

Table 1. Maximum Daily Criteria Air Pollutant Emission Estimates for Project Construction

Tustin Ranch Costco Gasoline Station

Orange County, California

Year ¹	Maximum Daily Criteria Air Pollutant Emission Estimates ¹					
	VOC ²	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}
	(lb/day)					
2019	2.4	23.3	15.5	0.0	6.8	3.8
2020	2.6	15.0	13.4	0.0	0.9	0.8
Maximum Emissions	2.6	23.3	15.5	0.0	6.8	3.8
SCAQMD Significance Thresholds³	75	100	550	150	150	55
Exceeds Threshold for any Year of Construction?	NO	NO	NO	NO	NO	NO

Notes:

¹ Total emissions for project construction were estimated using CalEEMod[®]. Total construction emissions include construction of the fuel station and parking lot, and demolition of the existing Goodyear facility.

² For purposes of this analysis VOC emissions are assumed to be equal to ROG.

³ SCAQMD Air Quality Significance Thresholds. Available at <http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2>. Accessed: June 2019.

Abbreviations:CalEEMod[®] - CALifornia Emissions Estimator MODEL

CO - carbon monoxide

lbs - pounds

NO_x - nitrogen oxide compounds (NO + NO₂)PM_{2.5} - particulate matter less than 2.5 microns in diameterPM₁₀ - particulate matter less than 10 microns in diameter

ROG - reactive organic gases

SCAQMD - South Coast Air Quality Management District

SO_x - sulfur oxide compounds

VOC - volatile organic compounds

Table 2. Maximum Daily Criteria Air Pollutant Emission Estimates for Project OperationTustin Ranch Costco Gasoline Station
Orange County, California

Emission Category	Maximum Daily Criteria Air Pollutant Emission Estimates ¹					
	VOC ²	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}
	(lb/day)					
Area ³	0.1	0.0	0.0	0.0	0.0	0.0
Energy ³	0.0	0.0	0.0	0.0	0.0	0.0
Mobile ⁴	2.7	11.2	35.3	0.1	10.9	3.0
Total Daily Emissions (lbs/day)	2.8	11.2	35.3	0.1	10.9	3.0
SCAQMD Significance Thresholds⁵	55	55	550	150	150	55
Exceeds Threshold?	NO	NO	NO	NO	NO	NO

Notes:

¹ Emissions shown as zero may be non-zero values, however, they are below a meaningful reporting level for this analysis.

² For purposes of this analysis VOC emissions are assumed to be equal to ROG.

³ Total Area and Energy emissions were estimated using CalEEMod[®].

⁴ Total mobile emissions were estimated using CalEEMod[®] default trip lengths and emission factors with Project-specific vehicle trip rates prepared by Kittelson & Associates in the *Tustin Ranch Costco Fuel Station Additional Memorandum* dated April 17, 2019.

⁵ SCAQMD Air Quality Significance Thresholds. Available at <http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2>. Accessed: June 2019.

Abbreviations:

CalEEMod[®] - CALifornia Emissions Estimator MODel

CO - carbon monoxide

lbs - pounds

NO_x - oxides of nitrogen

PM_{2.5} - particulate matter less than 2.5 microns in diameter

PM₁₀ - particulate matter less than 10 microns in diameter

ROG - reactive organic gases

SCAQMD - South Coast Air Quality Management District

SO_x - oxides of sulfur

VOC - volatile organic compounds

Table 3. Summary of GHG Emissions

Tustin Ranch Costco Gasoline Station
Orange County, California

Emissions Category ¹	GHG Emissions ^{2,3}
	(MT CO ₂ e/yr)
Area Sources	0
Energy Usage	10
Mobile	2,038
Water	2
Waste Disposed	4
Operational Sub-Total	2,053
Construction Amortized ⁴	8
Total⁵	2,061
SCAQMD Significance Threshold⁶	3,000
Exceeds Threshold?	NO

Notes:

¹ One-time emissions (i.e., construction) and operational emissions were calculated using CalEEMod[®].

² Emissions are presented as CO₂e, which include CO₂, CH₄, and N₂O emissions, weighted by their respective global warming potentials.

³ Emissions shown as zero may be non-zero values, however, they are below a meaningful reporting level for this analysis.

⁴ One-time emissions from construction were amortized over a 30-year period.

⁵ Sum of annualized one-time emissions and operational emissions.

⁶ Draft Threshold for commercial projects obtained from Minutes for the GHG CEQA Significance Threshold Stakeholder Working Group #15. Available at: <http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-%28ghg%29-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-15/ghg-meeting-15-minutes.pdf%29>. Accessed: June 2019

Abbreviations:

CalEEMod - CALifornia Emissions Estimator MODel

CH₄ - methane

CO₂ - carbon dioxide

CO₂e - carbon dioxide equivalents

GHG - greenhouse gases

MT - metric tons

N₂O - nitrous oxide

yr - year

MEMORANDUM

To: Diana Salazar, Costco Wholesale

From: Joseph Hower and Yi Tian, Ramboll US Corporation

Subject: **Air Quality and Greenhouse Gas Emissions for the Construction and Operation of the Gasoline Dispensing Facility at Costco Tustin Ranch Orange County, California**

INTRODUCTION

Costco currently operates a warehouse store at 2655 El Camino Real, Tustin California. Costco is proposing a gasoline dispensing facility ("GDF" or "fuel station") with 16 dispensers (i.e., 32 fueling positions) on the southeastern portion of the warehouse parking lot and relocate parking to the current location of the neighboring Goodyear service facility, which will be demolished. This memorandum provides an air quality and greenhouse gas emissions assessment of the proposed Costco GDF (the "Project") in compliance with the requirements of the California Environmental Quality Act (CEQA). Specifically, emissions of criteria air pollutants (CAP) and greenhouse gases (GHG) associated with construction and operation of the Project were estimated in order to evaluate if the Project would cause significant air quality impact. We conclude that the proposed Project would not cause a significant air quality or greenhouse gas impact.

A brief description of the methodology and results of the analyses are provided in the following sub-sections.

METHODOLOGY

Ramboll developed CAP and GHG emission inventories for the construction and operation of the proposed Project. Sources of Project-related construction emissions include off-road equipment, fugitive dust, off-gassing from paving, architectural coatings, and on-road mobile sources. The Project also generates emissions during operation from minor operation and maintenance (i.e., area sources, such as architectural coatings, consumer products, and landscaping), energy sources (natural gas and electricity), mobile sources (passenger vehicles and fuel delivery trucks), and gasoline transfer and dispensing.

Date October 3, 2019

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Construction Emissions

Ramboll utilized the California Emission Estimator Model version 2016.3.2 (CalEEMod®)¹ to quantify the CAP and GHG emissions associated with construction and operation of the Project. CalEEMod® is a state-wide program designed to calculate both criteria and greenhouse gas (GHG) emissions from development projects in California. CalEEMod® is based on California Air Resources Board (CARB) approved Off-Road and On-Road Mobile-Source Emission Factor models (OFFROAD² and EMFAC³, respectively), and is designed to estimate construction and operational emissions for land use development projects and allows for the input of project specific information. OFFROAD2011 is an emissions factor model used in CalEEMod® to calculate emission rates from off-road mobile sources (e.g., construction equipment, agricultural equipment). EMFAC2014 is the emissions factor model used in CalEEMod® to calculate emissions rates from on-road vehicles (e.g., passenger vehicles, fuel delivery trucks).

The following Project-specific assumptions were used as inputs to the CalEEMod® model runs:

- Construction Start Date: October 1, 2019 (which is a conservative assumption as air emissions are expected to be lower with a later start date);
- Project Build-out Year: 2020;
- Fuel Station Land-Use Size: 32 dispensing stations/0.92 acres (based on Site Plan included in the April 2019 Traffic Study⁴);
- Area of Parking Lot and Demolition Site: 9,136 square feet (size of the Goodyear Tire Facility);
- Material Export: 3,000 cubic yards during the Grading Phase; and
- Fugitive Dust Mitigation during Construction: 25% reduction (for watering at least one time daily to comply with SCAQMD Rule 403⁵).

All other inputs to the model were based on CalEEMod® defaults. A copy of the model output files is presented in Appendix A. Note, volatile organic compound (VOC) off-gassing emissions from paving of the fuel station were calculated externally using the CalEEMod® default emission factor of 2.62 lb VOC/acre, as CalEEMod® estimates these emissions only for parking lot land-uses.

¹ CAPCOA. 2017. California Emissions Estimator Model, Version 2016.3.2. Available at: <http://www.caleemod.com/>. Accessed: October 2019.

² CARB. 2019. MSEI – Off-Road Documentation, Available at: <https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-road-documentation-0>. Accessed: October 2019.

³ CARB. 2019. MSEI – Modeling Tools – EMFAC Software and Technical Support Documentation. Available at: <https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-modeling-tools-emfac>. Accessed: October 2019.

⁴ Kittelson & Associates. 2019. Final – Traffic Analysis. April 17.

⁵ SCAQMD. 2005. Rule 403 – Fugitive Dust. June. Available at: <https://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-403.pdf?sfvrsn=4>. Accessed: October 2019.

Operational Mobile Source Emissions

Mobile sources associated with the Project include passenger car travel, evaporative losses, starting, and idling⁶, as well as fuel delivery truck travel, starting, and idling. The United States Environmental Protection Agency (USEPA) recently approved EMFAC2017; hence it supersedes EMFAC2014. In order to allow for a more accurate representation of mobile source operational emissions associated with the Project, operational mobile source emission factors were estimated using EMFAC2017. These emissions factors were then used to estimate mobile source operational emissions based on CalEEMod[®] methodology and defaults along with Project-specific values where available.

The following assumptions were used to calculate emissions from Project-related mobile source emissions:

- EMFAC2017 Default Activity Inputs:
 - Run Mode: Emissions;
 - Run Type: Default Activity;
 - Area: Orange County (South Coast);
 - Calendar Year: 2020;
 - Season: Annual;
 - Aggregation Level: Day;
 - Vehicle Class: EMFAC2007 Vehicle Classes, LDA, LDT1, LDT2, MDV, HHDT;
 - Model Year: Aggregated;
 - Speed: Aggregated; and
 - Output Natural Gas Heavy Duty Vehicles: Yes; and
 - Output: All pollutants, activities, and output by process.
- EMFAC2017 Project-Level Inputs:
 - Run Mode: Emission Rates;
 - Run Type: Project-Level Assessment;
 - Area: Orange County (South Coast);
 - Calendar Year: 2020;
 - Season: Annual;
 - Vehicle Class: EMFAC2007 Vehicle Classes, LDA, LDT1, LDT2, MDV, HHDT;
 - Model Year: Aggregated;
 - Fuel: By fuel;

⁶ EMFAC2017 does not output idling emissions for light-duty autos, light-duty trucks, or medium duty vehicles. The idling emission rate for these vehicle categories was estimated as the running exhaust emission rate at 5 mph (grams per mile) multiplied by the speed correction factor.

- Speed: 5 mph;
- Meteorology: 64°F, 47% relative humidity; and
- Output: All pollutants.
- Passenger cars:
 - Vehicle class assumed to be light-duty autos, light-duty trucks, or medium duty vehicles;
 - Trip rates provided by Kittelson & Associates;
 - Trip distances based on CalEEMod® defaults for Orange County; and
 - Idle duration of 12 minutes, based on an average transaction time of four minutes and a maximum queue of five vehicles per line.
- Fuel delivery trucks:
 - Vehicle class assumed to be heavy-heavy duty trucks;
 - Trip rate (eight fuel delivery trucks per day) provided by Costco;
 - Trip distance based on CalEEMod® default for commercial-non-work trips in Orange County; and
 - Idle duration of five minutes based on CARB Air Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling.⁷

Details of the EMFAC2017 model runs and mobile source emission calculations are presented in Appendix B.

Operational Gasoline Transfer and Dispensing

Emissions from gasoline transfer and dispensing mainly occur during loading, breathing, refueling, spillage, and from hose permeation. Emission factors were obtained from Table X-1 of SCAQMD Risk Assessment Procedures for Rules 1401, 1401.1, and 212, replicated below.⁸ Emissions were calculated based on an annual throughput of 24.6 million gallons per year.

Table X-1. Gasoline Emission Factors for Retail Service Stations Process				
Controlled Gasoline Emission Factor (lbs VOC/1,000 gal)				
Loading	Breathing	Refueling	Hose Permeation	Spillage
0.15	0.024	0.32	0.009	0.24

⁷ CARB. 2016. Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. Available at: <https://ww3.arb.ca.gov/msprog/truck-idling/truck-idling.htm>. Accessed: October 2019.

⁸ SCAQMD. 2017. Risk Assessment Procedures for Rules 1401, 1401.1, and 212. Version 8.1. September. Available at: <http://www.aqmd.gov/docs/default-source/permitting/rule-1401-risk-assessment/riskassessproc-v8-1.pdf?sfvrsn=12>. Accessed: October 2019.

RESULTS

Criteria Air Pollutant Emissions

Mass Daily Emissions

Table 1 presents the maximum daily CAP emission estimates from Project construction for calendar years 2019 and 2020. As shown in this table, the construction emissions for the proposed Project are less than the SCAQMD mass daily significance thresholds⁹ for all pollutants.

Table 2 presents the maximum daily CAP emission estimates from Project operation. As shown in the table, the operational emissions for the Project are less than the SCAQMD mass daily significance thresholds for all pollutants.

Localized Ambient Air Quality

Ramboll evaluated the localized ambient air quality impacts from on-site construction and operational activities for carbon monoxide (CO), nitrogen dioxide (NO₂), particulate matter less than 10 microns (PM₁₀), and particulate matter less than 2.5 micron (PM_{2.5}) using SCAQMD's localized significance thresholds (LSTs) methodology¹⁰. As shown in Table 3, Project related emissions would not result in an exceedance of SCAQMD's LSTs. Hence, the proposed construction and operational activities do not result in a significant impact for air quality.

Greenhouse Gas Emissions

Table 4 presents the annual average GHG emissions associated with Project construction and operation. One-time emissions from construction were annualized over a 30-year period¹¹ and summed with operational emissions for comparison to the SCAQMD draft Tier 3 screening threshold for commercial projects of 3,000 metric tons carbon dioxide per year.¹¹ As shown in Table 4, the Project related GHG emissions are estimated to be 2,806 MT CO₂e/year, which is below the draft screening threshold. Hence, the Project would not cause a significant GHG impact.

CONCLUSION

As described in the results section, the proposed Project would not cause a significant air quality or greenhouse gas impact.

⁹ SCAQMD. 2019. South Coast AQMD Air Quality Significance Thresholds. April. Available at: <http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf>. Accessed: October 2019.

¹⁰ SCAQMD. 2008. Final Localized Significance Threshold Methodology. July. Available at: <http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf?sfvrsn=2>. Accessed: October 2019.

¹¹ SCAQMD. 2008. Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans. December. Available at: [http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-\(ghg\)-ceqa-significance-thresholds/ghgboardsynopsis.pdf?sfvrsn=2](http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgboardsynopsis.pdf?sfvrsn=2). Accessed: October 2019.

