

Appendix H Climate Change and Greenhouse Gases Impacts Report

GOLD LINE EASTSIDE TRANSIT CORRIDOR PHASE 2



Prepared for
Los Angeles Metropolitan
Transportation Authority
One Gateway Plaza
Los Angeles, CA 90012

June 2022

Appendix H

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Prepared for:
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Table of Contents

1.0	Introduction	1
2.0	Proposed Project and Alternatives	2
2.1	Project Setting and Description	2
2.2	Build Alternatives	6
2.2.1	Alternative 1 Washington	6
2.2.1.1	Guideway Alignment	7
2.2.2	Alternative 2 Atlantic to Commerce/Citadel IOS	9
2.2.2.1	Guideway Alignment	9
2.2.3	Alternative 3 Atlantic to Greenwood IOS	9
2.2.3.1	Guideway Alignment	10
2.3	Maintenance and Storage Facilities	10
2.3.1	Commerce MSF	10
2.3.2	Montebello MSF	11
2.4	Ancillary Facilities	12
2.5	Proposed Stations	13
2.6	Description of Construction	14
2.7	Description of Operations	15
2.8	No Project Alternative	15
3.0	Regulatory Framework	16
3.1	Federal	16
3.1.1	Massachusetts et al. v. Environmental Protection Agency et al.	16
3.1.2	Endangerment Finding	16
3.1.3	Greenhouse Gas and Fuel Efficiency Standards for Clean Vehicles	16
3.1.3.1	Passenger Cars and Light-Duty Trucks	17
3.1.3.2	Medium and Heavy-Duty Engines and Vehicles	18
3.1.3.3	Fuel Efficiency Standards for Construction Equipment	18
3.2	State	18
3.2.1	California Advanced Clean Cars Program	18
3.2.2	California Advanced Clean Cars II Program	19
3.2.3	California Executive Order S-3-05, B-30-15, and B-55-18	19
3.2.4	Global Warming Solutions Act of 2006 (Assembly Bill 32)	20
3.2.4.1	Scoping Plan	21
3.2.4.2	Cap-and-Trade Program	22
3.2.4.3	Paris Climate Accord - U.S. Climate Alliance	22
3.2.5	Senate Bill 743	22
3.2.6	Senate Bill 375	22
3.2.7	California Executive Order S-01-07 and the Low Carbon Fuel Standard	23
3.2.8	Senate Bill 49 The California Environmental Defense Act	23
3.2.9	Senate Bill 350 Clean Energy and Pollution Reduction Act	23
3.2.10	Innovative Clean Transit Regulation	24



- 3.2.11 Potential Amendments to the Diesel Engine Off-Road Emission Standards..... 24
- 3.3 Regional 24
 - 3.3.1 Southern California Association of Governments 2020-2045 Regional
Transportation Plan/Sustainable Communities Strategy..... 24
 - 3.3.2 South Coast Air Quality Management District Greenhouse Gas California
Environmental Quality Act Significance Threshold Working Group..... 25
 - 3.3.3 Metro Climate Action and Adaptation Plan 25
 - 3.3.4 Metro Green Construction Policy..... 25
- 3.4 Local 25
 - 3.4.1 County of Los Angeles 26
 - 3.4.2 City of Pico Rivera 26
 - 3.4.3 City of Santa Fe Springs..... 27
 - 3.4.4 City of Whittier 27
 - 3.4.5 Additional City Plans..... 27
- 4.0 Methodology..... 28
 - 4.1 Construction Emissions..... 28
 - 4.2 Operational Emissions..... 29
- 5.0 Thresholds of Significance 31
 - 5.1 South Coast Air Quality Management District Guidance..... 31
 - 5.2 Amendments to the CEQA Guidelines 31
- 6.0 Existing Setting 35
 - 6.1 Area of Potential Impact 35
 - 6.2 Description of Relevant Pollutants 35
 - 6.3 Existing Conditions 36
 - 6.3.1 Regional Highway Traffic Emissions 38
 - 6.3.2 Total Operational Emissions 39
- 7.0 Impacts 40
 - 7.1 Impact GHG-1: Emission Generation..... 40
 - 7.1.1 Alternative 1 Washington Boulevard 40
 - 7.1.1.1 Operational Impacts 40
 - 7.1.1.2 Construction Impacts 47
 - 7.1.2 Alternative 2 Atlantic to Commerce/Citadel IOS..... 49
 - 7.1.2.1 Operational Impacts 49
 - 7.1.2.2 Construction Impacts 54
 - 7.1.3 Alternative 3 Atlantic to Greenwood IOS 55
 - 7.1.3.1 Operational Impacts 55
 - 7.1.3.2 Construction Impacts 62
 - 7.1.4 Maintenance and Storage Facilities 64
 - 7.1.4.1 Operational Impacts 64
 - 7.1.4.2 Construction Impacts 65
 - 7.2 Impact GHG-2: Conflicts..... 66
 - 7.2.1 Alternative 1 Washington Boulevard 66
 - 7.2.1.1 Construction and Operational Impacts 66



- 7.2.2 Alternative 2 Atlantic to Commerce/Citadel IOS..... 67
 - 7.2.2.1 Construction and Operational Impacts 67
- 7.2.3 Alternative 3 Atlantic to Greenwood IOS 67
 - 7.2.3.1 Construction and Operational Impacts 67
- 7.2.4 Maintenance and Storage Facilities 68
 - 7.2.4.1 Construction and Operational Impacts 68
- 8.0 Mitigation Measures and Impacts After Mitigation..... 70
 - 8.1 Impact GHG-1: Emission Generation..... 70
 - 8.1.1 Alternative 1 Washington Boulevard 70
 - 8.1.2 Alternative 2 Atlantic to Commerce/Citadel IOS..... 70
 - 8.1.3 Alternative 3 Atlantic to Greenwood IOS 70
 - 8.1.4 Maintenance and Storage Facilities 71
 - 8.2 Impact GHG-2: Conflicts..... 71
 - 8.2.1 Alternative 1 Washington Boulevard 71
 - 8.2.2 Alternative 2 Atlantic to Commerce/Citadel IOS..... 71
 - 8.2.3 Alternative 3 Atlantic to Greenwood IOS 71
 - 8.2.4 Maintenance and Storage Facilities 71
 - 8.3 Mitigation Measure Applicability..... 72
- 9.0 No Project Alternative 73
 - 9.1 No Project Alternative 73
 - 9.1.1 Description..... 73
 - 9.1.2 Impacts..... 73
 - 9.1.2.1 Impact GHG-1: Emission Generation 73
 - 9.1.2.2 Impact GHG-2: Conflicts 74
- 10.0 Summary Of Alternatives 76
 - 10.1 No Project..... 76
 - 10.2 Alternative 1 Washington Boulevard + MSF..... 76
 - 10.2.1 Alternative 1 Washington + MSF + Design Options..... 77
 - 10.3 Alternative 2 Atlantic to Commerce/Citadel IOS + MSF 77
 - 10.3.1 Alternative 2 Atlantic to Commerce/Citadel IOS + MSF + Design Options..... 77
 - 10.4 Alternative 3 Atlantic to Greenwood IOS + MSF..... 78
 - 10.4.1 Alternative 3 Atlantic to Greenwood + MSF + Design Options 78
- 11.0 Preparers Qualifications..... 79
- 12.0 References Cited 80

Tables

Table 6-1. Existing Conditions Annual Regional Highway Traffic GHG Emissions	38
Table 6-2. Existing Conditions Total Operational GHG Emissions	39
Table 7-1. Alternative 1 Annual Regional Highway Traffic GHG Emissions.....	40
Table 7-2. Alternative 1 Annual LRV Operations GHG Emissions	41
Table 7-3. Alternative 1 Annual Station Operations GHG Emissions	42
Table 7-4. Alternative 1 Annual Parking Facility Operations GHG Emissions.....	42
Table 7-5. Alternative 1 Annual Train Control Operations GHG Emissions	43
Table 7-6. Alternative 1 Commerce MSF Site Option Operations GHG Emissions	43
Table 7-7. Alternative 1 Montebello MSF Site Option Operations GHG Emissions	44
Table 7-8. Alternative 1 with Commerce MSF Site Option Total Operational GHG Emissions	45
Table 7-9. Alternative 1 with Montebello MSF Site Option Total Operational GHG Emissions	46
Table 7-10. Alternative 1 Annual Construction GHG Emissions	48
Table 7-11. Alternative 2 Annual Regional Highway Traffic GHG Emissions.....	49
Table 7-12. Alternative 2 Annual LRV Operations GHG Emissions	50
Table 7-13. Alternative 2 Annual Station Operations GHG Emissions	51
Table 7-14. Alternative 2 Annual Train Control Operations GHG Emissions.....	51
Table 7-15. Alternative 2 Commerce MSF Site Option Operations GHG Emissions	52
Table 7-16. Alternative 2 with Commerce MSF Site Option Total Operational GHG Emissions	53
Table 7-17. Alternative 2 Annual Construction GHG Emissions	54
Table 7-18. Alternative 3 Annual Regional Highway Traffic GHG Emissions	55
Table 7-19. Alternative 3 Annual LRV Operations GHG Emissions	56
Table 7-20. Alternative 3 Annual Station Operations GHG Emissions	57
Table 7-21. Alternative 3 Annual Parking Facility Operations GHG Emissions	57
Table 7-22. Alternative 3 Annual Train Control Operations GHG Emissions.....	58
Table 7-23. Alternative 3 Commerce MSF Site Option Operations GHG Emissions.....	58
Table 7-24. Alternative 3 Montebello MSF Site Option Operations GHG Emissions.....	59
Table 7-25. Alternative 3 with Commerce MSF Site Option Total Operational GHG Emissions	60
Table 7-26. Alternative 3 with Montebello MSF Site Option Total Operational GHG Emissions	61
Table 7-27. Alternative 3 Annual Construction GHG Emissions.....	63
Table 9-1. No Project Alternative Annual Regional Highway Traffic GHG Emissions	74
Table 10-1. Significant/Adverse Impacts Remaining After Mitigation	76

Figures

Figure 2.1. Alternative 1 Washington GSA and DSA	3
Figure 2.2. Alternative 2 Atlantic to Commerce/Citadel IOS GSA and DSA	4
Figure 2.3. Alternative 3 Atlantic to Greenwood IOS GSA and DSA	5
Figure 2.4. Atlantic/Pomona Station Option	8
Figure 2.5. Montebello MSF S-Curve Alignment	12
Figure 6.1. California GHG Inventory for 2019	37

Appendices

- Attachment A – Construction Emission Calculations
- Attachment B – Operations Emission Calculations

Acronyms

2020 RTP/SCS	Connect SoCal 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy
AB	Assembly Bill
ACC	Advanced Clean Cars
AR4	Intergovernmental Panel on Climate Change Fourth Assessment Report
BMP	Best Management Practice
BNSF	Burlington Northern Santa Fe
C ₂ F ₆	perfluoroethane
CAA	Clean Air Act
CAFE	Corporate Average Fuel Economy
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CAP	climate action plan
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCAP	community climate action plan
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CF ₄	perfluoromethane
CFCs	chlorofluorocarbons
CFR	Code of Federal Regulations
CH ₄	methane
CNRA	California Natural Resources Agency

CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
DSA	detailed study area
EEl	Edison Electric Institute
EMFAC	Emission Factor Model for On-road Motor Vehicles
FR	Federal Register
FTA	Federal Transit Administration
GHG	greenhouse gas
g/mi	grams per mile
GSA	general study area
GVWR	gross vehicle weight rating
GWP	global warming potential
HCFCs	hydrochlorofluorocarbons
HFCs	hydrofluorocarbons
ICT	Innovative Clean Transit
IOS	Initial Operating Segment
IPCC	Intergovernmental Panel on Climate Change
IRPs	Integrated Resource Plans
LCFS	low carbon fuel standard
LEV III	Low-Emission Vehicle III
LRT	light rail transit
LRTP	Long Range Transportation Plan
LRV	light rail vehicles
Metro	Los Angeles County Metropolitan Transportation Authority
MMT	million metric tons

MMTCO _{2e}	Million metric tons carbon dioxide equivalent
mpg	miles per gallon
MPO	metropolitan planning organizations
MSE	mechanically stabilized earth
MSF	Maintenance and Storage Facility
MUTCD	Manual of Uniform Traffic Control Devices
N ₂ O	nitrous oxide
NHTSA	National Highway Traffic Safety Administration
NTD	National Transit Database
OAL	Office of Administrative Law
OCS	overhead catenary system
OFFROAD	Emissions Model for Off-road Equipment
OPR	Office of Planning and Research
PFCs	perfluorocarbons
Project	Eastside Transit Corridor Phase 2 Project
ROW	right-of-way
RPS	Renewable Portfolio Standard
RTAC	Regional Targets Advisory Committee
RTP	Regional Transportation Plan
SAFE	Safer Affordable Fuel-Efficient
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SCS	Sustainable Communities Strategy

SF ₆	sulfur hexafluoride
SoCAB	South Coast Air Basin
TBM	tunnel boring machine
TCR	The Climate Registry
TPSS	traction power substation
USEPA	United States Environmental Protection Agency
VMT	vehicle miles traveled
ZEB	zero emission bus
ZEV	zero emission vehicle

1.0 INTRODUCTION

This impacts report discusses the Eastside Transit Corridor Phase 2 Project (Project) setting in relation to climate change and greenhouse gases. It describes existing conditions, current applicable regulatory setting, and potential impacts from operation and construction of the Build Alternatives and the No Project Alternative. This study was conducted in compliance with the California Environmental Quality Act (CEQA) and the State CEQA Guidelines, California Code of Regulations Section 15000 et seq.

The Project would extend the Los Angeles County Metropolitan Transportation Authority (Metro) L (Gold) Line, a light rail transit (LRT) line, from its current terminus at the Atlantic Station in the unincorporated community of East Los Angeles to the city of Whittier. It would extend the existing Metro L (Gold) Line approximately 3.2 to 9.0 miles, depending on the Build Alternative.

The Project area of analysis includes a general study area (GSA) that is regional in scope and scale, and a detailed study area (DSA) that encompasses an approximately two-mile area from the Project alignment in eastern Los Angeles County. Additionally, specialized study areas were developed, where applicable, for certain environmental impact categories where the potential impacts would occur within an area that varies from the GSA or DSA. All specialized study areas are contained within the GSA. The study area for climate change and greenhouse gases is the GSA.

