW-hr})(8,760 \text{ hours})(147 \text{ BHP})(1 \text{ lb./}453.6 \text{ g})/(2,000 \text{ lbs./ton}) = 5.8 \text{ TPY}$

Table 5. Engine/Generator System Pollutant Emissions – Electricity Production Scenario

Constituent	No Treatment	Low-NOx	Ultra-Low Emissions
	g/kW-hr	g/kW-hr	g/kW-hr
CO	24.0		8.2
NOx	10.6	8.7	0.9
VOCs	1.9		
SO ₂	5.8		

Overall Project Emissions

A summary of project emissions for the production of vehicle fuel is provided in Table 6.

Table 6. Project Emission Summary – Vehicle Fuel Scenario

VOCs (TPY)	Methane (MTCO _{2e})	Nitrous Oxide (MTCO _{2e})	NOx (TPY)	CO (TPY)	PM (TPY)	SO ₂ (TPY)
1.16	399.3	9.6	0.84	2.5	0.03	0.4

A summary of project emissions for the production of electricity is provided in Table 7.

Table 7. Project Emission Summary – Electricity Production Scenario

VOCs (TPY)	Methane MTCO ₂ e	Nitrous Oxide MTCO ₂ e	NO _x (TPY)	CO (TPY)	PM (TPY)	SO ₂ (TPY)
2.74	471.9	9.6	10.6	24.1	0	6.0

Note: Assumes the “no treatment” genset emission factors.

Information Sources

Edgar & Associates, Inc., relied on information and data provided by the client, equipment vendors and other sources for the preparation of this report.

This report was reviewed by Evan W.R. Edgar, who has more twenty-seven years of experience in all aspects of solid waste management as a registered civil engineer since 1987. Mr. Edgar is the Principal of Total Compliance Management (TCM), an environmental engineering firm based in Sacramento and established in 1996, specializing in solid waste management, recycling, composting, renewable energy, and greenhouse gas reduction issues. Mr. Edgar has a B.S., in Civil Engineering, from California State University, Chico.

This report was prepared by Rick Moore, P.E., Principal Civil Engineer at Edgar and Associates. Mr. Moore has more than 20 years experience in solid waste management and public works engineering and received his M.S. in Civil Engineering from University of California, Davis.

References

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Likusta Environmental Solutions, Biofilter Specification Sheet.

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Current MSW Industry Position and State of the Practice on Methane Destruction Efficiency in Flares, Turbines, and Engines, SCS Engineers, July 2007.

ATTACHMENT 5
CalEEMod – Project GHG Offsets

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Proposed EDI Recycling Facility San Diego County, Annual

1.0 Project Characteristics

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.6	Precipitation Freq (Days)	40
Climate Zone	13			Operational Year	2020
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MW hr)	720.49	CH4 Intensity (lb/MW hr)	0.029	N2O Intensity (lb/MW hr)	0.006

2.0 Emissions Summary

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e	
Category	tons/yr										MT/yr						
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	-	-	-0.0658	-0.0136	-	
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-	1,634.0438	-	-0.0658	-0.0136	-
													1,634.0438	1,634.0438			1,639.6434

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

Kilowatt Hours of Renewable Electricity Generated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	-	-	-0.0658	-0.0136	-
												1,634.043	1,634.0438			1,639.6434
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			

User Defined	-5e+006	-	-0.0658	-0.0136	-
Industrial		1,634.0438			1,639.643
Total		-	-0.0658	-0.0136	-
		1,634.0438			1,639.643
					4