TABLES

Table 1. Maximum Daily Criteria Air Pollutant Emission Estimates for Project Construction
 Tustin Ranch Costco Fuel Station
 Orange County, California

Year ¹	Maximum Daily Criteria Air Pollutant Emission Estimates ¹					
	VOC ²	NO _x	CO	SO _x ³	PM ₁₀	PM _{2.5}
	(lb/day)					
2019	2.4	44.2	15.5	0.09	6.3	3.2
2020	4.7	15.0	13.4	0.02	0.9	0.8
Maximum Emissions	4.7	44.2	15.5	0.09	6.3	3.2
SCAQMD Mass Daily Significance Thresholds⁴	75	100	550	150	150	55
Exceeds Threshold for any Year of Construction?	NO	NO	NO	NO	NO	NO

Notes:

¹ Total emissions for project construction were estimated using CalEEMod[®] (see Appendix A). Total construction emissions include construction of the fuel station and parking lot, and demolition of the existing Goodyear Tire Facility. PM fugitive dust emissions include a 25% reduction (for watering at least one time daily to comply with SCAQMD Rule 403).

² For purposes of this analysis VOC emissions are assumed to be equal to ROG.

³ For purposes of this analysis SO_x emissions are assumed to be equal to SO₂.

⁴ SCAQMD Air Quality Significance Thresholds. Available at <http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2>. Accessed: August 2019.

Abbreviations:

CalEEMod[®] - CALifornia Emissions Estimator MODEl

CO - carbon monoxide

lbs - pounds

NO_x - nitrogen oxide compounds (NO + NO₂)

PM_{2.5} - particulate matter less than 2.5 microns in diameter

PM₁₀ - particulate matter less than 10 microns in diameter

ROG - reactive organic gases

SCAQMD - South Coast Air Quality Management District

SO₂ - sulfur dioxide

SO_x - sulfur oxide compounds

VOC - volatile organic compounds

Table 2. Maximum Daily Criteria Air Pollutant Emission Estimates for Project Operation

Tustin Ranch Costco Fuel Station
Orange County, California

Emission Category	Maximum Daily Criteria Air Pollutant Emission Estimates ¹					
	VOC ²	NO _x	CO	SO _x ³	PM ₁₀	PM _{2.5}
	(lb/day)					
Area ⁴	0.105	0.000	0.004	0.000	0.000	0.000
Energy ⁴	0.003	0.025	0.021	0.000	0.002	0.002
Mobile ⁵	4.8	5.3	50.4	0.2	14.0	3.8
Gasoline Dispensing Facility	50.1	--	--	--	--	--
Total Daily Emissions (lbs/day)	54.9	5.3	50.4	0.2	14.1	3.8
SCAQMD Mass Daily Significance Thresholds⁶	55	55	550	150	150	55
Exceeds Threshold?	NO	NO	NO	NO	NO	NO

Notes:

¹ Emissions totals may not add up due to rounding. Emissions shown as zero may be non-zero values, however, they are below a meaningful reporting level for this analysis.

² For purposes of this analysis VOC emissions are assumed to be equal to ROG.

³ For purposes of this analysis SO_x emissions are assumed to be equal to SO₂.

⁴ Total area and energy emissions were estimated using CalEEMod[®] (see Appendix A).

⁵ Total mobile emissions were estimated using CalEEMod[®] default trip lengths, EMFAC2017 emission factors, and Project-specific vehicle trip rates provided by Kittelson & Associates. See Appendix B for details.

⁶ SCAQMD Air Quality Significance Thresholds. Available at <http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2>. Accessed: August 2019.

Abbreviations:

CalEEMod[®] - CALifornia Emissions Estimator MODEL

CO - carbon monoxide

lbs - pounds

NO_x - nitrogen oxide compounds (NO + NO₂)

PM_{2.5} - particulate matter less than 2.5 microns in diameter

PM₁₀ - particulate matter less than 10 microns in diameter

ROG - reactive organic gases

SCAQMD - South Coast Air Quality Management District

SO₂ - sulfur dioxide

SO_x - sulfur oxide compounds

VOC - volatile organic compounds

Table 3. Comparison of On-site Project Emissions to SCAQMD Localized Significance Thresholds
 Tustin Ranch Costco Fuel Station
 Orange County, California

Location	Maximum Daily On-site Emissions ¹ (lb/day)						
	CO	NO _x	1-hour NO _x ²	PM ₁₀ Construction	PM ₁₀ Operation	PM _{2.5} Construction	PM _{2.5} Operation
Project Emissions	14.9	22.7	22.7	5.2	1.6	3.0	0.5
SCAQMD LSTs ³	624.4	82.0	45.6	8.2	2.0	3.5	1.0
Exceeds SCAQMD LSTs?	NO	NO	NO	NO	NO	NO	NO

Notes:

¹ Emissions for CO and NO_x are the maximum of on-site operation and on-site construction emissions. PM fugitive dust emissions during construction include a 25% reduction (for watering at least one time daily to comply with SCAQMD Rule 403).

² An approximated LST was estimated to evaluate the federal 1-hour NO₂ standard, as the SCAQMD LST has not been updated to reflect this standard. This value was estimated by scaling the SCAQMD LST that represents the state 1-hr NO₂ standard with the ratio of the federal to state 1-hr NO₂ standard (0.10 ppm/0.18 ppm).

³ LSTs based on the a receptor located at 38 meters from a 1-acre project site SRA 17 (Central Orange County). Distance was measured using Google Earth. LSTs were obtained from the 2008 SCAQMD Final Localized Significance Threshold Methodology, Appendix C, Mass Rate LST Look-up Tables. Available at: <http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds>. Accessed: August 2019.

Abbreviations:

- CO - carbon monoxide
- lb - pounds
- LST - localized significance threshold
- NO₂ - nitrogen dioxide
- NO_x - nitrogen oxides
- PM₁₀ - particulate matter less than 10 microns in aerodynamic diameter
- PM_{2.5} - particulate matter less than 2.5 microns in aerodynamic diameter
- ppm - parts per million
- SCAQMD - South Coast Air Quality Management District

Table 4. Summary of GHG Emissions

Tustin Ranch Costco Fuel Station
Orange County, California

Emissions Category ¹	GHG Emissions ^{2,3}
	(MT CO ₂ e/yr)
Area Sources	0.001
Energy Usage	18
Mobile ⁴	2,768
Water	3.3
Waste Disposed	8.7
Operational Sub-Total	2,798
Construction Amortized ⁵	8
Total⁶	2,806
SCAQMD Draft Screening Threshold⁷	3,000
Exceeds Threshold?	NO

Notes:

¹ One-time emissions (i.e., construction) and operational emissions were calculated using CalEEMod[®]. See Appendix A for details

² Emissions are presented as CO₂e, which include CO₂, CH₄, and N₂O emissions, weighted by their respective global warming potentials.

³ Emissions shown as zero may be non-zero values, however, they are below a meaningful reporting level for this analysis.

⁴ Total mobile emissions were estimated using CalEEMod[®] default trip lengths, EMFAC2017 emission factors, and Project-specific vehicle trip rates provided by Kittelson & Associates. See Appendix B for details.

⁵ One-time emissions from construction were amortized over a 30-year period.

⁶ Sum of annualized one-time emissions and operational emissions.

⁷ Draft screening threshold for commercial projects obtained from SCAQMD Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans. Available at: [http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-\(ghg\)-ceqa-significance-thresholds/ghgboardsynopsis.pdf?sfvrsn=2](http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgboardsynopsis.pdf?sfvrsn=2). Accessed: August 2019.

Abbreviations:

CalEEMod[®] - CALifornia Emissions Estimator MODel
CH₄ - methane
CO₂ - carbon dioxide
CO₂e - carbon dioxide equivalent

GHG - greenhouse gases
MT - metric tons
N₂O - nitrous oxide
yr - year

APPENDIX A
CALEEMOD® OUTPUT FILES

List of CalEEMod Runs

- Appendix A.1: Costco Tustin Ranch – Orange County, Summer
- Appendix A.2: Costco Tustin Ranch – Orange County, Winter
- Appendix A.3: Costco Tustin Ranch – Orange County, Annual

**APPENDIX A.1
COSTCO TUSTIN RANCH –
ORANGE COUNTY, SUMMER**

Costco Tustin Ranch - Orange County, Summer

Costco Tustin Ranch
Orange County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	9.14	1000sqft	0.21	9,136.00	0
Gasoline/Service Station	32.00	Pump	0.92	4,517.60	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	30
Climate Zone	8			Operational Year	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	CH4 Intensity (lb/MWhr)	0.029	N2O Intensity (lb/MWhr)	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Site plan

Grading -

Demolition -

Vehicle Trips - Mobile emissions calculated externally

Construction Off-road Equipment Mitigation - Project will include pre-watering and stabilization activities per Rule 403

Costco Tustin Ranch - Orange County, Summer

Table Name	Column Name	Default Value	New Value
tblGrading	MaterialExported	0.00	3,000.00
tblLandUse	LotAcreage	0.10	0.92
tblVehicleTrips	ST_TR	168.56	0.00
tblVehicleTrips	SU_TR	168.56	0.00
tblVehicleTrips	WD_TR	168.56	0.00

2.0 Emissions Summary

Costco Tustin Ranch - Orange County, Summer

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	lb/day										lb/day					
Area	0.1053	4.0000e-005	4.2300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.0000e-003	9.0000e-003	2.0000e-005		9.6100e-003
Energy	2.7900e-003	0.0254	0.0213	1.5000e-004		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003		30.4328	30.4328	5.8000e-004	5.6000e-004	30.6137
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
Total	0.1080	0.0254	0.0255	1.5000e-004	0.0000	1.9500e-003	1.9500e-003	0.0000	1.9500e-003	1.9500e-003		30.4418	30.4418	6.0000e-004	5.6000e-004	30.6233

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	lb/day										lb/day					
Area	0.1053	4.0000e-005	4.2300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.0000e-003	9.0000e-003	2.0000e-005		9.6100e-003
Energy	2.7900e-003	0.0254	0.0213	1.5000e-004		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003		30.4328	30.4328	5.8000e-004	5.6000e-004	30.6137
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
Total	0.1080	0.0254	0.0255	1.5000e-004	0.0000	1.9500e-003	1.9500e-003	0.0000	1.9500e-003	1.9500e-003		30.4418	30.4418	6.0000e-004	5.6000e-004	30.6233

Costco Tustin Ranch - Orange County, Summer

	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

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	10/1/2019	10/28/2019	5	20	
2	Site Preparation	Site Preparation	10/29/2019	10/30/2019	5	2	
3	Grading	Grading	10/31/2019	11/5/2019	5	4	
4	Building Construction	Building Construction	11/6/2019	8/11/2020	5	200	
5	Paving	Paving	8/12/2020	8/25/2020	5	10	
6	Architectural Coating	Architectural Coating	8/26/2020	9/8/2020	5	10	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1.5

Acres of Paving: 0.21

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 6,776; Non-Residential Outdoor: 2,259; Striped Parking Area: 548 (Architectural Coating – sqft)

OffRoad Equipment

Costco Tustin Ranch - Orange County, Summer

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Cranes	1	6.00	231	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Site Preparation	Graders	1	8.00	187	0.41
Paving	Pavers	1	6.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	187	0.41
Paving	Paving Equipment	1	8.00	132	0.36
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Building Construction	Welders	3	8.00	46	0.45

Trips and VMT

Costco Tustin Ranch - Orange County, Summer

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	42.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	375.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	5.00	2.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2019

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	lb/day										lb/day					
Fugitive Dust					0.4497	0.0000	0.4497	0.0681	0.0000	0.0681			0.0000			0.0000
Off-Road	2.2950	22.6751	14.8943	0.0241		1.2863	1.2863		1.2017	1.2017		2,360.7198	2,360.7198	0.6011		2,375.7475
Total	2.2950	22.6751	14.8943	0.0241	0.4497	1.2863	1.7359	0.0681	1.2017	1.2698		2,360.7198	2,360.7198	0.6011		2,375.7475

Costco Tustin Ranch - Orange County, Summer

3.2 Demolition - 2019

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	lb/day										lb/day					
Hauling	0.0175	0.6225	0.1492	1.6300e-003	0.0366	2.3900e-003	0.0390	0.0100	2.2900e-003	0.0123		181.1403	181.1403	0.0189		181.6130
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
Worker	0.0536	0.0351	0.4638	1.4700e-003	0.1453	9.7000e-004	0.1463	0.0385	8.9000e-004	0.0394		146.3982	146.3982	3.6000e-003		146.4882
Total	0.0710	0.6576	0.6130	3.1000e-003	0.1819	3.3600e-003	0.1852	0.0486	3.1800e-003	0.0517		327.5385	327.5385	0.0225		328.1012

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	lb/day										lb/day					
Fugitive Dust					0.3372	0.0000	0.3372	0.0511	0.0000	0.0511			0.0000			0.0000
Off-Road	2.2950	22.6751	14.8943	0.0241		1.2863	1.2863		1.2017	1.2017	0.0000	2,360.7197	2,360.7197	0.6011		2,375.7475
Total	2.2950	22.6751	14.8943	0.0241	0.3372	1.2863	1.6235	0.0511	1.2017	1.2528	0.0000	2,360.7197	2,360.7197	0.6011		2,375.7475

Costco Tustin Ranch - Orange County, Summer

3.2 Demolition - 2019

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	lb/day										lb/day					
Hauling	0.0175	0.6225	0.1492	1.6300e-003	0.0366	2.3900e-003	0.0390	0.0100	2.2900e-003	0.0123		181.1403	181.1403	0.0189		181.6130
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
Worker	0.0536	0.0351	0.4638	1.4700e-003	0.1453	9.7000e-004	0.1463	0.0385	8.9000e-004	0.0394		146.3982	146.3982	3.6000e-003		146.4882
Total	0.0710	0.6576	0.6130	3.1000e-003	0.1819	3.3600e-003	0.1852	0.0486	3.1800e-003	0.0517		327.5385	327.5385	0.0225		328.1012

3.3 Site Preparation - 2019

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	lb/day										lb/day					
Fugitive Dust					5.7996	0.0000	5.7996	2.9537	0.0000	2.9537			0.0000			0.0000
Off-Road	1.7123	19.4821	7.8893	0.0172		0.8824	0.8824		0.8118	0.8118		1,704.9189	1,704.9189	0.5394		1,718.4044
Total	1.7123	19.4821	7.8893	0.0172	5.7996	0.8824	6.6819	2.9537	0.8118	3.7655		1,704.9189	1,704.9189	0.5394		1,718.4044

Costco Tustin Ranch - Orange County, Summer

3.3 Site Preparation - 2019

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	lb/day										lb/day					
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
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
Worker	0.0330	0.0216	0.2854	9.0000e-004	0.0894	6.0000e-004	0.0900	0.0237	5.5000e-004	0.0243		90.0912	90.0912	2.2100e-003		90.1466
Total	0.0330	0.0216	0.2854	9.0000e-004	0.0894	6.0000e-004	0.0900	0.0237	5.5000e-004	0.0243		90.0912	90.0912	2.2100e-003		90.1466

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	lb/day										lb/day					
Fugitive Dust					4.3497	0.0000	4.3497	2.2153	0.0000	2.2153			0.0000			0.0000
Off-Road	1.7123	19.4821	7.8893	0.0172		0.8824	0.8824		0.8118	0.8118	0.0000	1,704.9189	1,704.9189	0.5394		1,718.4044
Total	1.7123	19.4821	7.8893	0.0172	4.3497	0.8824	5.2320	2.2153	0.8118	3.0270	0.0000	1,704.9189	1,704.9189	0.5394		1,718.4044