A diverse mix of land uses are located within the GSA and DSA, including single- and multi-family residences, commercial and retail uses, industrial development, parks and recreational, health and medical uses, educational institutions, and vacant land. The Project would traverse densely populated, low-income, and heavily transit-dependent communities with major activity centers within the Gateway Cities subregion of Los Angeles County.

2.0 PROPOSED PROJECT AND ALTERNATIVES

2.1 Project Setting and Description

This impacts report evaluates potential environmental impacts of three Build Alternatives and a No Project Alternative. The Build Alternatives are: Alternative 1 Washington (Alternative 1), Alternative 2 Atlantic to Commerce/Citadel Initial Operating Segment (IOS) (Alternative 2), and Alternative 3 Atlantic to Greenwood IOS (Alternative 3).

For purposes of describing the Project, two study areas have been defined. The GSA is regional in scope and scale, whereas the DSA encompasses an approximately two-mile area from the Project alignment's centerline. The GSA is the same for all three of the Build Alternatives. The purpose of the GSA is to establish the study area for environmental resources that are regional in scope and scale, such as regional transportation, including vehicle miles traveled (VMT) and regional travel demands, population, housing, or employment. The GSA consists of several jurisdictions within Los Angeles County including the cities of Bell, Commerce, El Monte, Industry, Los Angeles, Montebello, Monterey Park, Pico Rivera, Rosemead, South El Monte, Santa Fe Springs, Whittier, unincorporated areas of Los Angeles County, which includes East Los Angeles and West Whittier-Los Nietos, and other cities within the San Gabriel Valley. It is generally bounded by Interstate (I) 10 to the north, Peck Road in South El Monte and Lambert Road in Whittier to the east, I-5 and Washington Boulevard to the south, and I-710 to the west. **Figure 2.1**, **Figure 2.2**, and **Figure 2.3** present the boundaries of the GSA for each of the three Build Alternatives.

The DSA establishes a study area to evaluate environmental resources that are more sensitive to the physical location of the Build Alternatives. The DSA for Alternative 1 Washington generally includes the area within a half-mile to two-mile distance from the guideway centerline, as shown in **Figure 2.1**. It encompasses five cities, Commerce, Montebello, Pico Rivera, Santa Fe Springs, and Whittier, and communities of unincorporated East Los Angeles and Whittier-Los Nietos. The DSA for Alternative 2 Atlantic to Commerce/Citadel IOS and Alternative 3 Atlantic to Greenwood IOS, does not extend as far to the east. As shown in **Figure 2.2** and **Figure 2.3** for Alternative 2 and Alternative 3 respectively, the DSA extends to the Rio Hondo and includes Commerce, Montebello, and unincorporated East Los Angeles.



Source: Metro; CDM Smith/AECOM JV, 2021.

Figure 2.1. Alternative 1 Washington GSA and DSA



Source: Metro; CDM Smith/AECOM JV, 2021.

Figure 2.2. Alternative 2 Atlantic to Commerce/Citadel IOS GSA and DSA



Source: Metro; CDM Smith/AECOM JV, 2021.

Figure 2.3. Alternative 3 Atlantic to Greenwood IOS GSA and DSA

2.2 Build Alternatives

This impacts report evaluates the potential environmental impacts of three Build Alternatives which have the same guideway alignment east of the existing terminus at Atlantic Station but vary in length. Alternative 1 has the longest alignment at approximately 9.0 miles with seven stations (one relocated/reconfigured and six new), two maintenance and storage facility (MSF) site options and would terminate at Lambert station on Lambert Road in the city of Whittier. Alternative 2 is approximately 3.2 miles in length with three stations, one MSF site option, and would terminate at the Commerce/Citadel station in the city of Commerce, with non-revenue lead tracks extending further into the city of Commerce to connect to the Commerce MSF site option. Alternative 3 is approximately 4.6 miles in length with four stations, two MSF site options, and would terminate at Greenwood station in the city of Montebello.

There are also design options under consideration for each of the three Build Alternatives that consist of a variation in the design of the relocated/reconfigured Atlantic Station (applicable to Alternatives 1, 2, and 3) and a variation in the station and alignment profile in Montebello (applicable to Alternatives 1 and 3). Construction and operation of one or both design options are considered and evaluated for Alternative 1 and Alternative 3.

To differentiate the impacts evaluation of a Build Alternative with or without the design option(s) incorporated, a Build Alternative without the design option(s) is referred to as the “base Alternative” (i.e., base Alternative 1). A Build Alternative with a design option incorporated is referred to by using the design option name (e.g., Alternative 1 with the Atlantic/Pomona Station Option and/or the Montebello At-Grade Option). The three Build Alternatives and the design options are described in greater detail below.

2.2.1 Alternative 1 Washington

Alternative 1 would extend the Metro L (Gold) Line LRT approximately 9.0 miles east from the current at-grade station at Atlantic Boulevard to an at-grade terminus at Washington Boulevard/Lambert Road in the city of Whittier. This alternative would include a relocated/reconfigured Atlantic station in an underground configuration and six new stations: Atlantic/Whittier (underground), Commerce/Citadel (underground), Greenwood (aerial), Rosemead (at-grade), Norwalk (at-grade), and Lambert (at-grade). The base Alternative 1 alignment would transition from the existing at-grade alignment to an underground configuration and would transition to an aerial configuration in the city of Commerce before transitioning to at-grade at Montebello Boulevard. The alignment includes approximately 3.0 miles of tunnel, 1.5 miles of aerial, and 4.5 miles of at-grade alignment.

The Alternative 1 alignment crosses the Rio Hondo and San Gabriel River and the Rio Hondo Spreading Grounds. The existing San Gabriel River and Rio Hondo bridges would be replaced with new bridges designed to carry both the LRT facility and the four-lane roadway.

An MSF and other ancillary facilities would also be constructed as part of the Project, including overhead catenary system (OCS), cross passages, ventilation structures, traction power substation (TPSS) sites, crossovers, emergency generators, radio tower poles and equipment shelters, and other supporting facilities along the alignment.

Two design options for Alternative 1 are described below.

2.2.1.1 Guideway Alignment

Under Alternative 1, the guideway would begin at the eastern end of the existing East Los Angeles Civic Center Station, transitioning from at-grade to underground at the intersection of South La Verne Avenue and East 3rd Street. The guideway would turn south and run beneath Atlantic Boulevard to approximately Verona Street and Olympic Boulevard. The underground guideway would then curve southeast, running under Smithway Street near the Citadel Outlets in the city of Commerce. After crossing Saybrook Avenue, the guideway would daylight from underground to an aerial configuration. Depending on the MSF site option that is selected, the aerial guideway would continue parallel to Washington Boulevard, east of Garfield Avenue, and merge into the center median of Washington Boulevard (Commerce MSF site option) or merge into the center median of Washington Boulevard at Gayhart Street (Montebello MSF site option). The alignment would maintain an aerial configuration then transition to an at-grade configuration east of Carob Way and would remain at-grade in the center of Washington Boulevard. The at-grade alignment would terminate at Lambert station in the city of Whittier.

2.2.1.1.1 Design Options

The following design options are being considered for Alternative 1:

Atlantic/Pomona Station Option – The Atlantic/Pomona Station Option would relocate the existing Atlantic Station to a shallow open air underground station with two side platforms and a canopy (**Figure 2.4**). This station design option would be located beneath the existing triangular parcel bounded by Atlantic Boulevard, Pomona Boulevard, and Beverly Boulevard. The excavation depth of the station invert would be approximately 20 to 25 feet from the existing ground elevation.

This option would also impact the guideway alignment and location of the tunnel boring machine (TBM) extraction pit. The underground guideway would be located east of Atlantic Boulevard and require full property acquisitions at its footprint between Beverly Boulevard and 4th Street. The alignment would connect with the base Alternative 2 alignment just north of the proposed Atlantic/Whittier station. The TBM extraction pit would be east of Atlantic Boulevard between Repetto Street and 4th Street. Limits for the excavation would occur between the TBM extraction pit and the intersection of Pomona Boulevard and Beverly Boulevard.

Montebello At-Grade Option – This design option consists of approximately one mile of at-grade guideway along Washington Boulevard between Yates Avenue and Carob Way in the city of Montebello. In this design option, after crossing Saybrook Avenue, the LRT guideway would daylight from underground to an aerial configuration to avoid disrupting existing Burlington Northern Santa Fe (BNSF) Railway tracks. The aerial guideway would continue parallel to Washington Boulevard, then merge into the center median east of Garfield Avenue. At Yates Avenue, the guideway would transition from aerial to an at-grade configuration and remain at-grade until terminating near Lambert Road in the city of Whittier. This design option includes an at-grade Greenwood station located west of Greenwood Avenue. The lead tracks to the MSF site option would also be at-grade. Alternative 1 with the Montebello At-Grade Option would have approximately 3.0 miles of underground, 0.5 miles of aerial, and 5.5 miles of at-grade alignment.



Source: Metro; ACE Team, January 2022.

Figure 2.4. Atlantic/Pomona Station Option

2.2.2 Alternative 2 Atlantic to Commerce/Citadel IOS

Alternative 2 would extend the Metro L (Gold) Line approximately 3.2 miles from the current terminus at Atlantic Boulevard to an underground terminal station at the Commerce/Citadel station in the city of Commerce with lead tracks connecting to the Commerce MSF site option. Alternative 2 would include a relocated/reconfigured Atlantic station and two new stations: Atlantic/Whittier (underground), and Commerce/Citadel (underground). The base Alternative 2 alignment includes approximately 3.0 miles of underground, 0.1 miles of aerial, and 0.1 miles of at-grade alignment.

An MSF and other ancillary facilities would also be constructed as part of the Project, including OCS, tracks, cross passages, ventilation structures, TPSSs, track crossovers, emergency generators, radio tower poles and equipment shelters, and other facilities along the alignment.

2.2.2.1 Guideway Alignment

Under Alternative 2, the guideway would follow the same alignment as under Alternative 1. The guideway would begin at the eastern end of the existing East Los Angeles Civic Center Station, transitioning from at-grade to underground at the intersection of South La Verne Avenue and East 3rd Street. The guideway would turn south and run beneath Atlantic Boulevard to approximately Verona Street and Olympic Boulevard. The underground guideway would then curve southeast, running under Smithway Street near the Citadel Outlets in the city of Commerce. The alignment would terminate at the Commerce/Citadel station with non-revenue lead tracks connecting to the Commerce MSF site option.

2.2.2.1.1 Design Option

One design option, the Atlantic/Pomona Station Option described in **Section 2.2.1.1.1** and shown on **Figure 2.4** is being considered for Alternative 2.

2.2.3 Alternative 3 Atlantic to Greenwood IOS

Alternative 3 would extend the Metro L (Gold) Line approximately 4.6 miles east from the current terminus at Atlantic Boulevard to an aerial terminal station at the Greenwood station in the city of Montebello. This alternative would include a relocated/reconfigured Atlantic station and three new stations: Atlantic/Whittier (underground), Commerce/Citadel (underground), and Greenwood (aerial). The base Alternative 3 alignment includes approximately 3.0 miles of underground, 1.5 miles of aerial, and 0.1 miles of at-grade alignment.

An MSF and other ancillary facilities would also be constructed as part of the Project, including OCS, tracks, cross passages, ventilation structures, TPSSs, track crossovers, emergency generators, radio tower poles and equipment shelters, and other facilities along the alignment.

Two design options for Alternative 3 are described below.

2.2.3.1 Guideway Alignment

Under Alternative 3, the guideway would follow the same alignment as under Alternative 1. The guideway would begin at the eastern end of the existing East Los Angeles Civic Center Station, transitioning from at-grade to underground at the intersection of South La Verne Avenue and East 3rd Street. The guideway would then turn south and run beneath Atlantic Boulevard to approximately Verona Street and Olympic Boulevard. The underground guideway would then curve southeast, running under Smithway Street near the Citadel Outlets in the city of Commerce. After crossing Saybrook Avenue, the guideway would daylight from underground to an aerial configuration. Depending on the MSF site option that is selected, the aerial guideway would continue parallel to Washington Boulevard, east of Garfield Avenue, and merge into the center median of Washington Boulevard (Commerce MSF site option) or merge into the center media of Washington Boulevard at Gayhart Street (Montebello MSF site option). The aerial guideway would terminate at the Greenwood station in the city of Montebello.

2.2.3.1.1 Design Option

Two design options described in **Section 2.2.1.1.1**, the Atlantic/Pomona Station Option and the Montebello At-Grade Option are being considered for Alternative 3. Alternative 3 with the Montebello At-Grade Option would have approximately 3.0 miles of underground, 0.5 miles of aerial, and 1.1 miles of at-grade alignment.

2.3 Maintenance and Storage Facilities

The Project has two MSF site options: the Commerce MSF site option and the Montebello MSF site option. One MSF site option would be constructed. The MSF would provide equipment and facilities to clean, maintain, and repair rail cars, vehicles, tracks, and other components of the system. The MSF would enable storage of light rail vehicles (LRVs) that are not in service and would connect to the mainline with one lead track. The MSF would also provide office space for Metro rail operation staff, administrative staff, and communications support staff. The MSF would be the primary physical employment centers for rail operation employees, including train operators, maintenance workers, supervisors, administrative, security personnel and other roles.

The Commerce MSF site option is located in the city of Commerce, and the Montebello MSF site option is located in the city of Montebello. The Commerce MSF site option is located where it could support any of the three Build Alternatives. The Montebello MSF site option is located where it could support either Alternative 1 or Alternative 3.

2.3.1 Commerce MSF

The Commerce MSF site option is located in the city of Commerce, west of Washington Boulevard and north of Gayhart Street. The site is approximately 24 acres and is bounded by Davie Avenue to the east, Fleet Street to the north, Saybrook Avenue to the west, and an unnamed street to the south. Additional acreage would be needed to accommodate the lead track and construction staging. As shown in a dashed line on **Figure 2.5**, the guideway alignment with the Commerce MSF site option would daylight from an underground to aerial configuration west of the intersection of Gayhart Street

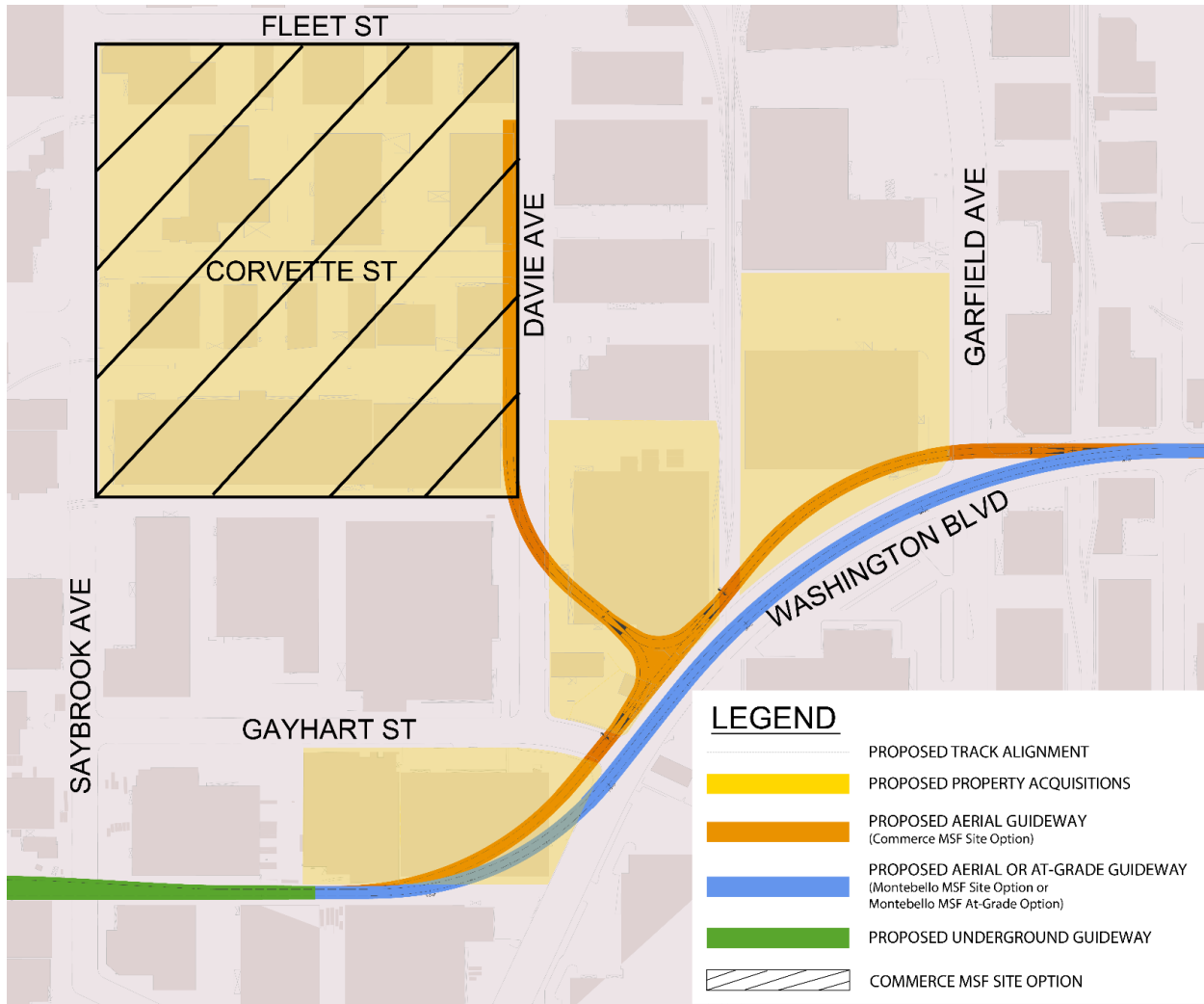
and Washington Boulevard and would run parallel to Washington Boulevard from Gayhart Street to Yates Avenue. The lead tracks to the Commerce MSF site option would be located northeast of the intersection of Gayhart Street and Washington Boulevard and extend in an aerial configuration and then would transition to at-grade within the MSF after crossing Davie Avenue. To construct and operate the Commerce MSF site option, Corvette Street would be permanently closed between Saybrook Avenue and Davie Avenue. Corvette Street is an undivided two-lane road and is functionally classified as a local street under the California Road System. The facility would accommodate storage for approximately 100 LRVs.

2.3.2 Montebello MSF

The Montebello MSF site option is located in the city of Montebello, north of Washington Boulevard and south of Flotilla Street between Yates Avenue and S. Vail Avenue. The site is approximately 30 acres in size and is bounded by S. Vail Avenue to the east, a warehouse structure along the south side of Flotilla Street to the north, Yates Avenue to the west, and a warehouse rail line to the south. Additional acreage would be needed to accommodate the lead track and construction staging. As shown on in a solid line on **Figure 2.5**, as with the Commerce MSF site option, the guideway alignment with the Montebello MSF site option would daylight from an underground to an aerial configuration west of intersection of Gayhart Street and Washington Boulevard. The alignment would be located further east than the alignment with the Commerce MSF site option. The aerial guideway for the Montebello MSF site option would transition to the median of Washington Boulevard at Gayhart Street. Columns that would provide structural support for the aerial guideway would be installed in the median of Washington Boulevard and would require roadway reconfiguration and striping on Washington Boulevard.

The lead tracks would be in an aerial configuration from Washington Boulevard, parallel S. Vail Avenue, and then transition to at-grade as it approaches the MSF. The facility would accommodate storage for approximately 120 LRVs.

The Montebello MSF At-Grade Option includes an at-grade configuration for the lead tracks to the Montebello MSF. This design option would be necessary if the Montebello At-Grade Option is selected under Alternative 1 or Alternative 3. In this design option, the lead tracks would be in an at-grade configuration from Washington Boulevard, paralleling S. Vail Avenue and remain at-grade to connect to the Montebello MSF site option. For this design option, through access on Acco Street to Vail Avenue would be eliminated and cul-de-sacs would be provided on each side of the lead tracks to ensure that access to businesses in this area is maintained. Acco Street is an undivided two-lane road and is functionally classified as a local street under the California Road System.



Source: Metro; ACE Team, January 2022.

Figure 2.5. Montebello MSF S-Curve Alignment

2.4 Ancillary Facilities

The Build Alternatives would require a number of additional elements to support vehicle operations, including but not limited to the OCS, tracks, crossovers, cross passages, ventilation structures, TPSS, train control houses, electric power switches and auxiliary power rooms, communications rooms, radio tower poles and equipment shelters, and an MSF. Alternatives 1, 2, and 3 would have an underground alignment of approximately 3 miles in length between La Verne and Saybrook Avenue. Per Metro’s Fire Life Safety Criteria, ventilation shafts and emergency fire exits would be installed along the tunnel portion of the alignment. These would be located at the underground stations or public right-of-way (ROW). The alignment for Alternative 1 and Alternative 3 would travel along the median of the roadway for most of the route. The precise location of ancillary facilities would be determined in a subsequent design phase.

2.5 Proposed Stations

The following stations would be constructed under Alternative 1:

- Atlantic (Relocated/Reconfigured) – The existing Atlantic Station would be relocated and reconfigured to an underground center platform station located beneath Atlantic Boulevard south of Beverly Boulevard in East Los Angeles. The existing parking structure located north of the 3rd Street and Atlantic Boulevard intersection would continue to serve this station.
- Atlantic Pomona Station Option – The Atlantic/Pomona Station Option would relocate the existing Atlantic Station to a shallow underground open-air station with two side platforms and a canopy. This station design option would be located beneath the existing triangular parcel bounded by Atlantic Boulevard, Pomona Boulevard, and Beverly Boulevard. The existing parking structure located north of the 3rd Street and Atlantic Boulevard intersection would continue to serve this station.
- Atlantic/Whittier – This station would be underground with a center platform located beneath the intersection of Atlantic and Whittier Boulevards in East Los Angeles. Parking would not be provided at this station.
- Commerce/Citadel – This station would be underground with a center platform located beneath Smithway Street near the Citadel Outlets in the city of Commerce. Parking would not be provided at this station.
- Greenwood – This station would be aerial with a side platform located in the median of Washington Boulevard east of Greenwood Avenue in the city of Montebello. This station would provide a surface parking facility near the intersection of Greenwood Avenue and Washington Boulevard.
 - Under the Montebello At-Grade Option, Greenwood station would be an at-grade station located west of the intersection at Greenwood and Washington Boulevard.
- Rosemead – This station would be at-grade with a center platform located in the center of Washington Boulevard west of Rosemead Boulevard in the city of Pico Rivera. This station would provide a surface parking facility near the intersection of Rosemead and Washington Boulevards.
- Norwalk – This station would be at-grade with a center platform located in the median of Washington Boulevard east of Norwalk Boulevard in the city of Santa Fe Springs. This station would provide a surface parking facility near the intersection of Norwalk and Washington Boulevards.
- Lambert – This station would be at-grade with a center platform located south of Washington Boulevard just west of Lambert Road in the city of Whittier. This station would provide a surface parking facility near the intersection of Lambert Road and Washington Boulevard.

Alternative 2 would include Atlantic (Relocated/Reconfigured), Atlantic/Whittier, and Commerce/Citadel stations as described above.

Alternative 3 would include Atlantic (Relocated/Reconfigured), Atlantic/Whittier, Commerce/Citadel, and Greenwood stations as described above.

Station amenities would include items in the Metro Systemwide Station Standards Policy (Metro 2018) such as station pin signs, security cameras, bus shelters, benches, emergency/information telephones, stairs, map cases, fare collection, pedestrian and street lighting, hand railing, station landscaping, trash receptacles, bike racks and lockers, emergency generators, power boxes, fire hydrants, and artwork. Escalators and elevators would be located in aerial and underground stations. Station entry portals would be implemented at underground stations. Station access would be ADA-compliant and also have bicycle and pedestrian connections. Details regarding most of these items, including station area planning and urban design, would be determined at a later phase.

2.6 Description of Construction

Construction of the Project would include a combination of elements dependent upon the locally preferred alternative. The major construction activities include guideway construction (at-grade, aerial, underground); decking and tunnel boring for the underground guideway; station construction; demolition; utility relocation and installation work; street improvements including sidewalk reconstruction and traffic signal installation; retaining walls; LRT operating systems installation including TPSS and OCS; parking facilities; an MSF; and construction of other ancillary facilities. Alternative 1 would include construction of bridge replacements over the San Gabriel and Rio Hondo Rivers.

In addition to adhering to regulatory compliance, the development of the Project would employ conventional construction methods, techniques, and equipment. All work for development of the LRT system would conform to accepted industry specifications and standards, including Best Management Practices (BMP). Project engineering and construction would, at minimum, be completed in conformance with the regulations, guidelines, and criteria, including, but not limited to, Metro Rail Design Criteria (MRDC) (Metro 2018), California Building Code, Metro Operating Rules, and Metro Sustainability Principles.

The construction of the Project is expected to last approximately 60 to 84 months. Construction activities would shift along the corridor so that overall construction activities should be relatively short in duration at any one point. Most construction activities would occur during daytime hours. For specialized construction tasks, it may be necessary to work during nighttime hours to minimize traffic disruptions. Traffic control and pedestrian control during construction would follow local jurisdiction guidelines and the Manual of Uniform Traffic Control Devices (MUTCD) standards. Typical roadway construction traffic control methods and devices would be followed including the use of signage, roadway markings, flagging, and barricades to regulate, warn, or guide road users. Properties adjacent to the Project's alignment would be used for construction staging. The laydown and storage areas for construction equipment and materials would be established in the vicinity of the Project within parking facilities, and/or on parcels that would be acquired for the proposed stations and MSF site options. Construction staging areas would be used to store building materials, construction equipment, assemble the TBM, temporary storage of excavated materials, and serve as temporary field offices for the contractor.

2.7 Description of Operations

The operating hours and schedules for Alternatives 1, 2, and 3 would be comparable to the weekday, Saturday and Sunday, and holiday schedules for the Metro L (Gold) Line (effective 2019). It is anticipated that trains would operate every day from 4:00 am to 1:30 am. On weekdays, trains would operate approximately every 5 to 10 minutes during peak hours, every 10 minutes mid-day and until 8:00 pm, and every 15 minutes in the early morning and after 8:00 pm. On weekends, trains would operate every 10 minutes from 9:00 am to 6:30 pm, every 15 minutes from 7:00 am to 9:00 am and from 6:30 pm to 7:30 pm, and every 20 minutes before 7:00 am and after 7:30 pm. These operational headways are consistent with Metro design requirements for future rail services.

2.8 No Project Alternative

The No Project Alternative establishes impacts that would reasonably be expected to occur in the foreseeable future if the Project were not approved. The No Project Alternative would maintain existing transit service through the year 2042. No new transportation infrastructure would be built within the GSA aside from projects currently under construction or funded for construction and operation by 2042 via the 2008 Measure R or 2016 Measure M sales taxes. The No Project Alternative would include highway and transit projects identified for funding in Metro's 2020 Long Range Transportation Plan (LRTP) and Southern California Association of Governments (SCAG) *Connect SoCal 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy* (2020 RTP/SCS). The No Project Alternative includes existing projects from the regional base year (2019) and planned regional projects in operation in the horizon year (2042).

3.0 REGULATORY FRAMEWORK

Climate change regulations are quickly evolving. The current regulatory setting related to climate change and greenhouse gas (GHG) emissions is summarized below.

3.1 Federal

3.1.1 Massachusetts et al. v. Environmental Protection Agency et al.

Twelve U.S. states (including California) and local governments, in conjunction with several environmental organizations, brought suit to force the United States Environmental Protection Agency (USEPA) to regulate GHGs as a pollutant pursuant to the Federal Clean Air Act (CAA) (*Massachusetts et al. v. Environmental Protection Agency et al.* [U.S. Supreme Court No. 05–1120]; argued November 29, 2006—decided April 2, 2007). The Court ruled that the plaintiffs had standing to sue, that GHGs fit within the CAA’s definition of an air pollutant, and that the USEPA’s reasons for not regulating GHGs were insufficiently grounded in the CAA.