Costco Tustin Ranch - Orange County, Summer

3.3 Site Preparation - 2019

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	lb/day										lb/day					
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
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
Worker	0.0330	0.0216	0.2854	9.0000e-004	0.0894	6.0000e-004	0.0900	0.0237	5.5000e-004	0.0243		90.0912	90.0912	2.2100e-003		90.1466
Total	0.0330	0.0216	0.2854	9.0000e-004	0.0894	6.0000e-004	0.0900	0.0237	5.5000e-004	0.0243		90.0912	90.0912	2.2100e-003		90.1466

3.4 Grading - 2019

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	lb/day										lb/day					
Fugitive Dust					4.9991	0.0000	4.9991	2.5385	0.0000	2.5385			0.0000			0.0000
Off-Road	1.4197	16.0357	6.6065	0.0141		0.7365	0.7365		0.6775	0.6775		1,396.390g	1,396.390g	0.4418		1,407.435g
Total	1.4197	16.0357	6.6065	0.0141	4.9991	0.7365	5.7355	2.5385	0.6775	3.2160		1,396.390g	1,396.390g	0.4418		1,407.435g

Costco Tustin Ranch - Orange County, Summer

3.4 Grading - 2019

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	lb/day										lb/day					
Hauling	0.7793	27.7889	6.6620	0.0727	1.6325	0.1067	1.7392	0.4469	0.1021	0.5490		8,086.6184	8,086.6184	0.8442		8,107.7231
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
Worker	0.0330	0.0216	0.2854	9.0000e-004	0.0894	6.0000e-004	0.0900	0.0237	5.5000e-004	0.0243		90.0912	90.0912	2.2100e-003		90.1466
Total	0.8123	27.8105	6.9473	0.0736	1.7219	0.1073	1.8292	0.4706	0.1026	0.5733		8,176.7096	8,176.7096	0.8464		8,197.8697

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	lb/day										lb/day					
Fugitive Dust					3.7493	0.0000	3.7493	1.9038	0.0000	1.9038			0.0000			0.0000
Off-Road	1.4197	16.0357	6.6065	0.0141		0.7365	0.7365		0.6775	0.6775	0.0000	1,396.3909	1,396.3909	0.4418		1,407.4359
Total	1.4197	16.0357	6.6065	0.0141	3.7493	0.7365	4.4858	1.9038	0.6775	2.5814	0.0000	1,396.3909	1,396.3909	0.4418		1,407.4359

Costco Tustin Ranch - Orange County, Summer

3.4 Grading - 2019

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	lb/day										lb/day					
Hauling	0.7793	27.7889	6.6620	0.0727	1.6325	0.1067	1.7392	0.4469	0.1021	0.5490		8,086.6184	8,086.6184	0.8442		8,107.7231
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
Worker	0.0330	0.0216	0.2854	9.0000e-004	0.0894	6.0000e-004	0.0900	0.0237	5.5000e-004	0.0243		90.0912	90.0912	2.2100e-003		90.1466
Total	0.8123	27.8106	6.9473	0.0736	1.7219	0.1073	1.8292	0.4706	0.1026	0.5733		8,176.7096	8,176.7096	0.8464		8,197.8697

3.5 Building Construction - 2019

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	lb/day										lb/day					
Off-Road	2.2721	15.9802	13.4870	0.0220		0.9158	0.9158		0.8846	0.8846		2,018.0224	2,018.0224	0.3879		2,027.7210
Total	2.2721	15.9802	13.4870	0.0220		0.9158	0.9158		0.8846	0.8846		2,018.0224	2,018.0224	0.3879		2,027.7210

Costco Tustin Ranch - Orange County, Summer

3.5 Building Construction - 2019

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	lb/day										lb/day					
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
Vendor	7.5000e-003	0.2270	0.0600	5.0000e-004	0.0128	1.5300e-003	0.0143	3.6800e-003	1.4700e-003	5.1400e-003		54.5938	54.5938	4.6100e-003		54.7090
Worker	0.0206	0.0135	0.1784	5.6000e-004	0.0559	3.7000e-004	0.0563	0.0148	3.4000e-004	0.0152		56.3070	56.3070	1.3800e-003		56.3416
Total	0.0281	0.2405	0.2384	1.0600e-003	0.0687	1.9000e-003	0.0706	0.0185	1.8100e-003	0.0203		110.9008	110.9008	5.9900e-003		111.0506

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	lb/day										lb/day					
Off-Road	2.2721	15.9802	13.4870	0.0220		0.9158	0.9158		0.8846	0.8846	0.0000	2,018.0224	2,018.0224	0.3879		2,027.7210
Total	2.2721	15.9802	13.4870	0.0220		0.9158	0.9158		0.8846	0.8846	0.0000	2,018.0224	2,018.0224	0.3879		2,027.7210

Costco Tustin Ranch - Orange County, Summer

3.5 Building Construction - 2019

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	lb/day										lb/day					
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
Vendor	7.5000e-003	0.2270	0.0600	5.0000e-004	0.0128	1.5300e-003	0.0143	3.6800e-003	1.4700e-003	5.1400e-003		54.5938	54.5938	4.6100e-003		54.7090
Worker	0.0206	0.0135	0.1784	5.6000e-004	0.0559	3.7000e-004	0.0563	0.0148	3.4000e-004	0.0152		56.3070	56.3070	1.3800e-003		56.3416
Total	0.0281	0.2405	0.2384	1.0600e-003	0.0687	1.9000e-003	0.0706	0.0185	1.8100e-003	0.0203		110.9008	110.9008	5.9900e-003		111.0506

3.5 Building Construction - 2020

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	lb/day										lb/day					
Off-Road	2.0305	14.7882	13.1881	0.0220		0.7960	0.7960		0.7688	0.7688		2,001.1595	2,001.1595	0.3715		2,010.4467
Total	2.0305	14.7882	13.1881	0.0220		0.7960	0.7960		0.7688	0.7688		2,001.1595	2,001.1595	0.3715		2,010.4467

Costco Tustin Ranch - Orange County, Summer

3.5 Building Construction - 2020

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	lb/day										lb/day					
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
Vendor	6.3900e-003	0.2084	0.0550	5.0000e-004	0.0128	1.0900e-003	0.0139	3.6800e-003	1.0400e-003	4.7200e-003		54.2258	54.2258	4.3900e-003		54.3354
Worker	0.0192	0.0121	0.1637	5.5000e-004	0.0559	3.7000e-004	0.0563	0.0148	3.4000e-004	0.0152		54.5022	54.5022	1.2400e-003		54.5332
Total	0.0256	0.2205	0.2187	1.0500e-003	0.0687	1.4600e-003	0.0701	0.0185	1.3800e-003	0.0199		108.7280	108.7280	5.6300e-003		108.8687

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	lb/day										lb/day					
Off-Road	2.0305	14.7882	13.1881	0.0220		0.7960	0.7960		0.7688	0.7688	0.0000	2,001.1595	2,001.1595	0.3715		2,010.4467
Total	2.0305	14.7882	13.1881	0.0220		0.7960	0.7960		0.7688	0.7688	0.0000	2,001.1595	2,001.1595	0.3715		2,010.4467

Costco Tustin Ranch - Orange County, Summer

3.5 Building Construction - 2020

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	lb/day										lb/day					
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
Vendor	6.3900e-003	0.2084	0.0550	5.0000e-004	0.0128	1.0900e-003	0.0139	3.6800e-003	1.0400e-003	4.7200e-003		54.2258	54.2258	4.3900e-003		54.3354
Worker	0.0192	0.0121	0.1637	5.5000e-004	0.0559	3.7000e-004	0.0563	0.0148	3.4000e-004	0.0152		54.5022	54.5022	1.2400e-003		54.5332
Total	0.0256	0.2205	0.2187	1.0500e-003	0.0687	1.4600e-003	0.0701	0.0185	1.3800e-003	0.0199		108.7280	108.7280	5.6300e-003		108.8687

3.6 Paving - 2020

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	lb/day										lb/day					
Off-Road	0.8402	8.4514	8.8758	0.0135		0.4695	0.4695		0.4328	0.4328		1,296.9461	1,296.9461	0.4111		1,307.2246
Paving	0.0550					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	0.8952	8.4514	8.8758	0.0135		0.4695	0.4695		0.4328	0.4328		1,296.9461	1,296.9461	0.4111		1,307.2246

Costco Tustin Ranch - Orange County, Summer

3.6 Paving - 2020

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	lb/day										lb/day					
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
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
Worker	0.0500	0.0315	0.4255	1.4200e-003	0.1453	9.6000e-004	0.1463	0.0385	8.8000e-004	0.0394		141.7057	141.7057	3.2300e-003		141.7864
Total	0.0500	0.0315	0.4255	1.4200e-003	0.1453	9.6000e-004	0.1463	0.0385	8.8000e-004	0.0394		141.7057	141.7057	3.2300e-003		141.7864

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	lb/day										lb/day					
Off-Road	0.8402	8.4514	8.8758	0.0135		0.4695	0.4695		0.4328	0.4328	0.0000	1,296.9461	1,296.9461	0.4111		1,307.2246
Paving	0.0550					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	0.8952	8.4514	8.8758	0.0135		0.4695	0.4695		0.4328	0.4328	0.0000	1,296.9461	1,296.9461	0.4111		1,307.2246

Costco Tustin Ranch - Orange County, Summer

3.6 Paving - 2020

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	lb/day										lb/day					
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
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
Worker	0.0500	0.0315	0.4255	1.4200e-003	0.1453	9.6000e-004	0.1463	0.0385	8.8000e-004	0.0394		141.7057	141.7057	3.2300e-003		141.7864
Total	0.0500	0.0315	0.4255	1.4200e-003	0.1453	9.6000e-004	0.1463	0.0385	8.8000e-004	0.0394		141.7057	141.7057	3.2300e-003		141.7864

3.7 Architectural Coating - 2020

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	lb/day										lb/day					
Archit. Coating	4.4417					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	4.6839	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928

Costco Tustin Ranch - Orange County, Summer

3.7 Architectural Coating - 2020

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	lb/day										lb/day					
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
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
Worker	3.8400e-003	2.4200e-003	0.0327	1.1000e-004	0.0112	7.0000e-005	0.0113	2.9600e-003	7.0000e-005	3.0300e-003		10.9004	10.9004	2.5000e-004		10.9067
Total	3.8400e-003	2.4200e-003	0.0327	1.1000e-004	0.0112	7.0000e-005	0.0113	2.9600e-003	7.0000e-005	3.0300e-003		10.9004	10.9004	2.5000e-004		10.9067

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	lb/day										lb/day					
Archit. Coating	4.4417					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928
Total	4.6839	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928

Costco Tustin Ranch - Orange County, Summer

3.7 Architectural Coating - 2020

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	lb/day										lb/day					
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
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
Worker	3.8400e-003	2.4200e-003	0.0327	1.1000e-004	0.0112	7.0000e-005	0.0113	2.9600e-003	7.0000e-005	3.0300e-003		10.9004	10.9004	2.5000e-004		10.9067
Total	3.8400e-003	2.4200e-003	0.0327	1.1000e-004	0.0112	7.0000e-005	0.0113	2.9600e-003	7.0000e-005	3.0300e-003		10.9004	10.9004	2.5000e-004		10.9067

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Costco Tustin Ranch - Orange County, Summer

	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	lb/day										lb/day					
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
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

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Gasoline/Service Station	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

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
Gasoline/Service Station	16.60	8.40	6.90	2.00	79.00	19.00	14	27	59
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Gasoline/Service Station	0.555968	0.043848	0.210359	0.116378	0.016765	0.005795	0.025008	0.016160	0.001677	0.001586	0.004867	0.000586	0.001002
Parking Lot	0.555968	0.043848	0.210359	0.116378	0.016765	0.005795	0.025008	0.016160	0.001677	0.001586	0.004867	0.000586	0.001002

Costco Tustin Ranch - Orange County, Summer

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e	
Category	lb/day										lb/day						
NaturalGas Mitigated	2.7900e-003	0.0254	0.0213	1.5000e-004		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003			30.4328	30.4328	5.8000e-004	5.6000e-004	30.6137
NaturalGas Unmitigated	2.7900e-003	0.0254	0.0213	1.5000e-004		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003			30.4328	30.4328	5.8000e-004	5.6000e-004	30.6137

Costco Tustin Ranch - Orange County, Summer

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Gasoline/Service Station	258.679	2.7900e-003	0.0254	0.0213	1.5000e-004		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003		30.4328	30.4328	5.8000e-004	5.6000e-004	30.6137
Parking Lot	0	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
Total		2.7900e-003	0.0254	0.0213	1.5000e-004		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003		30.4328	30.4328	5.8000e-004	5.6000e-004	30.6137

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Gasoline/Service Station	0.258679	2.7900e-003	0.0254	0.0213	1.5000e-004		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003		30.4328	30.4328	5.8000e-004	5.6000e-004	30.6137
Parking Lot	0	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
Total		2.7900e-003	0.0254	0.0213	1.5000e-004		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003		30.4328	30.4328	5.8000e-004	5.6000e-004	30.6137

6.0 Area Detail

6.1 Mitigation Measures Area

Costco Tustin Ranch - Orange County, Summer

	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	lb/day										lb/day					
Mitigated	0.1053	4.0000e-005	4.2300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.0000e-003	9.0000e-003	2.0000e-005		9.6100e-003
Unmitigated	0.1053	4.0000e-005	4.2300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.0000e-003	9.0000e-003	2.0000e-005		9.6100e-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	lb/day										lb/day					
Architectural Coating	0.0122					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0927					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.0000e-004	4.0000e-005	4.2300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.0000e-003	9.0000e-003	2.0000e-005		9.6100e-003
Total	0.1053	4.0000e-005	4.2300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.0000e-003	9.0000e-003	2.0000e-005		9.6100e-003

Costco Tustin Ranch - Orange County, Summer

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0122					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0927					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.0000e-004	4.0000e-005	4.2300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.0000e-003	9.0000e-003	2.0000e-005		9.6100e-003
Total	0.1053	4.0000e-005	4.2300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.0000e-003	9.0000e-003	2.0000e-005		9.6100e-003

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

Fire Pumps and Emergency Generators

Costco Tustin Ranch - Orange County, Summer

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

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

Equipment Type	Number
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11.0 Vegetation

**APPENDIX A.2
COSTCO TUSTIN RANCH –
ORANGE COUNTY, WINTER**

Costco Tustin Ranch - Orange County, Winter

**Costco Tustin Ranch
Orange County, Winter**

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	9.14	1000sqft	0.21	9,136.00	0
Gasoline/Service Station	32.00	Pump	0.92	4,517.60	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	30
Climate Zone	8			Operational Year	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MW hr)	702.44	CH4 Intensity (lb/MW hr)	0.029	N2O Intensity (lb/MW hr)	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Site plan

Grading -

Demolition -

Vehicle Trips - Mobile emissions calculated externally

Construction Off-road Equipment Mitigation - Project will include pre-watering and stabilization activities per Rule 403

Costco Tustin Ranch - Orange County, Winter

Table Name	Column Name	Default Value	New Value
tblGrading	MaterialExported	0.00	3,000.00
tblLandUse	LotAcreage	0.10	0.92
tblVehicleTrips	ST_TR	168.56	0.00
tblVehicleTrips	SU_TR	168.56	0.00
tblVehicleTrips	WD_TR	168.56	0.00