3.1.2 Endangerment Finding

On December 15, 2009, the USEPA published its endangerment finding for GHGs in the Federal Register (FR) (74 FR 66496). The endangerment finding responds to the 2007 U.S. Supreme Court decision that GHGs fit within the CAA’s definition of an air pollutant. The USEPA Administrator determined that six GHGs, taken in combination, endanger both the public health and welfare of current and future generations. Although the endangerment finding discusses the effects of six GHGs, it acknowledges that transportation sources only emit four of the key GHGs: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and hydrofluorocarbons (HFCs). Further, the USEPA Administrator found that the combined emissions of these GHGs from new motor vehicles contribute to air pollution that endangers the public health and welfare under CAA Section 202(a). These findings themselves did not impose any requirements on industry or other entities. However, this action was a prerequisite for implementing GHG emissions standards for vehicles.

3.1.3 Greenhouse Gas and Fuel Efficiency Standards for Clean Vehicles

The USEPA and the Department of Transportation’s National Highway Traffic Safety Administration (NHTSA) finalized several joint rules to establish programs designed to reduce GHG emission and to improve fuel economy for cars and trucks. These rules continue to respond to the U.S. Supreme Court’s decision that GHG should be regulated as air pollutants.

3.1.3.1 Passenger Cars and Light-Duty Trucks

In April 2010, the USEPA and NHTSA finalized new standards for new (model year 2012 through 2016) passenger cars, light-duty trucks, and medium-duty passenger vehicles. Under these standards CO₂ emission limits would decrease from 295 grams per mile (g/mi) in 2012 to 250 g/mi in 2016 for a combined fleet of cars and trucks. If all of the necessary emission reductions were made from fuel economy improvements, then the standards would correspond to a combined fuel economy of 30.1 miles per gallon (mpg) in 2012 and 35.5 mpg in 2016.

In August 2012, the USEPA and NHTSA issued joint Final Rule for national program standards for future light-duty vehicles (model year 2017 through 2025), which would correspond to a combined fuel economy of 36.6 mpg in 2017 and 54.5 mpg in 2025. This rulemaking also established a regulatory commitment to conduct a mid-term evaluation of the standards for model years 2022–2025. A mid-term evaluation which examined factors ranging from, but not limited to, the development in powertrain technology, vehicle electrification, light-weighting and vehicle safety impacts, penetration of fuel technologies in the marketplace, consumer adoption of fuel-efficient technologies, trends in fuel prices, and employment impacts, was finalized in April 2018 in the USEPA’s Mid-term Evaluation Final Determination. This determination found that the 2022–2025 model year GHG standards were no longer appropriate and should be revised.

In August 2018, the USEPA and NHTSA proposed the “Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks” (SAFE Vehicles Rules). The SAFE Vehicles Rule amend existing Corporate Average Fuel Economy (CAFE) and tailpipe CO₂ emissions standards for light-duty vehicles and establish new standards covering model years 2021–2026. The USEPA also proposed to withdraw the waiver previously provided to California under Section 209 of the CAA for the state’s GHG and Zero Emission Vehicle (ZEV) programs. The NHTSA proposed regulatory text implementing its statutory authority to set nationally applicable fuel economy standards that made explicit that those State programs would also be preempted under NHTSA’s authorities. On September 27, 2019, the USEPA and NHTSA published its Final Rule to revoke California’s waiver and establish the federal preemption in the FR (84 FR 51310). California and a coalition of other states has sued both the USEPA and the NHTSA, challenging their decisions that would block states from setting tougher automobile emissions standards.

On April 30, 2020, the SAFE standards for model year 2021–2026 light-duty vehicles were made final. To account for the impacts of the withdrawal of California’s waiver on criteria pollutant and GHG, California Air Resources Board (CARB) has adjusted the emission factors generated by the motor vehicle emissions model Emission Factor Model for On-road Motor Vehicles (EMFAC) 2017 for light-duty vehicles.

Litigation was held in abeyance pending review under Presidential Executive Order 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*. This order mandates the review of actions or policies taken between January 20, 2017, and January 20, 2021, for consistency with current national climate objectives and tasks agencies to suspend, revise, rescind, or amend these actions or policies as appropriate. In accordance with this order, on April 22, 2021, the NHTSA proposed to repeal the SAFE vehicle rule preemption on state fuel efficiency and GHG standards (86 FR 25980), and on August 10, 2021, new CAFE standards were proposed for 2024-2026 model year light-duty vehicles (86 FR 43726). On March 14, 2022, the USEPA issued a notice of decision rescinding the 2019 action withdrawing California’s CAA waiver of preemption for GHG emission standards and ZEV, and on March 28, 2022, proposed an updated clean truck rule to reduce

national air pollution from highway heavy-duty vehicles and engines, including ozone, particulate matter, and greenhouse gases (87 FR 14332; 87 FR 17414).

3.1.3.2 Medium and Heavy-Duty Engines and Vehicles

In October 2010, the USEPA and NHTSA announced a program to reduce GHG emissions and to improve fuel efficiency for medium- and heavy-duty vehicles (model years 2014 through 2018). This program was adopted on August 9, 2011. In October 2016, phase 2 GHG and fuel efficiency standards for medium- and heavy-duty vehicles were adopted. These standards are anticipated to lower CO₂ emissions by approximately 1.1 billion metric tons and reduce oil consumption by up to two billion barrels over the lifetime of the vehicles sold under the program.

3.1.3.3 Fuel Efficiency Standards for Construction Equipment

The federal government sets fuel efficiency standards for nonroad diesel engines that are used in construction equipment. The regulations, contained in 40 Code of Federal Regulations (CFR) Parts 1039, 1065, and 1068, include multiple tiers of emission standards. Most recently in 2011, USEPA adopted a comprehensive national program to reduce emissions from nonroad diesel engines by integrating engine and fuel controls as a system to gain the greatest emission reductions. This program required the gradual phase in of stricter emission regulation. Since 2015, all newly manufactured mobile nonroad diesel engines have been required to meet the strictest Tier 4 emission standards of this program. To meet these Tier 4 emission standards, engine manufacturers have produced new engines with advanced emission control technologies.

3.2 State

3.2.1 California Advanced Clean Cars Program

California Assembly Bill (AB) 1493 (“Pavley” regulation) required CARB to develop and adopt GHG emission standards for automobiles. AB 1493 became law in 2002, and CARB enacted subsequent regulations in September 2004. In 2012, CARB, in coordination with the USEPA and NHTSA, developed a set of regulations that are collectively known as the Advanced Clean Cars Program. The singular state and federal timeframe for fuel and economy standards aligned the Pavley standards with federal CAFE standards for passenger cars and light-duty trucks. The Low-Emission Vehicle III Regulation for GHG (LEV III GHG) builds upon AB 1493, which established GHG emission standards for 2009 through 2016 model year passenger vehicles, by requiring further reductions in passenger vehicle GHG emissions for 2017 and subsequent model years. The LEV III GHG regulation is projected to reduce GHG emissions by 40 percent in 2025 when compared to 2012 model year vehicles. The ZEV regulation also requires auto manufacturers to offer for sale specific numbers of full battery-electric, hydrogen fuel cell, and plug-in hybrid-electric vehicles. Approximately 8 percent of California new vehicle sales in 2025 are predicted to be ZEVs and plug-in hybrids (CARB 2019).

On August 24, 2018, the NHTSA and USEPA proposed freezing the current federal fuel efficiency and GHG emission standards for model year 2021 through 2026 vehicles at 2020 levels (SAFE Vehicles

Rules), thereby violating a provision in the LEV III GHG regulation that states cars meeting federal standards for model years 2017 through 2025 are “deemed to comply” with California’s emission standards. CARB subsequently voted on and approved a measure on September 28, 2018 that affirms that only cars meeting the current federal standards for model years 2017 through 2025 comply with the state’s standards (CARB 2018a).

3.2.2 California Advanced Clean Cars II Program

On September 16, 2020, CARB held the first public workshop to solicit input on the development of the Advanced Clean Cars II (ACC II) regulations. These regulations will seek to reduce criteria and GHG emissions from new light- and medium-duty vehicles beyond the 2025 model year and increase the number of ZEV for sale. Additional workshops were held in May, June, August, and October 2021. The regulations are scheduled to go to the CARB Board in the summer of 2022.

3.2.3 California Executive Order S-3-05, B-30-15, and B-55-18

California Executive Order S-3-05 (signed by Governor Schwarzenegger on June 1, 2005) and California Executive Order B-30-15 (signed by Governor Brown in 2015) established the following GHG emission reduction targets for California:

- Reduce GHG emissions to 2000 levels by 2010
- Reduce GHG emissions to 1990 levels by 2020
- Reduce GHG emissions to 40 percent below 1990 levels by 2030
- Reduce GHG emissions to 80 percent below 1990 levels by 2050

The order also requires the Secretary of the California Environmental Protection Agency (CalEPA) to report to the Governor and the state legislature biannually on progress made toward meeting the GHG emission reduction targets, commencing in January 2006. The Secretary is also required to report on impacts to water supply, public health, agriculture, the coastline, and forestry; mitigation and adaptation plans to combat these impacts must also be developed.

CARB reported a five percent decrease in statewide GHG emissions from 2000 to 2010. Thus, the state was successful in meeting the first milestone of S-3-05 (CARB 2018b). Additionally, statewide GHG emissions dropped below the 2020 GHG emission limit (i.e., 1990 levels) in 2016 and have remained there ever since, thereby also meeting the second milestone (CARB 2021a).

California Executive Order B-55-18 (signed by Governor Brown on September 10, 2018) established a directive for California to achieve carbon neutrality no later than 2045, and to achieve and maintain net negative emissions thereafter. The order directed CARB to work with relevant state and local agencies to develop a framework for implementation of the order and ensure that future Scoping Plans identify and recommend measures to achieve the State’s carbon neutrality goal.

3.2.4 Global Warming Solutions Act of 2006 (Assembly Bill 32)

California AB 32, the Global Warming Solutions Act of 2006, codifies the state's GHG emissions targets by requiring the state's global warming emissions to be reduced to 1990 levels by 2020 and directs CARB to enforce the statewide cap that began to phase in during 2012. In 2007, CARB recommended and adopted a 1990 GHG emissions level and 2020 emissions limit of 427 million metric tons (MMT) carbon dioxide equivalent (CO₂e) (MMTCO₂e); however, this limit has subsequently been updated to 431 MMTCO₂e using the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report global warming potentials (GWPs) (CARB 2014a). The limit is a statewide limit and does not require individual sectors or facilities to reduce emissions equally.

Key AB 32 milestones are as follows (CARB 2014a):

- January 1, 2009 – Scoping Plan adopted indicating how emissions will be achieved from significant sources of GHGs via regulations, market mechanisms, and other actions.
- During 2009 – CARB staff drafted rule language to implement its plan and held a series of public workshops on each measure (including market mechanisms).
- January 1, 2010 – Early action measures took effect.
- During 2010 – CARB conducted series of rulemakings, after workshops and public hearings, to adopt GHG regulations, including rules governing market mechanisms.
- January 1, 2011 – Completion of major rulemakings for reducing GHGs, including market mechanisms.
- January 1, 2012 – GHG rules and market mechanisms adopted by CARB and are legally enforceable.
- November 14, 2012 – CARB held first quarterly auction of GHG emissions allowances as part of the cap-and-trade program.
- January 1, 2013 – Cap-and-trade program began with a GHG emissions cap that declines over time.
- September 17, 2013 – CARB issued first carbon offset credits as part of the cap-and-trade program.
- May 22, 2014 – CARB approved First Update to the Climate Change Scoping Plan.
- December 31, 2020 – Deadline for achieving 2020 GHG emissions cap.

CARB has been proactive in its implementation of AB 32 and has met each of the milestones identified above that have already passed and is on track to meet the last milestone. Furthermore, California met (and continues to meet) its 2020 climate target in 2016 (CARB 2021a).

In 2016, California Senate Bill (SB) 32 was passed as a follow up to AB 32. SB 32 requires the CARB to ensure the state's greenhouse gas (GHG) emissions are reduced to 40 percent below the 1990 levels by 2030. SB further requires CARB to expand on or develop new regulations that are technologically reasonable and cost-effective, while also considering the state's most disadvantaged communities.

3.2.4.1 Scoping Plan

The initial Scoping Plan (CARB 2008) provides a framework for the State's strategy to reduce GHG emissions to 1990 levels by 2020. This reduction goal means reducing GHG emissions by approximately 30 percent from business-as-usual emission levels projected for 2020 or approximately 15 percent from 2005 levels. Key features of the State's plan for reducing emissions include six main recommendations:

- Expand and strengthen existing energy efficiency programs and building and appliance standards.
- Achieve a statewide renewables energy mix of 33 percent.
- Develop a cap-and-trade program that links other partner programs to create a regional market system.
- Establish targets for transportation-related GHG emissions for regions throughout the State, and pursue policies and incentives to achieve those targets.
- Adopt and implement measures, including California's clean car standards, goods movement measures, and the low carbon fuel standard (LCFS).
- Create targeted fees to fund the administrative costs of the State's long-term commitment to AB 32 implementation.

The Scoping Plan recommends 39 measures that would achieve an emissions reduction of 174 MMTCO_{2e} per year if fully implemented. The recommended measures cover nine sectors: (1) transportation; (2) electricity and natural gas; (3) green buildings; (4) water; (5) industry; (6) recycling and waste management; (7) forests; (8) high GWP gases; and (9) agriculture. Additionally, nine discrete early actions were adopted to reduce GHG emissions.

The First Update to the Climate Change Scoping Plan (CARB 2014b) builds on the 2008 Scoping Plan by identifying the next steps that are required to meet the State's emission reductions beyond 2020 (i.e., 80 percent below 1990 levels by 2050). The update adjusts the 2020 statewide limit to 431 MMTCO_{2e} to reflect updated GWPs.

In November 2017, CARB finalized the 2017 Climate Change Scoping Plan Update to describe potential policies that could be implemented to achieve the 2030 target established by EO B-30-15 (CARB 2017). CARB is currently in the process of developing the 2022 Scoping Plan Update and is holding a series of public workshops to discuss how different economic sectors can aid the state in achieving its goal of carbon neutrality by 2045 (CARB 2021b).

3.2.4.2 Cap-and-Trade Program

The Cap-and-Trade Program, started January 2012, was designed by CARB to meet the requirements of AB 32. The program sets a statewide cap on GHG emissions on sources responsible for 85 percent of California's GHG emissions; the cap declines approximately three percent each year from 2013 forward (CARB 2018b). The program also establishes a price signal to drive long-term investment in cleaner fuels and more efficient use of energy. The program provides covered entities the flexibility to seek out and implement the programs to reduce emissions through lower cost options. The program started in 2013 for electricity generators and large industrial facilities emitting 25,000 metric tons CO₂e or more annually. In 2015, the cap was extended to distributors of transportation, natural gas, and other fuels. If any Metro facility was to emit 25,000 metric tons CO₂e or more annually, it would be subject to cap-and-trade regulations.

3.2.4.3 Paris Climate Accord - U.S. Climate Alliance

The Paris Climate Accord, an agreement with 200 nations to reduce GHG emissions worldwide, included the United States as one of its founding nations. The United States announced its intention to withdraw from the accord in March 2017, and officially did so on November 4, 2020. Considering the United States withdrawal, California, under former California Governor Jerry Brown, along with two other states, formed the U.S. Climate Alliance on June 1, 2017. This alliance is a coalition of states that will adhere to the tenets of the Paris Climate Agreement. The goals of the coalition are to reduce GHG emissions by 26 to 28 percent from 2005 levels by 2025, meet or exceed the federal Clean Power Plan targets, and serve as a forum to share best practices and sustain existing climate programs (CA OG 2017). The U.S. Climate Alliance has since grown to 25 states or United States territories. The United States officially rejoined the Paris Climate Accord on February 19, 2021.

Implementation of AB 32 requires GHG emission reduction to 1990 level by 2020, which is approximately 0.9 percent of 2005 level (CARB 2007, CARB 2018c). Therefore, implementation of AB 32 would ensure California meets the requirements outlined in the U.S. Climate Alliance.

3.2.5 Senate Bill 743

California SB 743, enacted in September 2013, stipulated a variety of GHG reduction strategies, including the encouragement of infill development and diversity of land uses and the development of multi-modal transportation networks, and initiated a change to the assessment of transportation-related impacts under CEQA from congestion-based to VMT-based. In 2018, the California Natural Resources Agency (CNRA) finalized amendments to the CEQA Guidelines, including changes to CEQA Guidelines Section 15064.4, which address the analysis of GHG emissions. The amendments became effective on December 28, 2018 (OPR 2019). The significance criteria for CEQA analysis of GHG emissions are discussed in **Section 5.2**.

3.2.6 Senate Bill 375

SB 375 requires CARB to set regional targets for 2020 and 2035 to reduce GHG emissions from passenger vehicles. Regional targets were developed for each of the 18 metropolitan planning organizations (MPOs) in the state; the SCAG is the MPO that has jurisdiction over the GSA. A

Regional Targets Advisory Committee (RTAC) was appointed by CARB to provide recommendations to be considered and methodologies to be used in CARB's target setting process. The final RTAC report was released on January 23, 2009.

Each MPO is required to develop Sustainable Community Strategies (SCS) through integrated land use and transportation planning and to demonstrate an ability to attain the proposed reduction targets by 2020 and 2035. CARB issued an 8 percent per capita reduction target for the SCAG region by 2020 and a 19 percent per capita reduction target by 2035. SCAG adopted the latest 2020 RTP/SCS for the for the six-county Southern California region (Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura) on September 3, 2020.

3.2.7 California Executive Order S-01-07 and the Low Carbon Fuel Standard

California Executive Order S-01-07 establishes a statewide goal to reduce the carbon intensity of transportation fuels sold in California by at least ten percent by 2020 from 2005 levels. The Executive Order also mandated the creation of a low carbon fuel standard (LCFS) for transportation fuels. The LCFS requires that the lifecycle GHG emissions for the mix of fuels sold in California decline on average. Each fuel provider may meet the standard by selling fuel with lower carbon content, using previously banked credits from selling fuel that exceeded the LCFS, or purchasing credit from other fuel providers who have earned credits. The reduction goal of ten percent is expected to help meet other state goals such as AB 32, the Bioenergy Action Plan, and the California Energy Commission's (CEC) 2003 Integrated Energy Policy Report. In 2018, CARB amended the implementing LCFS regulations to require a 20 percent reduction in the carbon intensity of transportation fuels by 2030.

3.2.8 Senate Bill 49 The California Environmental Defense Act

SB 49, approved on May 30, 2017, guides state environmental, public health, and worker safety agencies to take all actions within their authority to ensure standards in effect and being enforced as of January 2017 continue to remain in effect. This policy ensures that even if the federal government rolls back or weakens environmental standards, California will continue to make current federal clean air, clean water, climate, worker safety, and endangered species laws enforceable under state law (California Legislative Information Website 2017).

3.2.9 Senate Bill 350 Clean Energy and Pollution Reduction Act

Signed into law in October 2015, SB 350 increases the State's renewable electricity procurement goal from 33 percent by 2020 to 50 percent by 2030. In addition, the State is required to double statewide energy efficiency savings in electricity and natural gas end uses by 2030. To ensure these goals are achieved and GHG emission reductions are met, large utilities will be required to generate and submit Integrated Resource Plans (IRPs). IRPs will detail how each utility will meet their customers' resource

needs, reduce GHG emissions and ramp up the deployment of clean energy resources, including solar, wind, biomass, and geothermal (CEC 2018).

3.2.10 Innovative Clean Transit Regulation

CARB adopted the Innovative Clean Transit (ICT) Regulation in December 2018 which requires all public transit agencies to gradually transition to a 100 percent zero emission bus (ZEB) fleet. Beginning in 2029, 100 percent of new purchases by transit agencies are required to be ZEBs, with a goal of fully transitioning all fleets by 2040. The regulation applies to all transit agencies that own, operate, or lease buses with a gross vehicle weight rating (GVWR) greater than 14,000 pounds and includes standard, articulated, over-the-road, double-decker, and cutaway bus types.

The ICT regulation is part of a statewide effort to reduce emissions from the transportation sector, which accounts for 40 percent of climate-changing gas emissions and 80 to 90 percent of smog-forming pollutants. The transition to zero emission technologies, where feasible, is essential to meeting California's air quality and climate goals.

Full implementation of the regulation is expected to reduce GHG emissions by 19 million metric tons from 2020 to 2050 – the equivalent of taking 4 million cars off the road, and it will reduce harmful tailpipe emissions (nitrogen oxides and particulate matter) by about 7,000 tons and 40 tons, respectively, during that same 30-year period (CARB 2018d).

3.2.11 Potential Amendments to the Diesel Engine Off-Road Emission Standards

CARB is currently in the process of working on potential amendments to the off-road diesel engine standards, which is called the Tier 5 rulemaking. This rulemaking could reduce emissions of nitrogen oxides and particulate matter by up to 90 percent and 75 percent when compared to the current Tier 4 standards. Additionally, first-time CO₂ emission standards for off-road engines could be proposed. These new Tier 5 emission standards would be expected to begin in 2028 (CARB 2021c).

3.3 Regional

3.3.1 Southern California Association of Governments 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy

SCAG is the MPO that has jurisdiction over the GSA. SCAG adopted the latest 2020 RTP/SCS for the six-county (Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura) Southern California region on September 3, 2020. The 2020 RTP/SCS includes various commitments to reduce

emissions from transportation sources in compliance with SB 375, including close integration of land use and transportation planning. The plan was prepared through a collaborative process by SCAG and other regional agencies and serves as a comprehensive update to the previous 2016-2040 RTP/SCS. The 2020 RTP/SCS includes strategies for land use, sustainability, preserving existing transportation infrastructure, and developing transportation networks. The 2020 RTP/SCS is expected to meet or exceed the SB 375 per capita targets, lowering regional per capita GHG emissions (below 2005 levels) by 19 percent by 2035.

3.3.2 South Coast Air Quality Management District Greenhouse Gas California Environmental Quality Act Significance Threshold Working Group

To provide guidance to lead agencies on determining the significance of GHG emission under CEQA, South Coast Air Quality Management District (SCAQMD) has convened an ongoing GHG CEQA Significance Threshold Working Group with the intention of developing guidance relating to CEQA GHG significance thresholds for various land uses. The GHG CEQA Significance Threshold Working Group has not convened since 2009 and SCAQMD has yet to adopt a GHG significance threshold for transportation land use projects.

3.3.3 Metro Climate Action and Adaptation Plan

In 2019, Metro published the *Metro Climate Action and Adaptation Plan*, building on Metro's existing commitments to environmental sustainability and stewardship and establishing a framework to reduce GHG emissions. The plan forecasts vehicular emissions, discusses actions that can be taken to mitigate those emissions, and identifies Metro services most likely to be affected by climate impacts.

3.3.4 Metro Green Construction Policy

In August 2014, Metro adopted a Green Construction Policy, which committed to using greener, less polluting construction equipment and vehicles on all Metro construction projects performed on Metro properties and rights-of-way than the statewide fleet average. This policy, revised in 2017, requires the use of renewable diesel fuel for projects where on-site bulk fuel storage is necessary. This measure would reduce GHG emissions and is a Metro policy. Thus, it is required for the Project.

3.4 Local

Various cities along the Project alignment have climate change plans applicable to the Project. The cities of Commerce, Montebello, Pico Rivera, and Whittier do not have applicable climate change plans.

3.4.1 County of Los Angeles

The Los Angeles County 2035 General Plan, county-wide air quality element outlines policies aimed at improving air quality in the South Coast Air Basin, which includes the majority of Los Angeles County. Applicable goals and policies include, but are not limited to, reducing air pollution and emissions through coordinated land use, transportation, and air quality planning, and reducing emissions and fugitive dust from construction activities through implementation of best management practices. One sub element, the Community Climate Action Plan (CCAP), supplements the Air Quality Element. This plan establishes actions for reaching the County's goals to reduce impacts of climate change by reducing GHG emissions from community activities in the unincorporated regions of Los Angeles County by 11 percent below 2010 levels by 2020. An update to the plan to address the continuing need for GHG emissions reductions is currently in development. The CCAP will be replaced by the Los Angeles County Climate Action Plan (CAP). The Los Angeles County CAP will combine existing climate change initiatives and provide a blueprint for greater carbon reductions, including a target for carbon neutrality by 2045 in the unincorporated county (Los Angeles County Department of Regional Planning n.d.).

3.4.2 City of Pico Rivera

The *Pico Rivera General Plan* (2014) Environmental Resources Element, Circulation Element, and Housing Element address the long-term management of Pico Rivera's environmental resources, including GHGs (City of Pico Rivera 2014). The elements include a variety of policies to reduce GHG emissions, including:

- Policy 8.2-2: Reduce greenhouse gas emissions in the City and the region through measures such as reducing the number of vehicular miles traveled through implementation of Transportation Demand Management Programs and encouraging the use of alternative modes of transportation by supporting transit facility.
- Policy 8.2-3 Construction Emissions. Require new development projects to incorporate feasible measures that reduce emissions from construction, grading, excavation, and demolition activities to avoid, minimize, and/or offset their impacts consistent with South Coast Air Quality Management District requirements.
- Policy 8.2-4 Operational Emissions. Require new development projects to incorporate feasible measures that reduce operational emissions through project and site design and use of best management practices to avoid, minimize, and/or offset their impacts consistent with South Coast Air Quality Management District requirements.
- Policy 8.2-14 Transit Vehicles. Encourage and work with local and regional transit providers to use transit vehicles and facilities that are powered by alternative fuels and are low emissions.

3.4.3 City of Santa Fe Springs

The city of Santa Fe Springs's *Re-Imagine Santa Fe Springs 2040 General Plan* addresses goals and policies related to reducing GHG emissions in the Conservation and Open Space Element (City of Santa Fe Springs 2021). The following policies are relevant to the Project:

- Policy COS-9.1: Land Use and Transportation. Allow urban infill and transit-oriented communities within walking distance (10-minute walk or half-mile distance) of transit stops and stations to reduce vehicle trips and trip lengths.
- Policy COS-9.2: Reduce Greenhouse Gas Emissions. Identify the specific activities/uses that the City will undertake to reduce greenhouse gas emissions.

3.4.4 City of Whittier

The city of Whittier's *Envision Whittier General Plan Resource Management Element* promotes the protection of natural resources, and includes policies supporting a reduction of GHG emissions (City of Whittier 2021). The following policies are relevant to the Project:

- RM-3.1: Reduce emissions generated by motorized vehicles.
- RM-3.2: Reduce energy use in municipal and construction projects.
- RM-3.3: Support the use of energy-efficient design and renewable energy technologies in public and private spaces and development projects

3.4.5 Additional City Plans

The cities of Commerce and Montebello do not include GHG specific policies within their current general plans. However, the general plans do include policies related to air quality which may include certain GHGs and often encourage public transportation and transit, which would support GHG emission reductions. The *Montebello 1973 General Plan* was adopted in 1973 and was intended to guide development for 20 years. Although the city is built beyond the life of the general plan, Montebello is currently in the process of updating the plan.

4.0 METHODOLOGY

Methodologies and protocols for analyzing GHG emissions have been extensively documented. The analysis used protocols established by The Climate Registry (TCR), namely the *General Reporting Protocol* (TCR 2019) and the *Local Government Operations Protocol* (TCR 2010). Generally, GHG impact analyses follow the same quantification methodologies as air quality studies for criteria pollutants.

GHG emissions were calculated for direct and indirect sources of GHG, including engine exhaust and purchased electricity; detailed calculations are provided in **Attachment A** and **Attachment B**. Emissions were estimated for three GHG pollutants regulated under California and federal mandatory reporting requirements and voluntary reporting registries, such as TCR: CO₂, CH₄, and N₂O. Although the Endangerment Finding also regulates three other GHG pollutants—HFCs, perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆)—these pollutants are not emitted as products of engine exhaust or purchased electricity and were not analyzed.¹

Emissions were converted to CO₂e using the GWPs in the IPCC's Fourth Assessment Report (AR₄) and documented in the *Inventory of U.S. Greenhouse Gas Emissions and Sinks* (USEPA 2021a). GWPs are defined by CARB as the radiative forcing impact (i.e., degree of warming to the atmosphere) of one mass-based unit of a given GHG relative to an equivalent unit of CO₂. For example, one ton of CH₄ is equivalent to approximately 25 tons of CO₂ in the atmosphere. Although the IPCC has released the Fifth and Sixth Assessment Reports since the AR₄ release in 2007, the international standard is to use the AR₄ to maintain consistency with GHG emission inventories already compiled.