2.0 Emissions Summary

Costco Tustin Ranch - Orange County, Winter

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	lb/day										lb/day					
Area	0.1053	4.0000e-005	4.2300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.0000e-003	9.0000e-003	2.0000e-005		9.6100e-003
Energy	2.7900e-003	0.0254	0.0213	1.5000e-004		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003		30.4328	30.4328	5.8000e-004	5.6000e-004	30.6137
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
Total	0.1080	0.0254	0.0255	1.5000e-004	0.0000	1.9500e-003	1.9500e-003	0.0000	1.9500e-003	1.9500e-003		30.4418	30.4418	6.0000e-004	5.6000e-004	30.6233

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	lb/day										lb/day					
Area	0.1053	4.0000e-005	4.2300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.0000e-003	9.0000e-003	2.0000e-005		9.6100e-003
Energy	2.7900e-003	0.0254	0.0213	1.5000e-004		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003		30.4328	30.4328	5.8000e-004	5.6000e-004	30.6137
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
Total	0.1080	0.0254	0.0255	1.5000e-004	0.0000	1.9500e-003	1.9500e-003	0.0000	1.9500e-003	1.9500e-003		30.4418	30.4418	6.0000e-004	5.6000e-004	30.6233

Costco Tustin Ranch - Orange County, Winter

	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

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	10/1/2019	10/28/2019	5	20	
2	Site Preparation	Site Preparation	10/29/2019	10/30/2019	5	2	
3	Grading	Grading	10/31/2019	11/5/2019	5	4	
4	Building Construction	Building Construction	11/6/2019	8/11/2020	5	200	
5	Paving	Paving	8/12/2020	8/25/2020	5	10	
6	Architectural Coating	Architectural Coating	8/26/2020	9/8/2020	5	10	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1.5

Acres of Paving: 0.21

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 6,776; Non-Residential Outdoor: 2,259; Striped Parking Area: 548 (Architectural Coating – sqft)

OffRoad Equipment

Costco Tustin Ranch - Orange County, Winter

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Cranes	1	6.00	231	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Site Preparation	Graders	1	8.00	187	0.41
Paving	Pavers	1	6.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	187	0.41
Paving	Paving Equipment	1	8.00	132	0.36
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Building Construction	Welders	3	8.00	46	0.45

Trips and VMT

Costco Tustin Ranch - Orange County, Winter

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	42.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	375.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	5.00	2.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2019

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	lb/day										lb/day					
Fugitive Dust					0.4497	0.0000	0.4497	0.0681	0.0000	0.0681			0.0000			0.0000
Off-Road	2.2950	22.6751	14.8943	0.0241		1.2863	1.2863		1.2017	1.2017		2,360.7198	2,360.7198	0.6011		2,375.7475
Total	2.2950	22.6751	14.8943	0.0241	0.4497	1.2863	1.7359	0.0681	1.2017	1.2698		2,360.7198	2,360.7198	0.6011		2,375.7475

Costco Tustin Ranch - Orange County, Winter

3.2 Demolition - 2019

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	lb/day										lb/day					
Hauling	0.0179	0.6307	0.1580	1.6100e-003	0.0366	2.4400e-003	0.0390	0.0100	2.3400e-003	0.0124		178.4560	178.4560	0.0194		178.9409
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
Worker	0.0604	0.0386	0.4294	1.3900e-003	0.1453	9.7000e-004	0.1463	0.0385	8.9000e-004	0.0394		138.5506	138.5506	3.4100e-003		138.6359
Total	0.0784	0.6693	0.5873	3.0000e-003	0.1819	3.4100e-003	0.1853	0.0486	3.2300e-003	0.0518		317.0066	317.0066	0.0228		317.5768

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	lb/day										lb/day					
Fugitive Dust					0.3372	0.0000	0.3372	0.0511	0.0000	0.0511			0.0000			0.0000
Off-Road	2.2950	22.6751	14.8943	0.0241		1.2863	1.2863		1.2017	1.2017	0.0000	2,360.7197	2,360.7197	0.6011		2,375.7475
Total	2.2950	22.6751	14.8943	0.0241	0.3372	1.2863	1.6235	0.0511	1.2017	1.2528	0.0000	2,360.7197	2,360.7197	0.6011		2,375.7475

Costco Tustin Ranch - Orange County, Winter

3.2 Demolition - 2019

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	lb/day										lb/day					
Hauling	0.0179	0.6307	0.1580	1.6100e-003	0.0366	2.4400e-003	0.0390	0.0100	2.3400e-003	0.0124		178.4560	178.4560	0.0194		178.9409
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
Worker	0.0604	0.0386	0.4294	1.3900e-003	0.1453	9.7000e-004	0.1463	0.0385	8.9000e-004	0.0394		138.5506	138.5506	3.4100e-003		138.6359
Total	0.0784	0.6693	0.5873	3.0000e-003	0.1819	3.4100e-003	0.1853	0.0486	3.2300e-003	0.0518		317.0066	317.0066	0.0228		317.5768

3.3 Site Preparation - 2019

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	lb/day										lb/day					
Fugitive Dust					5.7996	0.0000	5.7996	2.9537	0.0000	2.9537			0.0000			0.0000
Off-Road	1.7123	19.4821	7.8893	0.0172		0.8824	0.8824		0.8118	0.8118		1,704.9189	1,704.9189	0.5394		1,718.4044
Total	1.7123	19.4821	7.8893	0.0172	5.7996	0.8824	6.6819	2.9537	0.8118	3.7655		1,704.9189	1,704.9189	0.5394		1,718.4044

Costco Tustin Ranch - Orange County, Winter

3.3 Site Preparation - 2019

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	lb/day										lb/day					
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
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
Worker	0.0372	0.0238	0.2642	8.6000e-004	0.0894	6.0000e-004	0.0900	0.0237	5.5000e-004	0.0243		85.2619	85.2619	2.1000e-003		85.3144
Total	0.0372	0.0238	0.2642	8.6000e-004	0.0894	6.0000e-004	0.0900	0.0237	5.5000e-004	0.0243		85.2619	85.2619	2.1000e-003		85.3144

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	lb/day										lb/day					
Fugitive Dust					4.3497	0.0000	4.3497	2.2153	0.0000	2.2153			0.0000			0.0000
Off-Road	1.7123	19.4821	7.8893	0.0172		0.8824	0.8824		0.8118	0.8118	0.0000	1,704.9189	1,704.9189	0.5394		1,718.4044
Total	1.7123	19.4821	7.8893	0.0172	4.3497	0.8824	5.2320	2.2153	0.8118	3.0270	0.0000	1,704.9189	1,704.9189	0.5394		1,718.4044

Costco Tustin Ranch - Orange County, Winter

3.3 Site Preparation - 2019

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	lb/day										lb/day					
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
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
Worker	0.0372	0.0238	0.2642	8.6000e-004	0.0894	6.0000e-004	0.0900	0.0237	5.5000e-004	0.0243		85.2619	85.2619	2.1000e-003		85.3144
Total	0.0372	0.0238	0.2642	8.6000e-004	0.0894	6.0000e-004	0.0900	0.0237	5.5000e-004	0.0243		85.2619	85.2619	2.1000e-003		85.3144

3.4 Grading - 2019

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	lb/day										lb/day					
Fugitive Dust					4.9991	0.0000	4.9991	2.5385	0.0000	2.5385			0.0000			0.0000
Off-Road	1.4197	16.0357	6.6065	0.0141		0.7365	0.7365		0.6775	0.6775		1,396.3909	1,396.3909	0.4418		1,407.4359
Total	1.4197	16.0357	6.6065	0.0141	4.9991	0.7365	5.7355	2.5385	0.6775	3.2160		1,396.3909	1,396.3909	0.4418		1,407.4359

Costco Tustin Ranch - Orange County, Winter

3.4 Grading - 2019

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	lb/day										lb/day					
Hauling	0.7997	28.1542	7.0527	0.0717	1.6325	0.1091	1.7415	0.4469	0.1044	0.5513		7,966.7856	7,966.7856	0.8659		7,988.4332
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
Worker	0.0372	0.0238	0.2642	8.6000e-004	0.0894	6.0000e-004	0.0900	0.0237	5.5000e-004	0.0243		85.2619	85.2619	2.1000e-003		85.3144
Total	0.8369	28.1780	7.3169	0.0725	1.7219	0.1097	1.8316	0.4706	0.1049	0.5755		8,052.0475	8,052.0475	0.8680		8,073.7476

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	lb/day										lb/day					
Fugitive Dust					3.7493	0.0000	3.7493	1.9038	0.0000	1.9038			0.0000			0.0000
Off-Road	1.4197	16.0357	6.6065	0.0141		0.7365	0.7365		0.6775	0.6775	0.0000	1,396.3909	1,396.3909	0.4418		1,407.4359
Total	1.4197	16.0357	6.6065	0.0141	3.7493	0.7365	4.4858	1.9038	0.6775	2.5814	0.0000	1,396.3909	1,396.3909	0.4418		1,407.4359

Costco Tustin Ranch - Orange County, Winter

3.4 Grading - 2019

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	lb/day										lb/day					
Hauling	0.7997	28.1542	7.0527	0.0717	1.6325	0.1091	1.7415	0.4469	0.1044	0.5513		7,966.7856	7,966.7856	0.8659		7,988.4332
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
Worker	0.0372	0.0238	0.2642	8.6000e-004	0.0894	6.0000e-004	0.0900	0.0237	5.5000e-004	0.0243		85.2619	85.2619	2.1000e-003		85.3144
Total	0.8369	28.1780	7.3169	0.0725	1.7219	0.1097	1.8316	0.4706	0.1049	0.5755		8,052.0475	8,052.0475	0.8680		8,073.7476

3.5 Building Construction - 2019

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	lb/day										lb/day					
Off-Road	2.2721	15.9802	13.4870	0.0220		0.9158	0.9158		0.8846	0.8846		2,018.0224	2,018.0224	0.3879		2,027.7210
Total	2.2721	15.9802	13.4870	0.0220		0.9158	0.9158		0.8846	0.8846		2,018.0224	2,018.0224	0.3879		2,027.7210

Costco Tustin Ranch - Orange County, Winter

3.5 Building Construction - 2019

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	lb/day										lb/day					
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
Vendor	7.8200e-003	0.2272	0.0659	4.9000e-004	0.0128	1.5600e-003	0.0143	3.6800e-003	1.4900e-003	5.1700e-003		53.2710	53.2710	4.8500e-003		53.3923
Worker	0.0233	0.0149	0.1651	5.3000e-004	0.0559	3.7000e-004	0.0563	0.0148	3.4000e-004	0.0152		53.2887	53.2887	1.3100e-003		53.3215
Total	0.0311	0.2421	0.2310	1.0200e-003	0.0687	1.9300e-003	0.0706	0.0185	1.8300e-003	0.0203		106.5597	106.5597	6.1600e-003		106.7138

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	lb/day										lb/day					
Off-Road	2.2721	15.9802	13.4870	0.0220		0.9158	0.9158		0.8846	0.8846	0.0000	2,018.0224	2,018.0224	0.3879		2,027.7210
Total	2.2721	15.9802	13.4870	0.0220		0.9158	0.9158		0.8846	0.8846	0.0000	2,018.0224	2,018.0224	0.3879		2,027.7210

Costco Tustin Ranch - Orange County, Winter

3.5 Building Construction - 2019

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	lb/day										lb/day					
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
Vendor	7.8200e-003	0.2272	0.0659	4.9000e-004	0.0128	1.5600e-003	0.0143	3.6800e-003	1.4900e-003	5.1700e-003		53.2710	53.2710	4.8500e-003		53.3923
Worker	0.0233	0.0149	0.1651	5.3000e-004	0.0559	3.7000e-004	0.0563	0.0148	3.4000e-004	0.0152		53.2887	53.2887	1.3100e-003		53.3215
Total	0.0311	0.2421	0.2310	1.0200e-003	0.0687	1.9300e-003	0.0706	0.0185	1.8300e-003	0.0203		106.5597	106.5597	6.1600e-003		106.7138

3.5 Building Construction - 2020

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	lb/day										lb/day					
Off-Road	2.0305	14.7882	13.1881	0.0220		0.7960	0.7960		0.7688	0.7688		2,001.1595	2,001.1595	0.3715		2,010.4467
Total	2.0305	14.7882	13.1881	0.0220		0.7960	0.7960		0.7688	0.7688		2,001.1595	2,001.1595	0.3715		2,010.4467

Costco Tustin Ranch - Orange County, Winter

3.5 Building Construction - 2020

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	lb/day										lb/day					
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
Vendor	6.6700e-003	0.2083	0.0603	4.9000e-004	0.0128	1.1100e-003	0.0139	3.6800e-003	1.0600e-003	4.7400e-003		52.8932	52.8932	4.6100e-003		53.0084
Worker	0.0217	0.0133	0.1513	5.2000e-004	0.0559	3.7000e-004	0.0563	0.0148	3.4000e-004	0.0152		51.5811	51.5811	1.1800e-003		51.6105
Total	0.0284	0.2216	0.2116	1.0100e-003	0.0687	1.4800e-003	0.0701	0.0185	1.4000e-003	0.0199		104.4743	104.4743	5.7900e-003		104.6189

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	lb/day										lb/day					
Off-Road	2.0305	14.7882	13.1881	0.0220		0.7960	0.7960		0.7688	0.7688	0.0000	2,001.1595	2,001.1595	0.3715		2,010.4467
Total	2.0305	14.7882	13.1881	0.0220		0.7960	0.7960		0.7688	0.7688	0.0000	2,001.1595	2,001.1595	0.3715		2,010.4467

Costco Tustin Ranch - Orange County, Winter

3.5 Building Construction - 2020

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	lb/day										lb/day					
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
Vendor	6.6700e-003	0.2083	0.0603	4.9000e-004	0.0128	1.1100e-003	0.0139	3.6800e-003	1.0600e-003	4.7400e-003		52.8932	52.8932	4.6100e-003		53.0084
Worker	0.0217	0.0133	0.1513	5.2000e-004	0.0559	3.7000e-004	0.0563	0.0148	3.4000e-004	0.0152		51.5811	51.5811	1.1800e-003		51.6105
Total	0.0284	0.2216	0.2116	1.0100e-003	0.0687	1.4800e-003	0.0701	0.0185	1.4000e-003	0.0199		104.4743	104.4743	5.7900e-003		104.6189

3.6 Paving - 2020

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	lb/day										lb/day					
Off-Road	0.8402	8.4514	8.8758	0.0135		0.4695	0.4695		0.4328	0.4328		1,296.9461	1,296.9461	0.4111		1,307.2246
Paving	0.0550					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	0.8952	8.4514	8.8758	0.0135		0.4695	0.4695		0.4328	0.4328		1,296.9461	1,296.9461	0.4111		1,307.2246

Costco Tustin Ranch - Orange County, Winter

3.6 Paving - 2020

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	lb/day										lb/day					
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
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
Worker	0.0565	0.0346	0.3933	1.3400e-003	0.1453	9.6000e-004	0.1463	0.0385	8.8000e-004	0.0394		134.1108	134.1108	3.0600e-003		134.1873
Total	0.0565	0.0346	0.3933	1.3400e-003	0.1453	9.6000e-004	0.1463	0.0385	8.8000e-004	0.0394		134.1108	134.1108	3.0600e-003		134.1873

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	lb/day										lb/day					
Off-Road	0.8402	8.4514	8.8758	0.0135		0.4695	0.4695		0.4328	0.4328	0.0000	1,296.9461	1,296.9461	0.4111		1,307.2246
Paving	0.0550					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	0.8952	8.4514	8.8758	0.0135		0.4695	0.4695		0.4328	0.4328	0.0000	1,296.9461	1,296.9461	0.4111		1,307.2246