4.1 Construction Emissions

The analysis followed the SCAQMD's recommendation in the Interim CEQA GHG Significance Threshold document (2008) that construction emissions be amortized over 30 years (i.e., defined as life of a project) and added to the operational emissions.

Potential emissions of CO₂, CH₄, and N₂O from construction equipment (e.g., bulldozers, scrapers, graders, off-highway trucks, etc.) were calculated using the California Emissions Estimator Model (CalEEMod) version 2020.4.0, developed by the California Air Pollution Control Officers Association (CAPCOA) for land use projects. Emission factors from CARB's Emissions Model for Off-road Equipment (OFFROAD) and EMFAC version 2017² models are integrated into CalEEMod and are subsequently used to estimate emissions from construction equipment and construction-related on-road vehicle trips. All phases of construction, including street widening and construction of the guideway, stations, parking facilities, and an MSF, were included in the construction emissions calculations.

¹ Although HFCs may be emitted from mobile sources from leaks in air conditioning systems (e.g., HFC-134a), methods for estimating these emissions are limited and are not included in this evaluation.

² The Emission Factors (EMFAC) model is used to calculate emission rates from on-road motor vehicles in California. EMFAC2017 is the most recent version of the model approved by the USEPA for regulatory purposes.

The Metro Green Construction Policy requires the use renewable diesel fuel if reasonably available in the vicinity of the Project. Emissions benefits associated with this measure were not included in the analysis due to uncertainty in the availability of renewable diesel fuel in the vicinity of the Project at the time of buildout. Actual construction GHG emissions would be lower than those estimated in this analysis due to the incorporation of renewable diesel fuel, therefore the analysis presented in this impacts report is conservative.

4.2 Operational Emissions

Vehicle engine exhaust emissions were calculated to quantify the effects of Project-related reductions in highway traffic VMT on regional GHG emissions. EMFAC2017³ was used to develop an aggregated highway traffic emission factor for an average highway network speed of 35 miles per hour under the existing conditions and an average highway network speed of 30 miles per hour under future conditions.⁴ These aggregated factors were multiplied by projected regional highway VMT to quantify regional highway traffic emissions. Increased transit rider trips to stations proposed under each alternative were included in the alternative's regional traffic analysis. Regional traffic data, including average network speeds, were obtained from the Project's traffic analysis for each alternative.

Although LRVs do not directly emit GHG, the GHG analysis quantified emissions resulting from the remote generation of electricity to run the LRVs and to power the facilities at the proposed stations. Emissions from power generation for the electricity needed to operate the LRVs were estimated from the route distance, headway between trains, and the average energy intensity for the train operation. The Federal Transit Administration (FTA)'s National Transit Database (NTD) (2019) was used to estimate the average energy intensity for Metro's LRT service. Chester and Horvath (2008) have published various fundamental environmental factors for rail. Electricity usage factors for San Francisco Municipal Railway (Muni) (San Francisco), Massachusetts Bay Transportation Authority (MBTA) Green Line (Boston), and Bay Area Rapid Transit (BART) (San Francisco) were used to estimate emissions from train control. CalEEMod default energy usage factors for surrogate land uses were used to estimate emissions at the LRT stations, MSFs, and parking facilities. CalEEMod surrogate land uses are identified by project element in Attachment B.

CalEEMod default CO₂, CH₄, and N₂O emission factors for the Southern California Edison (SCE) utility provider were used for Project electricity demand. The California Public Utilities Code establishes minimum Renewable Portfolio Standard (RPS) targets for electricity retail sellers. According to the 2019 Edison Electric Institute (EII) ESG/Sustainability Report,⁵ the renewable portfolio of SCE, including wind energy, geothermal energy, biomass energy, and solar power, was approximately 44 percent in 2019 (SCE 2019). The California RPS targets are 33 percent by 2020, 60 percent by 2030, and 100 percent by 2045. However, the California RPS excludes non-renewable nuclear power and hydropower which are considered zero-carbon (clean energy) sources. When including these additional energy sources, SCE's 2019 clean energy portfolio was approximately 52 percent of its total generation. Because the emission factors used in this analysis were from 2019, it was necessary to reduce emissions by an amount equivalent to increasing the clean energy mix under future conditions. In SCE's 2020 Integrated Resource Plan, the preferred conforming portfolio indicated an 84 percent clean energy portfolio would be achieved by 2030 (SCE 2020). Therefore, the clean energy mix under

³ While EMFAC2021 is the current version of the EMFAC model (released in April 2021), EMFAC2017 is the most recent version of the model approved by the USEPA.

⁴ Traffic modeling performed for the project indicated an aggregate vehicle speed for highway vehicles of 35 miles per hour under the existing conditions or 30 miles per hour under future conditions for all alternatives.

⁵ ESG refers to environmental, social, and governance factors.

future conditions was adjusted from 52 percent under existing conditions to 84 percent under future conditions. Even with this adjustment, the analysis would be conservative, as SCE will continue to integrate renewable resources between the portfolio target year of 2030 and the California 100 percent RPS deadline year of 2045.



5.0 THRESHOLDS OF SIGNIFICANCE

5.1 South Coast Air Quality Management District Guidance

A tiered approach to evaluating the significance of GHG impacts was adopted by the SCAQMD Governing Board on December 5, 2008. The SCAQMD's *Interim GHG Significance Threshold Staff Proposal* (SCAQMD 2008) states that a project's GHG emissions analysis should include direct, indirect, and if possible, life-cycle emissions during construction and operation. The SCAQMD's recommendations regarding the quantification of emissions was followed for this Project; however, the SCAQMD interim thresholds are largely geared towards industrial, residential, and commercial projects, and do not specifically address transportation projects. Since a transportation-specific threshold of significance for GHG emissions has not been established by the SCAQMD, a quantitative threshold was not used to analyze the GHG emission impacts associated with the Project.

5.2 Amendments to the CEQA Guidelines

Amendments to the CEQA Guidelines (California Natural Resources Agency 2009) were adopted as final on March 18, 2010 and amended on December 28, 2018 (see **Section 3.2.5**). In the amendments to the CEQA Guidelines, the CNRA recommended the following criteria for determining the significance of GHG emissions (14 California Code of Regulations [CCR] §15064.4):

- The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting;
- Whether the project emissions exceed a threshold of significance that the lead agency⁶ determines applies to the project; or
- The extent to which the project complies with the regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions (14 CCR § 15183.5(b)). Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of GHG emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project. In determining the significance of impacts, the lead agency may consider a project's consistency with the State's long-term climate goals or strategies, provided that substantial evidence supports the agency's analysis of how those goals or strategies address the project's incremental contribution to climate change and its conclusion that the project's incremental contribution is not cumulatively considerable.

⁶ The lead agency is defined as "the public agency which has the primary responsibility for carrying out or approving a project which may have a significant effect upon the environment" under CEQA (Pub. Resources Code, § 21067). For the Project, the lead agency for purposes of CEQA is Metro.

The plans addressed in the final bullet can include RTPs, regional blueprint plans, and plans for the reduction of GHG emissions (14 CCR §15125).

In 2018, the CNRA finalized amendments to the CEQA Guidelines, which became effective on December 28, 2018 (OPR 2019). Revisions of CEQA Guidelines 14 CCR § 15064.4 clarified numerous points, including:

- Lead agencies must analyze the GHG emissions of proposed projects (14 CCR § 15064.4 (a)).
- The focus of the lead agency's analysis should be on the project's effect on climate change, rather than simply focusing on the quantity of emissions and how that quantity of emissions compares to statewide or global emissions. (14 CCR § 15064.4 (b)).
- The impacts analysis of GHG emissions is global in nature and thus should be considered in a broader context. A project's incremental contribution may be cumulatively considerable even if it appears relatively small compared to statewide, national or global emissions. (14 CCR § 15064.4 (b)).
- Lead agencies should consider a timeframe for the analysis that is appropriate for the project. (14 CCR § 15064.4 (b)).
- A lead agency's analysis must reasonably reflect evolving scientific knowledge and state regulatory schemes. (14 CCR § 15064.4 (b)).
- Lead agencies may rely on plans prepared pursuant to section 15183.5 (Plans for the Reduction of GHGs) in evaluating a project's GHG emissions. (14 CCR § 15064.4 (b)(3)).
- In determining the significance of a project's impacts, the lead agency may consider a project's consistency with the State's long-term climate goals or strategies, provided that substantial evidence supports the agency's analysis of how those goals or strategies address the project's incremental contribution to climate change and its conclusion that the project's incremental contribution is consistent with those plans, goals, or strategies. (14 CCR § 15064.4 (b)(3)).
- The lead agency has discretion to select the model or methodology it considers most appropriate to enable decision makers to intelligently take into account the project's incremental contribution to climate change. (14 CCR § 15064.4 (c)).

These various points and guidelines for the evaluation of GHG emissions significance can be summarized as presented in Appendix G of the State CEQA Guidelines, in that an Alternative would have a significant impact related to GHG emissions if it would:

- Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?
- Impact GHG-2: Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?

Typically, in a CEQA analysis, project-related impacts are compared to existing (without project) conditions. However, pursuant to CEQA Guidelines section 15125(a)(2), a lead agency has the

discretion to exclusively use a future conditions baseline for the purposes of determination of significance under CEQA in instances where showing an existing conditions analysis would be misleading or without informational value. Use of an existing conditions baseline would be misleading for the Project because it ignores the regional background growth in population, traffic, and transportation infrastructure that would occur between the existing conditions baseline year of 2019⁷ and Project build-out (i.e., the 2019 existing conditions will be substantially altered by regional growth that will occur independent of the Project, which, in turn, would mask the impacts that are attributable to the Project and would not provide the reader with an accurate and meaningful delineation of Project-related impacts). Considering such growth is critical when determining future effects for transit projects designed to reduce traffic congestion and associated air quality impacts over time. Isolating the Project's impacts from ancillary changes in the environment would result in a misleading analysis.

Therefore, for the quantification of GHG emissions, Project emissions will be defined as the difference between a Build Alternative (2042) and the existing conditions in 2019 adjusted for regional growth (i.e., the projected future conditions baseline) that would occur by 2042. In this case, the projected future conditions baseline is 2042 without Project Conditions. The horizon year (2042) of the regional travel demand Corridor Based Model 2018 (CMB18), which incorporates Metro Measure M projects identified in the Measure M Expenditure Plan, roadway improvements, and other transit improvements anticipated to occur throughout the transit corridor, was selected as the Project design year. Use of this 2042 design year represents a characterization of the holistic, long-term benefits of the Project as transit-oriented development expands within the GSA and throughout the region. Additionally, although the Project is projected to open in 2035, emission factors for highway vehicles (the preeminent emission source affected by this Project) decrease as engine technology improves and vehicle manufacturers meet more stringent state and federal engine emission and efficiency standards. Since all alternatives would reduce VMT associated with highway traffic as compared to 2042 without Project Conditions, using 2042 highway traffic emission rates would result in fewer GHG reductions from this emission source as compared to reductions which might be achieved in 2035. Therefore, evaluation of Project impacts during the 2042 design year would conservatively evaluate the impacts of operations.

In 2018 and 2021, the OPR issued technical advisories for the streamlined review of transportation projects under CEQA (OPR 2018; OPR 2021). In these advisories, consistent with Section 15064.3 of the CEQA Guidelines, OPR presumes that certain types of transportation projects (including light rail projects) which would reduce VMT would also result in a less than significant impact on transportation and would align with SB 743 goals to reduce GHG emissions, increase multimodal transportation, and facilitate mixed used development. While OPR does recognize that reducing VMT would be essential to meeting state GHG reduction targets, it does not presume any conclusions relative to GHG emissions impacts specifically for VMT-reducing projects.

The State CEQA Guidelines recommend that significance criteria established by the applicable air quality management district, air pollution control district, or lead agency be relied upon to make a determination of significance with respect to GHG impacts. No applicable quantitative threshold of significance has been established by SCAQMD, CARB, OPR, or Metro for the determination of project-level GHG emissions significance under CEQA. CARB and OPR, however, acknowledge that transforming public transit systems and reducing VMT are effective strategies for reducing GHG emissions on a regional scale. OPR recommends the streamlining of GHG emissions impacts

⁷ As described in Section 3.14, Transportation and Traffic, the base year data in Metro's regional travel demand forecasting model (the Corridor Based Model 2018 [CBM18]) is from 2017 and represents the data that was most recently available when the model was created in 2018. This data has been used to represent 2019, the existing conditions year in this study.

analyses for transit and active transportation projects because these projects reduce GHG emissions, improve and increase multimodal transportation networks, and facilitate mixed use development, which are crucial land use planning initiatives for climate adaptation. Therefore, GHG emissions are quantified, and Impact GHG-1 is assessed qualitatively in the context of the predicted annual project-level emission reductions and consistency with the statutory goals and requirements of the applicable statewide, regional, or local plans.

Impact GHG-2 is assessed by evaluating the Project's consistency with the emission reduction strategies of the applicable statewide, regional, or local plans. If the Project would not conflict with or obstruct the strategies and implementation mechanisms of these plans, then the Project impacts would be less than significant.

6.0 EXISTING SETTING

6.1 Area of Potential Impact

The area of potential impact is defined as the South Coast Air Basin (SoCAB), which includes all of Orange County and the urban, non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. Although the area of potential impact is extensive, the analysis will focus only on GHG emission sources that impact or are impacted by the Project. Specifically, the analysis will analyze Project impacts within the four-county region to capture the changes in highway traffic-related VMT that could occur as a direct result of each Build Alternative as determined by the Project traffic analysis. The analysis covers emissions from Project-related construction sources (i.e., construction equipment, haul and delivery trucks, and construction worker vehicles) in the SoCAB, as well as operational emissions from the LRVs within the SoCAB and from the proposed MSF site options.

6.2 Description of Relevant Pollutants

GHGs include CO₂, CH₄, and N₂O, and fluorinated gases. Presented below is a description of each GHG and their primary sources. Only emissions of CO₂, CH₄, and N₂O are substantially altered by implementation of the Project.