Costco Tustin Ranch - Orange County, Winter

3.6 Paving - 2020

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	lb/day										lb/day					
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
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
Worker	0.0565	0.0346	0.3933	1.3400e-003	0.1453	9.6000e-004	0.1463	0.0385	8.8000e-004	0.0394		134.1108	134.1108	3.0600e-003		134.1873
Total	0.0565	0.0346	0.3933	1.3400e-003	0.1453	9.6000e-004	0.1463	0.0385	8.8000e-004	0.0394		134.1108	134.1108	3.0600e-003		134.1873

3.7 Architectural Coating - 2020

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	lb/day										lb/day					
Archit. Coating	4.4417					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	4.6839	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928

Costco Tustin Ranch - Orange County, Winter

3.7 Architectural Coating - 2020

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	lb/day										lb/day					
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
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
Worker	4.3400e-003	2.6600e-003	0.0303	1.0000e-004	0.0112	7.0000e-005	0.0113	2.9600e-003	7.0000e-005	3.0300e-003		10.3162	10.3162	2.4000e-004		10.3221
Total	4.3400e-003	2.6600e-003	0.0303	1.0000e-004	0.0112	7.0000e-005	0.0113	2.9600e-003	7.0000e-005	3.0300e-003		10.3162	10.3162	2.4000e-004		10.3221

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	lb/day										lb/day					
Archit. Coating	4.4417					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928
Total	4.6839	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928

Costco Tustin Ranch - Orange County, Winter

3.7 Architectural Coating - 2020

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	lb/day										lb/day					
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
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
Worker	4.3400e-003	2.6600e-003	0.0303	1.0000e-004	0.0112	7.0000e-005	0.0113	2.9600e-003	7.0000e-005	3.0300e-003		10.3162	10.3162	2.4000e-004		10.3221
Total	4.3400e-003	2.6600e-003	0.0303	1.0000e-004	0.0112	7.0000e-005	0.0113	2.9600e-003	7.0000e-005	3.0300e-003		10.3162	10.3162	2.4000e-004		10.3221

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Costco Tustin Ranch - Orange County, Winter

	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	lb/day										lb/day					
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
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

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated Annual VMT	Mitigated Annual VMT
	Weekday	Saturday	Sunday		
Gasoline/Service Station	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

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
Gasoline/Service Station	16.60	8.40	6.90	2.00	79.00	19.00	14	27	59
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Gasoline/Service Station	0.555968	0.043848	0.210359	0.116378	0.016765	0.005795	0.025008	0.016160	0.001677	0.001586	0.004867	0.000586	0.001002
Parking Lot	0.555968	0.043848	0.210359	0.116378	0.016765	0.005795	0.025008	0.016160	0.001677	0.001586	0.004867	0.000586	0.001002

Costco Tustin Ranch - Orange County, Winter

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Natural Gas Mitigated	2.7900e-003	0.0254	0.0213	1.5000e-004		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003		30.4328	30.4328	5.8000e-004	5.6000e-004	30.6137
Natural Gas Unmitigated	2.7900e-003	0.0254	0.0213	1.5000e-004		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003		30.4328	30.4328	5.8000e-004	5.6000e-004	30.6137

Costco Tustin Ranch - Orange County, Winter

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Gasoline/Service Station	258.679	2.7900e-003	0.0254	0.0213	1.5000e-004		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003		30.4328	30.4328	5.8000e-004	5.6000e-004	30.6137
Parking Lot	0	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
Total		2.7900e-003	0.0254	0.0213	1.5000e-004		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003		30.4328	30.4328	5.8000e-004	5.6000e-004	30.6137

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Gasoline/Service Station	0.258679	2.7900e-003	0.0254	0.0213	1.5000e-004		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003		30.4328	30.4328	5.8000e-004	5.6000e-004	30.6137
Parking Lot	0	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
Total		2.7900e-003	0.0254	0.0213	1.5000e-004		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003		30.4328	30.4328	5.8000e-004	5.6000e-004	30.6137

6.0 Area Detail

6.1 Mitigation Measures Area

Costco Tustin Ranch - Orange County, Winter

	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	lb/day										lb/day					
Mitigated	0.1053	4.0000e-005	4.2300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.0000e-003	9.0000e-003	2.0000e-005		9.6100e-003
Unmitigated	0.1053	4.0000e-005	4.2300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.0000e-003	9.0000e-003	2.0000e-005		9.6100e-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	lb/day										lb/day					
Architectural Coating	0.0122					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0927					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.0000e-004	4.0000e-005	4.2300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.0000e-003	9.0000e-003	2.0000e-005		9.6100e-003
Total	0.1053	4.0000e-005	4.2300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.0000e-003	9.0000e-003	2.0000e-005		9.6100e-003

Costco Tustin Ranch - Orange County, Winter

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0122					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0927					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.0000e-004	4.0000e-005	4.2300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.0000e-003	9.0000e-003	2.0000e-005		9.6100e-003
Total	0.1053	4.0000e-005	4.2300e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.0000e-003	9.0000e-003	2.0000e-005		9.6100e-003

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

Fire Pumps and Emergency Generators

Costco Tustin Ranch - Orange County, Winter

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

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

Equipment Type	Number
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11.0 Vegetation

**APPENDIX A.3
COSTCO TUSTIN RANCH –
ORANGE COUNTY, ANNUAL**

Costco Tustin Ranch - Orange County, Annual

Costco Tustin Ranch
Orange County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	9.14	1000sqft	0.21	9,136.00	0
Gasoline/Service Station	32.00	Pump	0.92	4,517.60	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	30
Climate Zone	8			Operational Year	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	CH4 Intensity (lb/MWhr)	0.029	N2O Intensity (lb/MWhr)	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Site plans

Grading -

Demolition -

Vehicle Trips - Mobile emissions calculated externally

Construction Off-road Equipment Mitigation - Project will include pre-watering and stabilization activities per Rule 403

Costco Tustin Ranch - Orange County, Annual

Table Name	Column Name	Default Value	New Value
tblGrading	MaterialExported	0.00	3,000.00
tblLandUse	LotAcreage	0.10	0.92
tblVehicleTrips	ST_TR	168.56	0.00
tblVehicleTrips	SU_TR	168.56	0.00
tblVehicleTrips	WD_TR	168.56	0.00

2.0 Emissions Summary

Costco Tustin Ranch - Orange County, Annual

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	10-1-2019	12-31-2019	0.7424	0.7424
2	1-1-2020	3-31-2020	0.5547	0.5547
3	4-1-2020	6-30-2020	0.5546	0.5546
4	7-1-2020	9-30-2020	0.3350	0.3350
		Highest	0.7424	0.7424

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	0.0192	0.0000	5.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0200e-003	1.0200e-003	0.0000	0.0000	1.0900e-003
Energy	5.1000e-004	4.6300e-003	3.8900e-003	3.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	18.2203	18.2203	6.4000e-004	2.0000e-004	18.2974
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	3.5016	0.0000	3.5016	0.2069	0.0000	8.6751
Water						0.0000	0.0000		0.0000	0.0000	0.1348	2.6854	2.8203	0.0140	3.5000e-004	3.2736
Total	0.0197	4.6300e-003	4.4200e-003	3.0000e-005	0.0000	3.5000e-004	3.5000e-004	0.0000	3.5000e-004	3.5000e-004	3.6364	20.9067	24.5432	0.2215	5.5000e-004	30.2471

Costco Tustin Ranch - Orange County, Annual

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0192	0.0000	5.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0200e-003	1.0200e-003	0.0000	0.0000	1.0900e-003
Energy	5.1000e-004	4.6300e-003	3.8900e-003	3.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	18.2203	18.2203	6.4000e-004	2.0000e-004	18.2974
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	3.5016	0.0000	3.5016	0.2069	0.0000	8.6751
Water						0.0000	0.0000		0.0000	0.0000	0.1348	2.6854	2.8203	0.0140	3.5000e-004	3.2736
Total	0.0197	4.6300e-003	4.4200e-003	3.0000e-005	0.0000	3.5000e-004	3.5000e-004	0.0000	3.5000e-004	3.5000e-004	3.6364	20.9067	24.5432	0.2215	5.5000e-004	30.2471

	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

3.0 Construction Detail

Construction Phase

Costco Tustin Ranch - Orange County, Annual

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	10/1/2019	10/28/2019	5	20	
2	Site Preparation	Site Preparation	10/29/2019	10/30/2019	5	2	
3	Grading	Grading	10/31/2019	11/5/2019	5	4	
4	Building Construction	Building Construction	11/6/2019	8/11/2020	5	200	
5	Paving	Paving	8/12/2020	8/25/2020	5	10	
6	Architectural Coating	Architectural Coating	8/26/2020	9/8/2020	5	10	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1.5

Acres of Paving: 0.21

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 6,776; Non-Residential Outdoor: 2,259; Striped Parking Area: 548 (Architectural Coating – sqft)

OffRoad Equipment

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Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Cranes	1	6.00	231	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Site Preparation	Graders	1	8.00	187	0.41
Paving	Pavers	1	6.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	187	0.41
Paving	Paving Equipment	1	8.00	132	0.36
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Building Construction	Welders	3	8.00	46	0.45

Trips and VMT

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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	42.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	375.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	5.00	2.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2019

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					4.5000e-003	0.0000	4.5000e-003	6.8000e-004	0.0000	6.8000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0230	0.2268	0.1489	2.4000e-004		0.0129	0.0129		0.0120	0.0120	0.0000	21.4161	21.4161	5.4500e-003	0.0000	21.5524
Total	0.0230	0.2268	0.1489	2.4000e-004	4.5000e-003	0.0129	0.0174	6.8000e-004	0.0120	0.0127	0.0000	21.4161	21.4161	5.4500e-003	0.0000	21.5524

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3.2 Demolition - 2019

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	1.8000e-004	6.4300e-003	1.5300e-003	2.0000e-005	3.6000e-004	2.0000e-005	3.8000e-004	1.0000e-004	2.0000e-005	1.2000e-004	0.0000	1.6331	1.6331	1.7000e-004	0.0000	1.6374
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	5.4000e-004	4.0000e-004	4.4000e-003	1.0000e-005	1.4300e-003	1.0000e-005	1.4400e-003	3.8000e-004	1.0000e-005	3.9000e-004	0.0000	1.2761	1.2761	3.0000e-005	0.0000	1.2769
Total	7.2000e-004	6.8300e-003	5.9300e-003	3.0000e-005	1.7900e-003	3.0000e-005	1.8200e-003	4.8000e-004	3.0000e-005	5.1000e-004	0.0000	2.9092	2.9092	2.0000e-004	0.0000	2.9143

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					3.3700e-003	0.0000	3.3700e-003	5.1000e-004	0.0000	5.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0230	0.2268	0.1489	2.4000e-004		0.0129	0.0129		0.0120	0.0120	0.0000	21.4161	21.4161	5.4500e-003	0.0000	21.5524
Total	0.0230	0.2268	0.1489	2.4000e-004	3.3700e-003	0.0129	0.0162	5.1000e-004	0.0120	0.0125	0.0000	21.4161	21.4161	5.4500e-003	0.0000	21.5524

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3.2 Demolition - 2019

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	1.8000e-004	6.4300e-003	1.5300e-003	2.0000e-005	3.6000e-004	2.0000e-005	3.8000e-004	1.0000e-004	2.0000e-005	1.2000e-004	0.0000	1.6331	1.6331	1.7000e-004	0.0000	1.6374
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	5.4000e-004	4.0000e-004	4.4000e-003	1.0000e-005	1.4300e-003	1.0000e-005	1.4400e-003	3.8000e-004	1.0000e-005	3.9000e-004	0.0000	1.2761	1.2761	3.0000e-005	0.0000	1.2769
Total	7.2000e-004	6.8300e-003	5.9300e-003	3.0000e-005	1.7900e-003	3.0000e-005	1.8200e-003	4.8000e-004	3.0000e-005	5.1000e-004	0.0000	2.9092	2.9092	2.0000e-004	0.0000	2.9143

3.3 Site Preparation - 2019

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					5.8000e-003	0.0000	5.8000e-003	2.9500e-003	0.0000	2.9500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7100e-003	0.0195	7.8900e-003	2.0000e-005		8.8000e-004	8.8000e-004		8.1000e-004	8.1000e-004	0.0000	1.5467	1.5467	4.9000e-004	0.0000	1.5589
Total	1.7100e-003	0.0195	7.8900e-003	2.0000e-005	5.8000e-003	8.8000e-004	6.6800e-003	2.9500e-003	8.1000e-004	3.7600e-003	0.0000	1.5467	1.5467	4.9000e-004	0.0000	1.5589

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3.3 Site Preparation - 2019

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	2.0000e-005	2.7000e-004	0.0000	9.0000e-005	0.0000	9.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0785	0.0785	0.0000	0.0000	0.0786
Total	3.0000e-005	2.0000e-005	2.7000e-004	0.0000	9.0000e-005	0.0000	9.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0785	0.0785	0.0000	0.0000	0.0786

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					4.3500e-003	0.0000	4.3500e-003	2.2200e-003	0.0000	2.2200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7100e-003	0.0195	7.8900e-003	2.0000e-005		8.8000e-004	8.8000e-004		8.1000e-004	8.1000e-004	0.0000	1.5467	1.5467	4.9000e-004	0.0000	1.5589
Total	1.7100e-003	0.0195	7.8900e-003	2.0000e-005	4.3500e-003	8.8000e-004	5.2300e-003	2.2200e-003	8.1000e-004	3.0300e-003	0.0000	1.5467	1.5467	4.9000e-004	0.0000	1.5589

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3.3 Site Preparation - 2019

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	2.0000e-005	2.7000e-004	0.0000	9.0000e-005	0.0000	9.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0785	0.0785	0.0000	0.0000	0.0786
Total	3.0000e-005	2.0000e-005	2.7000e-004	0.0000	9.0000e-005	0.0000	9.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0785	0.0785	0.0000	0.0000	0.0786

3.4 Grading - 2019

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					0.0100	0.0000	0.0100	5.0800e-003	0.0000	5.0800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.8400e-003	0.0321	0.0132	3.0000e-005		1.4700e-003	1.4700e-003		1.3600e-003	1.3600e-003	0.0000	2.5336	2.5336	8.0000e-004	0.0000	2.5536
Total	2.8400e-003	0.0321	0.0132	3.0000e-005	0.0100	1.4700e-003	0.0115	5.0800e-003	1.3600e-003	6.4400e-003	0.0000	2.5336	2.5336	8.0000e-004	0.0000	2.5536

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3.4 Grading - 2019

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	1.5800e-003	0.0574	0.0137	1.4000e-004	3.2100e-003	2.2000e-004	3.4300e-003	8.8000e-004	2.1000e-004	1.0900e-003	0.0000	14.5808	14.5808	1.5500e-003	0.0000	14.6195
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	7.0000e-005	5.0000e-005	5.4000e-004	0.0000	1.8000e-004	0.0000	1.8000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1571	0.1571	0.0000	0.0000	0.1572
Total	1.6500e-003	0.0575	0.0142	1.4000e-004	3.3900e-003	2.2000e-004	3.6100e-003	9.3000e-004	2.1000e-004	1.1400e-003	0.0000	14.7379	14.7379	1.5500e-003	0.0000	14.7767