- **CO₂** enters the atmosphere through the burning of fossil fuels (i.e., oil, natural gas, and coal), solid waste, trees and wood products, respiration, and is the result of chemical reactions (e.g., the manufacture of cement). CO₂ is also removed from the atmosphere (or “sequestered”) when it is absorbed by plants as part of the biological carbon cycle.
- **CH₄** is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and the decay of organic waste in municipal solid waste landfills.
- **N₂O** is emitted during agricultural and industrial activities as well as during the combustion of fossil fuels and solid waste.
- **Fluorinated gases** are synthetic GHGs emitted from industrial processes. Fluorinated gases are sometimes used as substitutes for ozone-depleting substances. Although these gases are typically emitted in smaller quantities, they are potent GHGs with high GWPs.
- **Chlorofluorocarbons (CFCs)** are GHGs covered under the 1987 Montreal Protocol. CFCs are used in refrigeration, air-conditioning, packaging, insulation, solvents, or aerosol propellants. CFCs are not destroyed in the lower atmosphere. CFCs rise into the upper atmosphere where, given suitable conditions, they deplete ozone.
- **PFCs** are a group of synthetic compounds composed of carbon and fluorine only. These chemicals (predominantly perfluoromethane [CF₄] and perfluoroethane [C₂F₆]) were introduced as alternatives, along with HFCs, to ozone-depleting substances. PFCs are emitted as by-products of industrial processes and are used in manufacturing. Although PFCs do not harm the stratospheric ozone layer, they are high GWP GHGs.



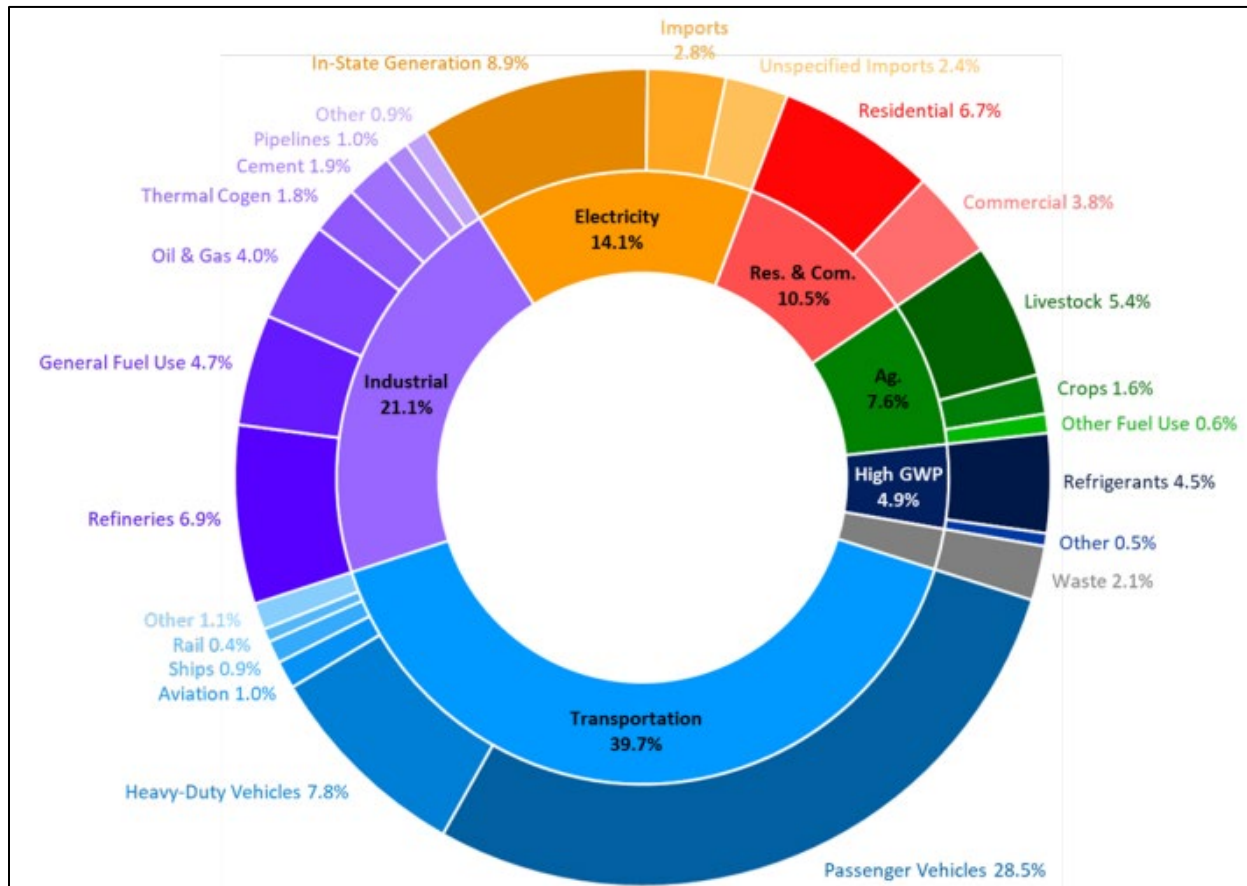
- **SF₆** is a high GWP GHG used primarily in electrical transmission and distribution systems as a dielectric.
- **Hydrochlorofluorocarbons (HCFCs)** contain hydrogen, fluorine, chlorine, and carbon atoms. HCFCs are ozone-depleting substances that are less potent than CFCs. They have been introduced as temporary replacements for CFCs and are also GHGs.
- **HFCs** contain only hydrogen, fluorine, and carbon atoms. They were introduced as alternatives to ozone-depleting substances in items that serve industrial, commercial, and personal needs. HFCs are emitted as by-products of industrial processes and are also used in manufacturing. They are not substantially ozone-depleting substances, but they are GHGs with high GWPs.

6.3 Existing Conditions

According to the IPCC, in 2010, worldwide man-made emissions of GHGs were approximately 49,000 MMTCO₂e (IPCC 2007). Total U.S. GHG emissions in 2019 were 6558.3 MMTCO₂e, or about 13 percent of worldwide GHG emissions (USEPA 2021a). California, due in part to its large size and large population, is a substantial contributor of global GHGs, and is the second largest contributor to GHG emissions in the United States; Texas is the largest (U.S. Energy Information Administration 2021). As mandated by the Global Warming Solutions Act of 2006 (AB 32), CARB has implemented a Scoping Plan to reduce state GHG emissions. Accordingly, California's GHG emissions have steadily decreased, with emissions in 2019 decreasing by nearly 15 percent since peak levels in 2004 (CARB 2021a).

As shown in **Figure 6.1**, transportation is responsible for 39.7 percent of the state's GHG emissions, followed by the industrial sector (21.1 percent), electricity generation (14.1 percent), commercial and residential (10.5 percent), agriculture and forestry (7.6 percent) and other sources (7.0 percent). Passenger vehicles and heavy-duty trucks represent approximately 36 percent of total emissions, with rail contributing less than one percent. Rail is therefore a key element in reducing the state's GHG emissions by providing an alternative to passenger vehicles.

Emissions of CO₂ and N₂O are largely byproducts of fossil fuel combustion. CH₄, a highly potent GHG, results largely from off-gassing associated with agricultural practices and landfills. Sinks of CO₂ include uptake by vegetation and dissolution into the ocean. California GHG emissions in 2019 totaled approximately 418 MMTCO₂e (CARB 2021a).



Source: CARB, 2021a.

Figure 6.1. California GHG Inventory for 2019

Climate change has the potential to affect the natural environment in California in the following ways, among others:

- Rising sea levels along the California coastline, particularly in San Francisco and the San Joaquin Delta due to ocean expansion
- Extreme heat conditions, such as heat waves and very high temperatures, which could last longer and become more frequent
- Increased frequency and severity of wildfires
- An increase in heat-related human deaths, infectious diseases, and a higher risk of respiratory problems caused by deteriorating air quality
- Reduced snow pack and streamflow in the Sierra Nevada mountains, affecting winter recreation and water supplies
- An increase in the severity of winter storms, affecting peak streamflow and flooding;
- Changes in growing season conditions that could affect California agriculture, causing variations in crop quality and yield

- Changes in the distribution of plant and wildlife species due to changes in temperature, competition from colonizing species, changes in hydrologic cycles, changes in sea levels, and other climate-related effects

These changes in California’s climate and ecosystems would occur over a period when California’s population is projected to increase from 39.5 million in 2017 to 44 million by 2042 (SCDF 2020). As such, the number of people that could be affected by climate change, as well as the amount of anthropogenic GHG emissions expected under a No Project Alternative, is expected to increase. Changes similar to those noted above for California would also occur in other parts of the world, with regional variations in resources affected and vulnerability to adverse effects.

6.3.1 Regional Highway Traffic Emissions

Model year 2017 traffic data was used to estimate emissions representative of 2019 regional traffic the analysis for disclosure purposes; as discussed in **Section 5.0**, CEQA significance was determined by comparing future year 2042 Build Alternatives to 2042 without Project Conditions. Data on VMT in the region and emission factors from the EMFAC2017 model were used to estimate emissions of GHG. The emissions calculations were based on the total VMT in the region and the average speed on the highway network. **Table 6-1** summarizes the results of the GHG emissions from existing conditions. Detailed calculations are provided in **Attachment B**.

Table 6-1. Existing and 2042 without Project Conditions Annual Regional Highway Traffic GHG Emissions

Source	CO ₂	CH ₄	N ₂ O	Total ¹
2019 Existing Conditions VMT	n/a	n/a	n/a	151,291,998,000
2019 Emission Factor (grams per mile)	369	0.021	0.021	n/a
2019 Existing Conditions Emissions (metric tons per year)	55,766,998	3,122	3,219	n/a
2042 without Project Conditions VMT	n/a	n/a	n/a	185,726,628,000
2042 Emission Factor (grams per mile)	252	0.007	0.012	n/a
2042 without Project Conditions Emissions (metric tons per year)	46,845,556	1,387	2,178	n/a
GWP	1	25	298	n/a
2019 Existing Conditions CO ₂ e Emissions ² (metric tons per year)	55,766,998	78,051	959,403	56,804,452
2042 without Project Conditions CO ₂ e Emissions (metric tons per year)	46,845,556	34,685	649,069	47,529,310

Notes:

¹ Totals may vary due to rounding.

² CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

Key:

CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; GWP = Global Warming Potential; N/A = not applicable; N₂O = nitrous oxide; VMT = vehicle miles traveled

6.3.2 Total Operational Emissions

Total operational emissions for the existing year 2019 conditions, summarized in **Table 6-2**, were estimated from the regional highway traffic. Emissions from bus operations were not estimated because implementation of a Build Alternative would not include the addition of new bus services or removal of existing services and would include only minor adjustment of existing services to accommodate station access. Emissions from urban rail were not estimated because there are no expected urban rail operations under the existing conditions within the DSA. Emissions from construction-related activities were not quantified because there is no Project-related construction under the existing conditions.

Table 6-2. Existing and 2042 without Project Conditions Total Operational GHG Emissions

Source	Emissions (metric tons CO ₂ e per year)			
	CO ₂	CH ₄	N ₂ O	Total ¹
Existing Conditions Regional Traffic	55,766,998	78,051	959,403	56,804,452
Existing Conditions Total Emissions ²	55,766,998	78,051	959,403	56,804,452
2042 without Project Conditions Regional Traffic	46,845,556	34,685	649,069	47,529,310
2042 without Project Conditions Total Emissions ²	46,845,556	34,685	649,069	47,529,310

Notes:

¹ Totals may vary due to rounding.

² CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

Key:

CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; N₂O = nitrous oxide

7.0 IMPACTS

This section describes the results of the impact analysis conducted for the Project. More detailed emission calculations and model outputs can be found in **Attachment A** and **Attachment B** of this impacts report.

7.1 Impact GHG-1: Emission Generation

Impact GHG-1: Would a Build Alternative generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

7.1.1 Alternative 1 Washington Boulevard

7.1.1.1 Operational Impacts

Operational emissions associated with Alternative 1 would include indirect emissions from electricity needed to operate the LRVs, new stations, parking facilities, MSF operations, which are essential in maintaining a reliable light rail system, and direct emissions from highway traffic after construction is completed and the Project is implemented. MSF operations are also discussed in **Section 7.1.4**.

7.1.1.1.1 Regional Highway Traffic Emissions

Direct operational GHG emissions from regional highway traffic were estimated following the methodology described in **Section 4.2**. The Project would provide an alternative to automobile transportation in the region; therefore, it was necessary to evaluate highway traffic to assess how the Project would increase or decrease operational emissions from highway vehicles. **Table 7-1** provides a summary of estimated direct GHG emissions under Alternative 1.

Table 7-1. Alternative 1 Annual Regional Highway Traffic GHG Emissions

Source	CO ₂	CH ₄	N ₂ O	Total ¹
VMT	n/a	n/a	n/a	185,723,448,000
Emission Factor (grams per mile)	252	0.007	0.012	n/a
Emissions (metric tons per year)	46,844,754	1,387	2,178	n/a
GWP	1	25	298	n/a
CO ₂ e Emissions ² (metric tons per year)	46,844,754	34,684	649,058	47,528,496

Notes:

¹ Totals may vary due to rounding.

² CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

Key:

CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; GWP = Global Warming Potential; N/A = not applicable;

N₂O = nitrous oxide; VMT = vehicle miles traveled

7.1.1.1.2 Light Rail, Station, Parking, and Maintenance and Storage Facility Operational Emissions

Indirect operational GHG emissions would occur from the generation of electricity used to operate the LRVs, the lighting, train control, and other functions of the LRV stations, lighting at parking facilities, and lighting and other equipment at the MSF. Emissions associated with electrical generation were estimated using baseline emission factors for the SCE utility provider. Emissions were also estimated assuming that the provider would achieve its preferred 84 percent clean energy portfolio by 2030. A small amount of direct operational GHG emissions would also occur from operation of the MSF and would include natural gas combustion for comfort heating and water use. Operational GHG emissions associated with vehicle trips for workers at the MSF and stations would be accounted for in the regional traffic emissions presented previously. **Table 7-2** and **Table 7-3** provide a summary of estimated indirect emissions associated with the LRV operation and station operation, respectively. **Table 7-4** provides a summary of estimated indirect emissions associated with parking facilities' operations. **Table 7-5** presents estimated indirect emissions associated with train control. **Table 7-6** and **Table 7-7** provide a summary of estimated direct and indirect GHG emissions associated with each of the MSF site options.