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					7.5000e-003	0.0000	7.5000e-003	3.8100e-003	0.0000	3.8100e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.8400e-003	0.0321	0.0132	3.0000e-005		1.4700e-003	1.4700e-003		1.3600e-003	1.3600e-003	0.0000	2.5336	2.5336	8.0000e-004	0.0000	2.5536
Total	2.8400e-003	0.0321	0.0132	3.0000e-005	7.5000e-003	1.4700e-003	8.9700e-003	3.8100e-003	1.3600e-003	5.1700e-003	0.0000	2.5336	2.5336	8.0000e-004	0.0000	2.5536

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3.4 Grading - 2019

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	1.5800e-003	0.0574	0.0137	1.4000e-004	3.2100e-003	2.2000e-004	3.4300e-003	8.8000e-004	2.1000e-004	1.0900e-003	0.0000	14.5808	14.5808	1.5500e-003	0.0000	14.6195
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	7.0000e-005	5.0000e-005	5.4000e-004	0.0000	1.8000e-004	0.0000	1.8000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1571	0.1571	0.0000	0.0000	0.1572
Total	1.6500e-003	0.0575	0.0142	1.4000e-004	3.3900e-003	2.2000e-004	3.6100e-003	9.3000e-004	2.1000e-004	1.1400e-003	0.0000	14.7379	14.7379	1.5500e-003	0.0000	14.7767

3.5 Building Construction - 2019

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	0.0454	0.3196	0.2697	4.4000e-004		0.0183	0.0183		0.0177	0.0177	0.0000	36.6144	36.6144	7.0400e-003	0.0000	36.7904
Total	0.0454	0.3196	0.2697	4.4000e-004		0.0183	0.0183		0.0177	0.0177	0.0000	36.6144	36.6144	7.0400e-003	0.0000	36.7904

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3.5 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5000e-004	4.6300e-003	1.2600e-003	1.0000e-005	2.5000e-004	3.0000e-005	2.8000e-004	7.0000e-005	3.0000e-005	1.0000e-004	0.0000	0.9805	0.9805	9.0000e-005	0.0000	0.9826
Worker	4.2000e-004	3.0000e-004	3.3800e-003	1.0000e-005	1.1000e-003	1.0000e-005	1.1100e-003	2.9000e-004	1.0000e-005	3.0000e-004	0.0000	0.9816	0.9816	2.0000e-005	0.0000	0.9822
Total	5.7000e-004	4.9300e-003	4.6400e-003	2.0000e-005	1.3500e-003	4.0000e-005	1.3900e-003	3.6000e-004	4.0000e-005	4.0000e-004	0.0000	1.9621	1.9621	1.1000e-004	0.0000	1.9648

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	0.0454	0.3196	0.2697	4.4000e-004		0.0183	0.0183		0.0177	0.0177	0.0000	36.6143	36.6143	7.0400e-003	0.0000	36.7903
Total	0.0454	0.3196	0.2697	4.4000e-004		0.0183	0.0183		0.0177	0.0177	0.0000	36.6143	36.6143	7.0400e-003	0.0000	36.7903

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3.5 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5000e-004	4.6300e-003	1.2600e-003	1.0000e-005	2.5000e-004	3.0000e-005	2.8000e-004	7.0000e-005	3.0000e-005	1.0000e-004	0.0000	0.9805	0.9805	9.0000e-005	0.0000	0.9826
Worker	4.2000e-004	3.0000e-004	3.3800e-003	1.0000e-005	1.1000e-003	1.0000e-005	1.1100e-003	2.9000e-004	1.0000e-005	3.0000e-004	0.0000	0.9816	0.9816	2.0000e-005	0.0000	0.9822
Total	5.7000e-004	4.9300e-003	4.6400e-003	2.0000e-005	1.3500e-003	4.0000e-005	1.3900e-003	3.6000e-004	4.0000e-005	4.0000e-004	0.0000	1.9621	1.9621	1.1000e-004	0.0000	1.9648

3.5 Building Construction - 2020

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	0.1624	1.1831	1.0551	1.7600e-003		0.0637	0.0637		0.0615	0.0615	0.0000	145.2337	145.2337	0.0270	0.0000	145.9077
Total	0.1624	1.1831	1.0551	1.7600e-003		0.0637	0.0637		0.0615	0.0615	0.0000	145.2337	145.2337	0.0270	0.0000	145.9077

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3.5 Building Construction - 2020

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	5.2000e-004	0.0170	4.6200e-003	4.0000e-005	1.0100e-003	9.0000e-005	1.0900e-003	2.9000e-004	8.0000e-005	3.7000e-004	0.0000	3.8948	3.8948	3.3000e-004	0.0000	3.9029
Worker	1.5600e-003	1.0900e-003	0.0124	4.0000e-005	4.3900e-003	3.0000e-005	4.4200e-003	1.1700e-003	3.0000e-005	1.1900e-003	0.0000	3.8006	3.8006	9.0000e-005	0.0000	3.8028
Total	2.0800e-003	0.0181	0.0170	8.0000e-005	5.4000e-003	1.2000e-004	5.5100e-003	1.4600e-003	1.1000e-004	1.5600e-003	0.0000	7.6955	7.6955	4.2000e-004	0.0000	7.7058

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	0.1624	1.1831	1.0551	1.7600e-003		0.0637	0.0637		0.0615	0.0615	0.0000	145.2335	145.2335	0.0270	0.0000	145.9076
Total	0.1624	1.1831	1.0551	1.7600e-003		0.0637	0.0637		0.0615	0.0615	0.0000	145.2335	145.2335	0.0270	0.0000	145.9076

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3.5 Building Construction - 2020

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	5.2000e-004	0.0170	4.6200e-003	4.0000e-005	1.0100e-003	9.0000e-005	1.0900e-003	2.9000e-004	8.0000e-005	3.7000e-004	0.0000	3.8948	3.8948	3.3000e-004	0.0000	3.9029
Worker	1.5600e-003	1.0900e-003	0.0124	4.0000e-005	4.3900e-003	3.0000e-005	4.4200e-003	1.1700e-003	3.0000e-005	1.1900e-003	0.0000	3.8006	3.8006	9.0000e-005	0.0000	3.8028
Total	2.0800e-003	0.0181	0.0170	8.0000e-005	5.4000e-003	1.2000e-004	5.5100e-003	1.4600e-003	1.1000e-004	1.5600e-003	0.0000	7.6955	7.6955	4.2000e-004	0.0000	7.7058

3.6 Paving - 2020

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	4.2000e-003	0.0423	0.0444	7.0000e-005		2.3500e-003	2.3500e-003		2.1600e-003	2.1600e-003	0.0000	5.8829	5.8829	1.8600e-003	0.0000	5.9295
Paving	2.8000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	4.4800e-003	0.0423	0.0444	7.0000e-005		2.3500e-003	2.3500e-003		2.1600e-003	2.1600e-003	0.0000	5.8829	5.8829	1.8600e-003	0.0000	5.9295

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3.6 Paving - 2020

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	2.5000e-004	1.8000e-004	2.0100e-003	1.0000e-005	7.1000e-004	0.0000	7.2000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.6176	0.6176	1.0000e-005	0.0000	0.6180
Total	2.5000e-004	1.8000e-004	2.0100e-003	1.0000e-005	7.1000e-004	0.0000	7.2000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.6176	0.6176	1.0000e-005	0.0000	0.6180

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	4.2000e-003	0.0423	0.0444	7.0000e-005		2.3500e-003	2.3500e-003		2.1600e-003	2.1600e-003	0.0000	5.8828	5.8828	1.8600e-003	0.0000	5.9295
Paving	2.8000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	4.4800e-003	0.0423	0.0444	7.0000e-005		2.3500e-003	2.3500e-003		2.1600e-003	2.1600e-003	0.0000	5.8828	5.8828	1.8600e-003	0.0000	5.9295

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3.6 Paving - 2020

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	2.5000e-004	1.8000e-004	2.0100e-003	1.0000e-005	7.1000e-004	0.0000	7.2000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.6176	0.6176	1.0000e-005	0.0000	0.6180
Total	2.5000e-004	1.8000e-004	2.0100e-003	1.0000e-005	7.1000e-004	0.0000	7.2000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.6176	0.6176	1.0000e-005	0.0000	0.6180

3.7 Architectural Coating - 2020

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	0.0222					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.2100e-003	8.4200e-003	9.1600e-003	1.0000e-005		5.5000e-004	5.5000e-004		5.5000e-004	5.5000e-004	0.0000	1.2766	1.2766	1.0000e-004	0.0000	1.2791
Total	0.0234	8.4200e-003	9.1600e-003	1.0000e-005		5.5000e-004	5.5000e-004		5.5000e-004	5.5000e-004	0.0000	1.2766	1.2766	1.0000e-004	0.0000	1.2791

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3.7 Architectural Coating - 2020

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	2.0000e-005	1.0000e-005	1.5000e-004	0.0000	5.0000e-005	0.0000	6.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0475	0.0475	0.0000	0.0000	0.0475
Total	2.0000e-005	1.0000e-005	1.5000e-004	0.0000	5.0000e-005	0.0000	6.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0475	0.0475	0.0000	0.0000	0.0475

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	0.0222					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.2100e-003	8.4200e-003	9.1600e-003	1.0000e-005		5.5000e-004	5.5000e-004		5.5000e-004	5.5000e-004	0.0000	1.2766	1.2766	1.0000e-004	0.0000	1.2791
Total	0.0234	8.4200e-003	9.1600e-003	1.0000e-005		5.5000e-004	5.5000e-004		5.5000e-004	5.5000e-004	0.0000	1.2766	1.2766	1.0000e-004	0.0000	1.2791

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3.7 Architectural Coating - 2020

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	2.0000e-005	1.0000e-005	1.5000e-004	0.0000	5.0000e-005	0.0000	6.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0475	0.0475	0.0000	0.0000	0.0475
Total	2.0000e-005	1.0000e-005	1.5000e-004	0.0000	5.0000e-005	0.0000	6.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0475	0.0475	0.0000	0.0000	0.0475

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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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
Category	tons/yr										MT/yr					
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	0.0000	0.0000
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	0.0000	0.0000

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Gasoline/Service Station	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

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
Gasoline/Service Station	16.60	8.40	6.90	2.00	79.00	19.00	14	27	59
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Gasoline/Service Station	0.555968	0.043848	0.210359	0.116378	0.016765	0.005795	0.025008	0.016160	0.001677	0.001586	0.004867	0.000586	0.001002
Parking Lot	0.555968	0.043848	0.210359	0.116378	0.016765	0.005795	0.025008	0.016160	0.001677	0.001586	0.004867	0.000586	0.001002

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5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	13.1818	13.1818	5.4000e-004	1.1000e-004	13.2290
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	13.1818	13.1818	5.4000e-004	1.1000e-004	13.2290
NaturalGas Mitigated	5.1000e-004	4.6300e-003	3.8900e-003	3.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	5.0385	5.0385	1.0000e-004	9.0000e-005	5.0684
NaturalGas Unmitigated	5.1000e-004	4.6300e-003	3.8900e-003	3.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	5.0385	5.0385	1.0000e-004	9.0000e-005	5.0684

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5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Gasoline/Service Station	94417.8	5.1000e-004	4.6300e-003	3.8900e-003	3.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	5.0385	5.0385	1.0000e-004	9.0000e-005	5.0684
Parking Lot	0	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
Total		5.1000e-004	4.6300e-003	3.8900e-003	3.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	5.0385	5.0385	1.0000e-004	9.0000e-005	5.0684

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Gasoline/Service Station	94417.8	5.1000e-004	4.6300e-003	3.8900e-003	3.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	5.0385	5.0385	1.0000e-004	9.0000e-005	5.0684
Parking Lot	0	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
Total		5.1000e-004	4.6300e-003	3.8900e-003	3.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	5.0385	5.0385	1.0000e-004	9.0000e-005	5.0684

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5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Gasoline/Service Station	38173.7	12.1630	5.0000e-004	1.0000e-004	12.2065
Parking Lot	3197.6	1.0188	4.0000e-005	1.0000e-005	1.0225
Total		13.1818	5.4000e-004	1.1000e-004	13.2290

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Gasoline/Service Station	38173.7	12.1630	5.0000e-004	1.0000e-004	12.2065
Parking Lot	3197.6	1.0188	4.0000e-005	1.0000e-005	1.0225
Total		13.1818	5.4000e-004	1.1000e-004	13.2290

6.0 Area Detail

6.1 Mitigation Measures Area

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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
Category	tons/yr										MT/yr					
Mitigated	0.0192	0.0000	5.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0200e-003	1.0200e-003	0.0000	0.0000	1.0900e-003
Unmitigated	0.0192	0.0000	5.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0200e-003	1.0200e-003	0.0000	0.0000	1.0900e-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	2.2200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0169					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	5.0000e-005	0.0000	5.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0200e-003	1.0200e-003	0.0000	0.0000	1.0900e-003
Total	0.0192	0.0000	5.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0200e-003	1.0200e-003	0.0000	0.0000	1.0900e-003

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6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	2.2200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0169					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	5.0000e-005	0.0000	5.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0200e-003	1.0200e-003	0.0000	0.0000	1.0900e-003
Total	0.0192	0.0000	5.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0200e-003	1.0200e-003	0.0000	0.0000	1.0900e-003

7.0 Water Detail

7.1 Mitigation Measures Water

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	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	2.8203	0.0140	3.5000e-004	3.2736
Unmitigated	2.8203	0.0140	3.5000e-004	3.2736

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Gasoline/Service Station	0.42502 / 0.260496	2.8203	0.0140	3.5000e-004	3.2736
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		2.8203	0.0140	3.5000e-004	3.2736

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7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Gasoline/Service Station	0.42502 / 0.260496	2.8203	0.0140	3.5000e-004	3.2736
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		2.8203	0.0140	3.5000e-004	3.2736

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	3.5016	0.2069	0.0000	8.6751
Unmitigated	3.5016	0.2069	0.0000	8.6751

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8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Gasoline/Service Station	17.25	3.5016	0.2069	0.0000	8.6751
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		3.5016	0.2069	0.0000	8.6751

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Gasoline/Service Station	17.25	3.5016	0.2069	0.0000	8.6751
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		3.5016	0.2069	0.0000	8.6751

9.0 Operational Offroad

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

Fire Pumps and Emergency Generators

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

Boilers

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

Equipment Type	Number
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11.0 Vegetation

APPENDIX B
MOBILE SOURCE EMISSION CALCULATIONS

Table B-1. Trip Lengths and Vehicle Miles Traveled by Operational Mobile Sources

Tustin Ranch Costco Fuel Station

Orange County, California

Trip Type		Average One-Way Trip Length ^{1,2}	Peak Daily Trips (one-way trips/day) ³	Peak Daily VMT ⁴	Annual Trips (one-way trips/year) ³	Annual VMT ⁴
Passenger Vehicles	Primary	8.3	1,515	12,543	545,799	4,518,670
	Diverted	2.1	2,362	4,889	812,626	1,681,933
	Pass-By	0.32	2,315	741	777,375	248,760
	Internal ⁵	0	3,325	0	1,166,305	0
Fuel Delivery Trucks	Primary	6.9	16	110	5,840	40,296

Notes:

¹ Passenger vehicles represent vehicles used by patrons of the fuel station. Average trip length for primary and diverted trip types is assumed to be equal to the CalEEMod[®] default trip lengths for Orange County. Pass-by trip length represents on-site driveways and was measured using Google Earth.

² Fuel delivery truck trip length is assumed to be 6.9 miles based on the CalEEMod[®] default for commercial-nonwork trips in CalEEMod[®].

³ Trip rates based Project-specific data provided by Kittelson & Associates.

⁴ Estimated as a product of average trip length and number of trips.

⁵ Internal trips include trips made by patrons visiting the Costco member warehouse. Project-related emissions from internal trips are assumed to be from idling only. Therefore, no VMT is associated with internal trips.

Abbreviations:

CalEEMod[®] - CALifornia Emissions Estimator MODEL

VMT - vehicle miles traveled

Table B-2. Operational Mobile Source Fleet Mixes

Tustin Ranch Costco Fuel Station
Orange County, California

CalEEMod [®] Default ¹	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
	55.6%	4.4%	21.0%	11.6%	1.7%	0.6%	2.5%	1.6%	0.2%	0.2%	0.5%	0.1%	0.1%

Passenger Vehicles ²	LDA	LDT1	LDT2	MDV
	60.0%	4.7%	22.7%	12.6%

Notes:

¹ CalEEMod[®] default for Gasoline Service Station land use subtype in Orange County - South Coast.

² Passenger cars represent vehicles used by patrons of the fuel station. Fleet mix for passenger vehicles are estimated based on the ratio of the vehicle classes in CalEEMod[®] default fleet mix.

Abbreviations:

CalEEMod[®] - CALifornia Emissions Estimator Model

LDA - Light Duty Automobile

LDT - Light-Duty Truck

LHD - Light-Heavy Duty truck

HHDT - Heavy-Heavy Duty truck

MDV - Medium-Duty Vehicle

MH - Motor Home

MHD - Medium-Heavy Duty truck

OBUS - Other Buses

UBUS - Urban Buses

MCY - Motorcycle

SBUS - School Bus

Table B-3. Operational Mobile Source CAP Emission Factors - Running Exhaust, Running Loss, Tire Wear, and Brake Wear

Tustin Ranch Costco Fuel Station
Orange County, California

EMFAC Vehicle Class	EMFAC VMT Output ¹ (miles/day)	EMFAC Emissions Output ^{1,2} (tons/day)					
		VOC ³	NO _x	CO	SO _x	PM ₁₀ ⁴	PM _{2.5} ⁴
Passenger Vehicles⁵							
LDA	48,945,590	2.10	2.41	40.79	0.15	2.51	1.04
LDT1	5,047,196	0.66	0.65	7.85	0.02	0.26	0.11
LDT2	17,039,204	1.29	1.60	18.78	0.07	0.87	0.36
MDV	11,413,222	1.07	1.51	15.82	0.05	0.59	0.24
Fuel Delivery Trucks⁵							
HHDT	1,179,820	0.18	5.80	0.70	0.02	0.20	0.12

EMFAC Vehicle Class	Project Specific Fleet Mix ⁶	Running Exhaust, Running Loss, Tire Wear and Brake Wear Emission Factors ⁷ (grams/mile)					
		VOC ³	NO _x	CO	SO _x	PM ₁₀ ⁴	PM _{2.5} ⁴
Passenger Vehicles⁵							
LDA	60.0%	0.039	0.045	0.76	0.0028	0.046	0.019
LDT1	4.7%	0.119	0.116	1.41	0.0032	0.047	0.020
LDT2	22.7%	0.069	0.085	1.00	0.0035	0.046	0.019
MDV	12.6%	0.085	0.120	1.26	0.0043	0.047	0.019
Weighted Emission Factor⁸		0.055	0.067	0.905	0.003	0.047	0.019
Fuel Delivery Trucks⁵							
HHDT	100.0%	0.14	4.46	0.53	0.014	0.16	0.09

Notes:

- ¹ Data obtained from EMFAC2017 for default emissions activity.
- ² Sum of running exhaust, running loss, tire wear, and brake wear emissions obtained from EMFAC2017 for default emissions activity.
- ³ For purposes of this analysis VOC is assumed to be equal to ROG.
- ⁴ PM emissions are a sum of exhaust, tire wear, and brake wear.
- ⁵ Passenger vehicles are assumed to be gasoline-fueled. Fuel delivery trucks are assumed to be diesel-fueled.
- ⁶ Data obtained from Table B-2.
- ⁷ Emission factors for EMFAC vehicle classes are estimated as a ratio of the EMFAC emissions output and EMFAC VMT output.
- ⁸ Emission factors for EMFAC vehicle classes are weighted based on project-specific fleet mix to estimate VMT-based emission factors for passenger vehicles.

Abbreviations:

- CAP - criteria air pollutant
- CO - carbon monoxide
- EMFAC - Emission FACTors model
- LDA - Light Duty Automobile
- LDT - Light-Duty Truck
- HHDT - Heavy-Heavy Duty truck
- MDV - medium-duty vehicle
- NO_x - nitrogen oxide compounds (NO + NO₂)
- PM - particulate matter
- PM_{2.5} - particulate matter less than 2.5 microns in diameter
- PM₁₀ - particulate matter less than 10 microns in diameter
- ROG - reactive organic gases
- SO_x - sulfur oxide compounds
- VOC - volatile organic compounds
- VMT - vehicle miles traveled

Conversion Factor:

907184.74 grams per ton

Table B-4. Operational Mobile Source CAP Emission Factors - Off-Site Starting Exhaust, Hot Soak, Diurnal Loss, and Resting Loss

Tustin Ranch Costco Fuel Station
Orange County, California

EMFAC Vehicle Class	EMFAC Vehicle Trips Output ¹ (trips/day)	EMFAC Emissions Output ¹ (tons/day)								
		VOC ²				NO _x	CO	SO _x	PM ₁₀	PM _{2.5}
		Off-site Starting Exhaust	Hot Soak	Diurnal	Resting Loss	Off-site Starting Exhaust				
Passenger Vehicles³										
LDA	5,912,595	1.7	0.7	0.4	0.3	1.3	14.6	0.004	0.014	0.012
LDT1	619,699	0.3	0.1	0.1	0.1	0.2	1.7	0.000	0.002	0.002
LDT2	2,097,730	0.8	0.3	0.2	0.2	0.7	6.5	0.002	0.004	0.004
MDV	1,449,102	0.7	0.2	0.1	0.1	0.6	5.3	0.001	0.003	0.003
Fuel Delivery Trucks³										
HHDT	102,871	0	0	0	0	0.2	0	0	0	0

Vehicle Class	Project Specific Fleet Mix ⁴	Off-Site Starting Exhaust, Hot Soak, Diurnal, and Resting Loss Emission Factors ⁵ (grams/trip)								
		VOC ²				NO _x	CO	SO _x	PM ₁₀	PM _{2.5}
		Off-site Starting Exhaust	Hot Soak	Diurnal	Resting Loss	Off-site Starting Exhaust				
Passenger Vehicles³										
LDA	60.0%	0.26	0.11	0.06	0.05	0.21	2.2	0.00057	0.0021	0.0019
LDT1	4.7%	0.4	0.21	0.14	0.11	0.29	2.4	0.00066	0.0029	0.0026
LDT2	22.7%	0.35	0.13	0.07	0.08	0.32	2.8	0.00074	0.0019	0.0018
MDV	12.6%	0.46	0.15	0.09	0.09	0.40	3.3	0.00091	0.0021	0.0020
Weighted Emission Factor⁶		0.31	0.12	0.07	0.07	0.26	2.51	0.00	0.00	0.00
Fuel Delivery Trucks³										
HHDT	100.0%	0	0	0	0	1.9	0	0	0	0

Notes:

¹ Data obtained from EMFAC2017 for default emissions activity.

² For purposes of this analysis VOC is assumed to be equal to ROG.

³ Passenger vehicles are assumed to be gasoline-fueled. Fuel delivery trucks are assumed to be diesel-fueled.

⁴ Data obtained from Table B-2.

⁵ Emission factors for EMFAC vehicle classes are estimated as a ratio of the EMFAC emissions output and EMFAC trip output.

⁶ Emission factors for EMFAC vehicle classes are weighted based on project-specific fleet mix to estimate trip-based emission factors for passenger vehicles.

Abbreviations:

CAP - criteria air pollutant

CO - carbon monoxide

EMFAC - Emission FACTors model

LDA - Light Duty Automobile

LDT - Light-Duty Truck

HHDT - Heavy-Heavy Duty truck

MDV - medium-duty vehicle

NO_x - nitrogen oxide compounds (NO + NO₂)

PM - particulate matter

PM_{2.5} - particulate matter less than 2.5 microns

PM₁₀ - particulate matter less than 10 microns

ROG - reactive organic gases

SO_x - sulfur oxide compounds

VOC - volatile organic compounds

Conversion Factor:

907184.74 grams per ton

Table B-5. Operational Mobile Source CAP Emission Factors - On-Site Starting Exhaust

Tustin Ranch Costco Fuel Station

Orange County, California

Vehicle Class	Project Specific Fleet Mix ¹	On-Site Starting Exhaust Emission Factors ² (grams/trip)					
		VOC ³	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}
Passenger Vehicles⁴							
LDA	60.0%	0.026	0.036	0.189	0.0001	0.0002	0.0002
LDT1	4.7%	0.041	0.059	0.210	0.0001	0.0003	0.0002
LDT2	22.7%	0.037	0.057	0.228	0.0001	0.0002	0.0001
MDV	12.6%	0.049	0.071	0.316	0.0001	0.0002	0.0002
Weighted Emission Factor⁵		0.032	0.046	0.215	0.0001	0.0002	0.0002
Fuel Delivery Trucks⁴							
HHDT	100.0%	0	1.89	0	0	0	0

Notes:

¹ Data obtained from Table B-2.

² Passenger vehicles will turn off their engines for approximately 4 minutes while fueling on-site. Hence, on-site starting exhaust emission factors for these vehicles were obtained from EMFAC2017 project-level output for starting exhaust with a 5-minute soak time. Fuel delivery trucks would turn off their engines for longer periods of time while filling up the on-site underground fuel tank. Hence, on-site starting exhaust emission factors for these vehicles were obtained from EMFAC2017 for default emissions activity.

³ For purposes of this analysis VOC is assumed to be equal to ROG.

⁴ Passenger vehicles are assumed to be gasoline-fueled. Fuel delivery trucks are assumed to be diesel-fueled.

⁵ Emission factors for EMFAC vehicle classes are weighted based on project-specific fleet mix to estimate trip-based emission factors for passenger vehicles.

Abbreviations:

CAP - criteria air pollutant

CO - carbon monoxide

EMFAC - Emission FACTors model

LDA - Light Duty Automobile

LDT - Light-Duty Truck

HHDT - Heavy-Heavy Duty truck

MDV - medium-duty vehicle

NO_x - nitrogen oxide compounds (NO + NO₂)

PM - particulate matter

PM_{2.5} - particulate matter less than 2.5 microns in diameter

PM₁₀ - particulate matter less than 10 microns in diameter

ROG - reactive organic gases

SO_x - sulfur oxide compounds

VOC - volatile organic compounds

Conversion Factor:

907184.74 grams per ton

Table B-6. Operational Mobile Source CAP Emission Factors - Idling

Tustin Ranch Costco Fuel Station
Orange County, California

EMFAC Vehicle Class	Project Specific Fleet Mix ¹	Idling Emission Factors for Fuel Trucks ² (grams/idle-minute)					
		VOC ³	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}
Passenger Vehicles⁴							
LDA	60.0%	0.003	0.003	0.053	0.0003	0.0004	0.0004
LDT1	4.7%	0.007	0.009	0.107	0.0003	0.0006	0.0006
LDT2	22.7%	0.004	0.007	0.072	0.0003	0.0004	0.0004
MDV	12.6%	0.007	0.009	0.096	0.0004	0.0005	0.0004
Weighted Emission Factor⁵		0.00	0.01	0.07	0.0003	0.0005	0.0004
Fuel Delivery Trucks⁴							
HHDT	100.0%	0.040	0.593	0.517	0.001	0.001	0.001

Notes:

¹ Data obtained from Table B-2.

² Data obtained from EMFAC2017 project-level output. Passenger vehicle emission rates are equivalent to the running exhaust emission rate in grams per mile at 5 mph, multiplied by the speed correction factor of 2.5 mph.

³ For purposes of this analysis VOC is assumed to be equal to ROG.

⁴ Passenger vehicles are assumed to be gasoline-fueled. Fuel delivery trucks are assumed to be diesel-fueled.

⁵ Emission factors for EMFAC vehicle classes are weighted based on project-specific fleet mix to estimate idling emission factors for passenger vehicles.

Abbreviations:

CAP - criteria air pollutant

CO - carbon monoxide

EMFAC - Emission FACTors model

LDA - Light Duty Automobile

LDT - Light-Duty Truck

HHDT - Heavy-Heavy Duty truck

MDV - medium-duty vehicle

mph - miles per hour

NO_x - nitrogen oxide compounds (NO + NO₂)

PM - particulate matter

PM_{2.5} - particulate matter less than 2.5 microns in diameter

PM₁₀ - particulate matter less than 10 microns in diameter

ROG - reactive organic gases

SO_x - sulfur oxide compounds

VOC - volatile organic compounds

Conversion Factor:

60 minutes per hour

Table B-7. Entrained Road Dust Emission Factors for Operational Mobile Sources

Tustin Ranch Costco Fuel Station

Orange County, California

Vehicle Type	Entrained Road Dust Emission Factor ¹ (lb/VMT)	
	PM ₁₀	PM _{2.5}
Passenger Vehicles	0.00066	0.00016
Fuel Delivery Trucks		

Notes:

¹ Emission factor calculated following guidance in the CalEEMod User's Guide, Appendix A, which is based on AP-42, Section 13.2.1 for vehicles traveling on paved roads. The equation is:

$$EF = k \times (sL)^{0.91} \times (W)^{1.02}, \text{ where:}$$

0.0022 = $k_{PM_{10}}$ (lb/VMT), PM₁₀ particle size multiplier

0.00054 = $k_{PM_{2.5}}$ (lb/VMT), PM_{2.5} particle size multiplier

0.1 = sL (g/m²), silt loading (CalEEMod Default)

2.4 = W (tons), mean vehicle weight (CalEEMod Default)

³ Assumes 100% of on-road travel occurs on paved roads.

Abbreviations:

CalEEMod - California Emissions Estimator Model

EF - emission factor

lb - pounds

PM₁₀ - particulate matter less than 10 microns in aerodynamic diameter

PM_{2.5} - particulate matter less than 2.5 microns in aerodynamic diameter

VMT - vehicle miles traveled

Table B-8. Operational Mobile Source GHG Emission Factors - Running Exhaust

Tustin Ranch Costco Fuel Station
Orange County, California

EMFAC Vehicle Class	EMFAC VMT Output ¹ (miles/day)	EMFAC Running Exhaust Emissions Output ² (tons/day)		
		CO ₂	N ₂ O	CH ₄
Passenger Vehicles³				
LDA	48,945,590	15,020	0.266	0.170
LDT1	5,047,196	1,794	0.049	0.040
LDT2	17,039,204	6,667	0.134	0.086
MDV	11,413,222	5,483	0.117	0.082
Fuel Delivery Trucks³				
HHDT	1,179,820	1,948	0.306	0.008

EMFAC Vehicle Class	Project Specific Fleet Mix ⁴	Running Exhaust Emission Factors ⁵ (grams/mile)		
		CO ₂	N ₂ O	CH ₄
Passenger Vehicles³				
LDA	60.0%	278	0.005	0.0031
LDT1	4.7%	322	0.009	0.0071
LDT2	22.7%	355	0.007	0.0046
MDV	12.6%	436	0.009	0.0065
Weighted Emission Factor⁶		318	0.006	0.004
Fuel Delivery Trucks³				
HHDT	100.0%	1,498	0.24	0.006

Notes:

- ¹ Data obtained from EMFAC2017 for default emissions activity.
- ² Running exhaust emissions obtained from EMFAC2017 for default emissions activity.
- ³ Passenger vehicles are assumed to be gasoline-fueled. Fuel delivery trucks are assumed to be diesel-fueled.
- ⁴ Data obtained from Table B-2.
- ⁵ Emission factors for EMFAC vehicle classes are estimated as a ratio of the EMFAC emissions output and EMFAC VMT output.
- ⁶ Emission factors for EMFAC vehicle classes are weighted based on project-specific fleet mix to estimate VMT-based emission factors for passenger vehicles.

Abbreviations:

- CH₄ - methane
- CO₂ - carbon dioxide
- EMFAC - Emission FACTors model
- GHG - greenhouse gas
- LDA - Light Duty Automobile
- LDT - Light-Duty Truck
- HHDT - Heavy-Heavy Duty truck
- MDV - medium-duty vehicle
- N₂O - nitrous oxide

Conversion Factor:

907,184.74 grams per ton

Table B-9. Operational Mobile Source GHG Emission Factors - Off-Site Starting Exhaust
 Tustin Ranch Costco Fuel Station
 Orange County, California

EMFAC Vehicle Class	EMFAC Vehicle Trips Output ¹ (trips/day)	EMFAC Starting Exhaust Emissions Output ^{1,2} (tons/day)		
		CO ₂	N ₂ O	CH ₄
Passenger Vehicles³				
LDA	5,912,595	374	0.178	0.37
LDT1	619,699	46	0.021	0.055
LDT2	2,097,730	173	0.081	0.173
MDV	1,449,102	146	0.062	0.148
Fuel Delivery Trucks³				
HHDT	102,871	0	0	0

Vehicle Class	Project Specific Fleet Mix ⁴	Off-Site Starting Exhaust Emission Factors ⁵ (grams/trip)		
		CO ₂	N ₂ O	CH ₄
Passenger Vehicles³				
LDA	60.0%	57	0.027	0.057
LDT1	4.7%	67	0.031	0.080
LDT2	22.7%	75	0.035	0.075
MDV	12.6%	92	0.039	0.092
Weighted Emission Factor⁶		66	0.031	0.067
Fuel Delivery Trucks³				
HHDT	100.0%	0	0	0

Notes:

- ¹ Data obtained from EMFAC2017 for default emissions activity.
- ² Greenhouse gas starting exhaust emissions for HHDT are zero, as reported by EMFAC.
- ³ Passenger vehicles are assumed to be gasoline-fueled. Fuel delivery trucks are assumed to be diesel-fueled.
- ⁴ Data obtained from Table B-2.
- ⁵ Emission factors for EMFAC vehicle classes are estimated as a ratio of the EMFAC emissions output and EMFAC trip output.
- ⁶ Emission factors for EMFAC vehicle classes are weighted based on project-specific fleet mix to estimate trip-based emission factors for passenger vehicles..

Abbreviations:

- CH₄ - methane
- CO₂ - carbon dioxide
- EMFAC - Emission FACTors model
- GHG - greenhouse gas
- LDA - Light Duty Automobile
- LDT - Light-Duty Truck
- HHDT - Heavy-Heavy Duty truck
- MDV - medium-duty vehicle
- N₂O - nitrous oxide

Conversion Factor:

907,184.74 grams per ton

Table B-10. Operational Mobile Source GHG Emission Factors - On-Site Starting Exhaust
 Tustin Ranch Costco Fuel Station
 Orange County, California

Vehicle Class	Project Specific Fleet Mix ¹	On-Site Starting Exhaust Emission Factors ² (grams/trip)		
		CO ₂	N ₂ O ³	CH ₄
Passenger Vehicles⁴				
LDA	60.0%	8.1	0.027	0.006
LDT1	4.7%	9.1	0.031	0.009
LDT2	22.7%	10.6	0.035	0.009
MDV	12.6%	13.0	0.039	0.011
Weighted Emission Factor⁵		9.3	0.031	0.007
Fuel Delivery Trucks⁴				
HHDT	100.0%	0	0	0

Notes:

¹ Data obtained from Table B-2.

² Passenger vehicles will turn off their engines for approximately 4 minutes while fueling on-site. Hence, on-site starting exhaust emission factors for these vehicles obtained from EMFAC2017 project-level output for starting exhaust with a 5-minute soak time. Greenhouse gas starting exhaust emissions for HHDT are zero, as reported by EMFAC.

³ EMFAC2017 project-level tool does not output N₂O emissions. N₂O emissions shown in this table are obtained from Table B-9.

⁴ Passenger vehicles are assumed to be gasoline-fueled. Fuel delivery trucks are assumed to be diesel-fueled.

⁵ Emission factors for EMFAC vehicle classes are weighted based on project-specific fleet mix to estimate trip-based emission factors for passenger vehicles.

Abbreviations:

CH₄ - methane

CO₂ - carbon dioxide

EMFAC - Emission FACTors model

GHG - greenhouse gas

LDA - Light Duty Automobile

LDT - Light-Duty Truck

HHDT - Heavy-Heavy Duty truck

MDV - medium-duty vehicle

N₂O - nitrous oxide

Conversion Factor:

907184.74 grams per ton

Table B-11. Operational Mobile Source GHG Emission Factors - Idling

Tustin Ranch Costco Fuel Station

Orange County, California

EMFAC Vehicle Class	Project Specific Fleet Mix ¹	Idling Emission Factors for Trucks ² (grams/idle-minute)		
		CO ₂	N ₂ O	CH ₄
Passenger Vehicles³				
LDA	60.0%	27	0	0.001
LDT1	4.7%	31	0	0.001
LDT2	22.7%	34	0	0.001
MDV	12.6%	42	0	0.001
Weighted Emission Factor⁴		30	0	0.001
Fuel Delivery Trucks³				
HHDT	100.0%	103	0	0.002

Notes:

¹ Data obtained from EMFAC2017 project-level output.

² Data obtained from EMFAC2017 project-level output. N₂O emissions are zero, as reported by EMFAC. Passenger vehicle emission rates are equivalent to the running exhaust emission rate in grams per mile at 5 mph, multiplied by the speed correction factor of 2.5 mph.

³ Passenger vehicles are assumed to be gasoline-fueled. Fuel delivery trucks are assumed to be diesel-fueled.

⁴ Emission factors for EMFAC vehicle classes are weighted based on project-specific fleet mix to estimate idling emission factors for trucks.

Abbreviations:

CH₄ - methane

CO₂ - carbon dioxide

EMFAC - Emission FACTors model

GHG - greenhouse gas

LDA - Light Duty Automobile

LDT - Light-Duty Truck

HHDT - Heavy-Heavy Duty truck

MDV - medium-duty vehicle

N₂O - nitrous oxide

Conversion Factor:

60 minutes per hour

Table B-12. Maximum Daily Criteria Air Pollutant Emission Estimates for Operational Mobile Sources
 Tustin Ranch Costco Fuel Station
 Orange County, California

Mobile Source Activity	Trip Type	Trip Distance ¹ (miles)	Peak Daily Trips ¹ (one-way trips/day)	Peak Daily VMT ² (miles/day)	Idle Duration ³ (minutes/round trip)	Maximum Daily Emissions (lb/day)					
						VOC ⁴	NO _x ⁵	CO ⁵	SO _x ⁵	PM ₁₀ ⁶	PM _{2.5} ⁶
Passenger Vehicles (Off-Site)	Primary ⁷	8.0	1,515	12,058	--	2.42	2.21	28.27	0.08	9.21	2.47
	Diverted ⁸	1.7	2,362	4,133	--	0.50	0.61	8.25	0.03	3.16	0.85
Passenger Vehicles (On-Site)	Primary ⁹	0.32	1,515	485	12	0.40	0.25	2.64	0.01	0.38	0.11
	Diverted ⁸	0.32	2,362	756	12	0.62	0.39	4.12	0.01	0.59	0.17
	Pass-By ⁹	0.32	2,315	741	12	0.61	0.38	4.03	0.01	0.58	0.17
	Internal ¹⁰	0	3,325	--	12	0.18	0.22	2.88	0.01	0.02	0.02
Fuel Delivery Trucks (Off-Site)	Primary ⁷	6.6	16	105	--	0.03	1.07	0.12	0.003	0.11	0.04
Fuel Delivery Trucks (On-Site)	Primary ¹¹	0.32	16	5	5	0.01	0.14	0.05	0.000	0.01	0.00
On-Site Emissions						1.8	1.4	13.7	0.1	1.6	0.5
Total Emissions						4.8	5.3	50.4	0.2	14.0	3.8

Notes

- ¹ Data obtained from Table B-1. The off-site trip distance is equivalent to the average trip length minus the on-site distance of 0.32 miles.
- ² VMT is calculated as the product of the trip distance and peak daily trips shown in this table.
- ³ Idle duration for passenger vehicles is estimated using a maximum queue length of 5 vehicles and a transaction time of 4 minutes per vehicle. Fuel delivery truck idle duration is 5 minutes based on the CARB Air Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. Available at: <https://ww3.arb.ca.gov/msprog/truck-idling/truck-idling.htm>. Accessed September 2019.
- ⁴ VOC emissions include running exhaust, running loss, hot soak, diurnal, resting loss, starting exhaust, and idling exhaust. Emissions were estimated using emission factors from Tables B-3, B-4, B-5, and B-6 along with peak daily VMT and peak daily trips.
- ⁵ NO_x, CO, and SO_x emissions include running exhaust, starting exhaust, and idling exhaust. Emissions were estimated using emission factors from Tables B-3, B-4, B-5, and B-6 along with peak daily VMT and peak daily trips.
- ⁶ PM₁₀ and PM_{2.5} emissions include running exhaust, tire wear, brake wear, fugitive dust, starting exhaust, and idling exhaust. Emissions were estimated using emission factors from Tables B-3, B-4, B-5, B-6, and B-7 along with peak daily VMT and peak daily trips.
- ⁷ Off-site primary trip emissions include travel emissions (running exhaust, running loss, tire wear, brake wear, and fugitive dust), off-site evaporative emissions (hot soak, diurnal, and resting loss) using the number of round trips (i.e., half of the one-way trips), and off-site starts using the number of round trips.
- ⁸ Off-site diverted trip emissions include travel emissions (running exhaust, running loss, tire wear, brake wear, and fugitive dust).
- ⁹ On-site passenger vehicle trip emissions include travel emissions (running exhaust, running loss, tire wear, brake wear, and fugitive dust), on-site evaporative emissions (hot soak) using the number of round trips (i.e., half of the one-way trips), on-site starts using the number of round trips, and idling exhaust using the number of round trips. Since passenger vehicles turn off their engines for approximately 4 minutes while fueling on-site, they will not emit diurnal and resting loss emissions; these types of emissions occur after the engine has been turned off for more than 30 minutes.
- ¹⁰ On-site internal vehicle trip emissions include idling exhaust using the number of round trips (i.e., half of the one-way trips).
- ¹¹ On-site fuel delivery truck trip emissions include travel emissions (running exhaust, running loss, tire wear, brake wear, and fugitive dust), on-site evaporative emissions (hot soak, diurnal, and resting loss) using the number of round trips (i.e., half of the one-way trips), on-site starts using the number of round trips, and idling exhaust using the number of round trips.

Abbreviations:

- | | | |
|------------------------------------|--|--|
| CO - carbon monoxide | NO _x - nitrogen oxide compounds (NO + NO ₂) | ROG - reactive organic gases |
| lb - pounds | PM - particulate matter | SO _x - sulfur oxide compounds |
| NO - nitrogen monoxide | PM _{2.5} - particulate matter less than 2.5 microns in diameter | VOC - volatile organic compounds |
| NO ₂ - nitrogen dioxide | PM ₁₀ - particulate matter less than 10 microns in diameter | VMT - vehicle miles traveled |

Table B-13. Operational Mobile Source Greenhouse Gas Emissions Summary
 Tustin Ranch Costco Fuel Station
 Orange County, California

Mobile Source Activity	Trip Type	Trip Distance ¹ (miles)	Annual Trips ¹ (one-way trips/year)	Annual Average VMT ² (miles/year)	Idle Duration ³ (minutes/round trip)	GHG Emissions ⁴ (MT/yr)			
						CO ₂	N ₂ O	CH ₄	CO ₂ e ⁵
Passenger Cars (Off-Site)	Primary ⁶	8.0	545,799	4,344,014	--	1,398	0.04	0.036	1,409
	Diverted ⁷	1.7	812,626	1,421,892	--	452	0.01	0.006	454
Passenger Cars (On-Site)	Primary ⁸	0.32	545,799	174,656	12	157	0.01	0.006	160
	Diverted ⁸	0.32	812,626	260,040	12	234	0.01	0.009	239
	Pass-By ⁸	0.32	777,375	248,760	12	224	0.01	0.008	228
	Internal ⁹	0	1,166,305	0	12	212	0.00	0.006	212
Fuel Delivery Trucks (Off-Site)	Primary ⁶	6.6	5,840	38,427	--	58	0.01	0.0002	60
Fuel Delivery Trucks (On-Site)	Primary ⁸	0.32	5,840	1,869	5	4	0.00	0.0000	4.4
Total Emissions⁵						2,739	0.09	0.071	2,768

Notes

- ¹ Data obtained from Table B-1. The off-site trip distance is equivalent to the average trip length minus the on-site distance of 0.32 miles.
- ² VMT is calculated as the product of the trip distance and annual trips shown in this table.
- ³ Idle duration for passenger vehicles is estimated using a maximum queue length of 5 vehicles and a transaction time of 4 minutes per vehicle. Fuel delivery truck idle duration is 5 minutes based on the CARB Air Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. Available at: <https://ww3.arb.ca.gov/msprog/truck-idling/truck-idling.htm>. Accessed: September 2019.
- ⁴ Includes emissions from running exhaust, starting exhaust, and idling exhaust. Emissions were estimated using emission factors from Tables B-8, B-9, B-10, and B-11 along with annual average VMT and annual average trips.
- ⁵ CO₂e estimated based on Global Warming Potentials for 100-year time horizon for CO₂, N₂O, and CH₄ as presented in the Intergovernmental Panel on Climate Change Fourth Assessment Report.
- ⁶ Off-site primary trip emissions include travel emissions (running exhaust) and off-site starts using the number of round trips (i.e., half of the one-way trips).
- ⁷ Off-site diverted trip emissions include travel emissions (running exhaust).
- ⁸ On-site primary trip emissions include travel emissions (running exhaust), on-site starts using the number of round trips (i.e., half of the one-way trips), and idling exhaust using the number of round trips.
- ⁹ On-site internal vehicle trip emissions include idling exhaust using the number of round trips (i.e., half of the one-way trips).

Abbreviations:

CH₄ - methane
 CO₂ - carbon dioxide
 CO₂e - carbon dioxide equivalents
 lbs - pounds

MT - metric tonnes
 N₂O - nitrous oxide
 VMT - vehicle miles traveled
 yr - Year

Conversion Factors:

2204.62 lb/MT
 453.592 g/lb

Global Warming Potentials

CO₂ 1
 CH₄ 25
 N₂O 298