Table 7-2. Alternative 1 Annual LRV Operations GHG Emissions

Source	CO ₂	CH ₄	N ₂ O	Total ¹
Electricity Used (kWh)	n/a	n/a	n/a	4,296,555
Emission Factor (pounds per kWh)	0.39	0.000033	0.000004	n/a
Emissions (metric tons per year)	762	0.064	0.008	n/a
GWP	1	25	298	n/a
CO ₂ e Emissions ² (metric tons per year)	762	2	2	766
CO ₂ e Emissions ² (metric tons per year) (Adjusted for 84% clean energy) ³	250	1	1	251

Notes:

¹ Totals may vary due to rounding.

² CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

³ GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.

Key:

CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; GWP = Global Warming Potential; kWh = kilowatt-hour;

N/A = not applicable; N₂O = nitrous oxide



Table 7-3. Alternative 1 Annual Station Operations GHG Emissions

Station	Annual Consumption (kWh per year) ¹	Emissions (metric tons per year)			
		CO ₂	CH ₄	N ₂ O	Total ²
Atlantic (relocated/reconfigured)	75,072	13	0.001	<0.001	n/a
Atlantic/Whittier	75,072	13	0.001	<0.001	n/a
Commerce/Citadel	75,072	13	0.001	<0.001	n/a
Greenwood	26,772	5	<0.001	<0.001	n/a
Rosemead	24,150	4	<0.001	<0.001	n/a
Norwalk	24,150	4	<0.001	<0.001	n/a
Lambert	24,150	4	<0.001	<0.001	n/a
GWP		1	25	298	n/a
Total CO ₂ e Emissions ³ (metric tons per year)		58	<1	<1	58
Total CO ₂ e Emissions ³ (metric tons per year) (Adjusted for 84% clean energy) ⁴		19	<1	<1	19

Notes:

1 Infrastructure energy consumption includes lighting, operation of elevators or escalators for elevated or sub-grade stations, and other station-related operational electrical demands.

2 Totals may vary due to rounding.

3 CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

4 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.

Key:

CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; GWP = Global Warming Potential; kWh = kilowatt-hour;

N/A = not applicable; N₂O = nitrous oxide

Table 7-4. Alternative 1 Annual Parking Facility Operations GHG Emissions

Parking Facility	Annual Consumption (kWh per year) ¹	Emissions (metric tons per year)			
		CO ₂	CH ₄	N ₂ O	Total ²
Greenwood	51,800	9	0.001	<0.001	n/a
Rosemead	57,400	10	0.001	<0.001	n/a
Norwalk	54,600	10	0.001	<0.001	n/a
Lambert	91,000	16	0.001	<0.001	n/a
GWP		1	25	298	n/a
Total CO ₂ e Emissions ³ (metric tons per year)		45	<1	<1	45
Total CO ₂ e Emissions ³ (metric tons per year) (Adjusted for 84% clean energy) ⁴		15	<1	<1	15

Notes:

1 Infrastructure energy consumption includes lighting and other parking facility-related operational electrical demands.

2 Totals may vary due to rounding.

3 CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

4 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.

Key:

CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; GWP = Global Warming Potential; kWh = kilowatt-hour;

N/A = not applicable; N₂O = nitrous oxide

Table 7-5. Alternative 1 Annual Train Control Operations GHG Emissions

Infrastructure	Annual Consumption (kWh per year)	Emissions (metric tons per year)			
		CO ₂	CH ₄	N ₂ O	Total ¹
Train Control	446,500	79	0.007	0.001	n/a
GWP		1	25	298	n/a
Total CO ₂ e Emissions ² (metric tons per year)		79	<1	<1	80
Total CO ₂ e Emissions ² (metric tons per year) (Adjusted for 84% clean energy) ³		26	<1	<1	26

Source: Chester & Horvath, 2008.

Notes:

1 Totals may vary due to rounding.

 2 CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

3 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.

Key:

 CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; GWP = Global Warming Potential; kWh = kilowatt-hour;

 N/A = not applicable; N₂O = nitrous oxide

Table 7-6. Alternative 1 Commerce MSF Site Option Operations GHG Emissions

Source	Emissions (metric tons per year)			
	CO ₂	CH ₄	N ₂ O	Total ³
MSF Natural Gas ¹	8	<0.001	<0.001	n/a
MSF Electricity	134	0.011	0.001	n/a
MSF Water Usage	108	1.342	0.033	n/a
GWP		1	25	298
Total CO ₂ e Emissions ² (metric tons per year)		249	34	10
Total CO ₂ e Emissions ² (metric tons per year) (Adjusted for 84% clean energy) ⁴		159	34	10

Notes:

1 Operational emissions from the MSF include natural gas combustion for comfort heating and cooling.

 2 CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

3 Totals may vary due to rounding.

4 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.

Key:

 CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; GWP = Global Warming Potential; kWh = kilowatt-hour;

 MSF = maintenance and storage facility; N/A = not applicable; N₂O = nitrous oxide

Table 7-7. Alternative 1 Montebello MSF Site Option Operations GHG Emissions

Source	Emissions (metric tons per year)			
	CO ₂	CH ₄	N ₂ O	Total ³
MSF Natural Gas ¹	8	<0.001	<0.001	n/a
MSF Electricity	138	0.012	0.001	n/a
MSF Water Usage	108	1.342	0.033	n/a
GWP	1	25	298	n/a
Total CO ₂ e Emissions ² (metric tons per year)	253	34	10	297
Total CO ₂ e Emissions ² (metric tons per year) (Adjusted for 84% clean energy) ⁴	161	34	10	204

Notes:

1 Operational emissions from the MSF include natural gas combustion for comfort heating and landscaping.

 2 CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

3 Totals may vary due to rounding.

4 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.

Key:

 CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; GWP = Global Warming Potential; kWh = kilowatt-hour;

 MSF = maintenance and storage facility; N/A = not applicable; N₂O = nitrous oxide

7.1.1.1.3 Total Operational Emissions for Alternative 1

Total operational emissions from Alternative 1, including the LRVs, stations, parking facilities, train control, and the MSF site options, are summarized in **Table 7-8** and **Table 7-9**. This alternative would reduce highway traffic VMT and the associated GHG emissions as compared to 2042 without Project Conditions; however, the operation of the LRVs, stations, train control, parking facilities, and MSF would increase demand for electricity. Overall, a net decrease in regional operational GHG emissions would be expected as compared to 2042 without Project Conditions. Implementation of Alternative 1 would reduce regional VMT by 3,180,000 miles annually. Overall, operation of Alternative 1 was estimated to reduce total GHG emissions by 300 metric tons CO₂e per year with the Commerce MSF site option, or 298 metric tons CO₂e per year with the Montebello MSF site option. Regional traffic emission estimates are based on VMT projections associated only with implementation of Alternative 1, and do not account for increased ridership (VMT reductions) from potential future transportation system improvements, such as those which may occur from improved bus, pedestrian, bike, and other First/Last Mile (FLM) enhancements or from increased mixed-use development in the DSA. Additionally, GHG estimates from electricity generation account for an 84 percent clean energy portfolio anticipated to be achieved by SCE, the local utility provider, by 2030. However, California SB 100 requires public utility providers to achieve 100 percent renewable energy by 2045. Thus, even with the 84 percent clean energy adjustment, the analysis would be conservative, as SCE will continue to integrate renewable electricity sources between the portfolio target year of 2030 and the California 100 percent RPS deadline year of 2045. By 2045, GHG emissions presented for the light rail operation, station operation, train control, and parking facilities project elements, which are associated with electrical generation, would be reduced to zero, and GHG emissions from MSF operations would also be reduced, resulting in additional annual GHG reductions starting in 2045.

As indicated previously, SCAQMD generally recommends that construction emissions be amortized over a period of 30 years. However, the project lifetime would be expected to be considerably longer than 30 years, and therefore the construction contribution to annual emissions would be lower than presented in this analysis. When amortized over 30 years, construction emissions would contribute

288 metric tons CO₂e per year with the Commerce MSF site option or 297 metric tons CO₂e per year with the Montebello MSF site option, resulting in total annual emission reductions of 11.9 metric tons CO₂e per year for the Commerce MSF site option or 1.4 metric tons CO₂e per year for the Montebello MSF site option. California’s RPS sets a target of 100 percent renewable grid power by 2045, three years after the Project horizon year. As discussed previously, as grid power becomes increasingly renewable, additional GHG benefits from operation would be expected.

In addition to emissions decreases on the project level, the Project is a component of the RTP and contributes to California’s goal to increase mass transit under the AB 32 Scoping Plan. Implementation of Alternative 1 would enhance regional transportation systems and contribute to planning efforts to reduce VMT and GHG emissions from transportation sources. Thus, operation of Alternative 1 would be consistent with the State’s long-term climate strategies and the incremental contribution to climate change from Alternative 1 would be less than significant.

Table 7-8. Alternative 1 with Commerce MSF Site Option Total Operational GHG Emissions

Source	Emissions (metric tons CO ₂ e per year) ^{1,2}			
	CO ₂	CH ₄	N ₂ O	Total ³
Regional Traffic	46,844,754	34,684	649,058	47,528,496
Light Rail Operation	250	1	1	251
Station Operation	19	<1	<1	19
Train Control	26	<1	<1	26
Parking Facilities	15	<1	<1	15
MSF Operation	159	34	10	203
Total Emissions ³	46,845,223	34,719	649,069	47,529,010
Increment based on Existing Conditions (2019) ^{4,5}	(8,921,776)	(43,332)	(310,334)	(9,275,442)
Increment based on 2042 without Project Conditions ^{4,6}	(333)	34	(<1)	(300)

Notes:

1 CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

2 Emissions associated with electrical consumption are adjusted for SCE’s preferred clean energy portfolio anticipated to be met by 2030.

3 Totals may vary due to rounding.

4 Emission reductions (beneficial impacts) are shown in parentheses.

5 Increment calculated as the difference between the total emissions for the Build Alternative and the total emissions for the Existing Conditions, presented in **Table 6-2**.

6 Increment calculated as the difference between the total emissions for the Build Alternative and the total emissions for 2042 without Project Conditions, presented in **Table 9-1**.

Key:

CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; MSF = maintenance and storage facility; N₂O = nitrous oxide

Table 7-9. Alternative 1 with Montebello MSF Site Option Total Operational GHG Emissions

Source	Emissions (metric tons CO ₂ e per year) ^{1,2}			
	CO ₂	CH ₄	N ₂ O	Total ³
Regional Traffic	46,844,754	34,684	649,058	47,528,496
Light Rail Operation	250	1	1	251
Station Operation	19	<1	<1	19
Train Control	26	<1	<1	26
Parking Facilities	15	<1	<1	15
MSF Operation	161	34	10	204
Total Emissions ³	46,845,224	34,719	649,069	47,529,011
Increment based on Existing Conditions (2019) ^{4,5}	(8,921,774)	(43,332)	(310,334)	(9,275,441)
Increment based on 2042 without Project Conditions ^{4,6}	(332)	34	(<1)	(298)

Notes:

1 CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

2 Emissions associated with electrical consumption are adjusted for SCE's preferred clean energy portfolio anticipated to be met by 2030.

3 Totals may vary due to rounding.

4 Emission reductions (beneficial impacts) are shown in parentheses.

5 Increment calculated as the difference between the total emissions for Alternative 1 and the total emissions for the Existing Conditions, presented in **Table 6-2**.

6 Increment calculated as the difference between the total emissions for Alternative 1 and the total emissions for 2042 without Project Conditions, presented in **Table 9-1**.

Key:

CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; MSF = maintenance and storage facility; N₂O = nitrous oxide

Design Options

Atlantic/Pomona Station Option

As described above, the operation of the base Alternative 1 would result in a decrease in GHG emissions at the project level. The Project would be consistent with state and regional climate strategies to increase mass transit, and would thus result in an incremental contribution to climate change that would be less than significant. While the Atlantic/Pomona Station option would slightly alter the configuration of Alternative 1, it would not be expected to increase or decrease ridership of the light rail system, nor would it be expected to appreciably increase or decrease VMT relative to the base Alternative 1. Therefore, operation of Alternative 1 with the Atlantic/Pomona Station Option would not result in a meaningful difference in operational GHG emissions as compared to the base Alternative 1, nor would it alter the Project's contribution to the state and regional mass transit climate strategies. Therefore, operation of Alternative 1 with the Atlantic/Pomona Station Option would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change that would be less than significant.

Montebello At-Grade Option

As described above, the operation of the base Alternative 1 would result in a decrease in GHG emissions at the project level. The Project would be consistent with state and regional climate strategies to increase mass transit, and would thus result in an incremental contribution to climate change which would be less than significant. While the Montebello At-Grade option would slightly alter the configuration of Alternative 1, it would not be expected to increase or decrease ridership of the light rail system, nor would it be expected to appreciably increase or decrease VMT relative to the base Alternative 1. Therefore, implementation of Alternative 1 with the Montebello At-Grade Option would result in no meaningful difference in operational GHG emissions as compared to the base alternative, nor would it alter the Project's contribution to the state and regional mass transit climate strategies. Therefore, operation of Alternative 1 with the Montebello At-Grade Option would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change that would be less than significant.

7.1.1.2 Construction Impacts

Construction GHG emission sources under Alternative 1 include exhaust from construction worker motor vehicles traveling to and from the project site, exhaust from delivery and hauling trucks traveling to and from the project site, and exhaust from heavy-duty construction equipment operating on-site.

Table 7-10 details the annual GHG emissions associated with construction of Alternative 1 and the MSF site options. Consistent with SCAQMD guidance, construction GHG emissions are amortized over the project lifetime, assumed to be 30 years, to be combined with annual operational emissions. When amortized over 30 years, construction emissions would contribute 288 metric tons CO₂e per year with the Commerce MSF site option or 297 metric tons CO₂e per year with the Montebello MSF site option. As indicated in **Section 7.1.1.1.3**, the incremental contribution to climate change from construction of Alternative 1, including amortized construction emissions, would be less than significant.

Table 7-10. Alternative 1 Annual Construction GHG Emissions

Project Element ¹	Emissions of CO ₂ e (metric tons per year) ²					
	Year 1	Year 2	Year 3	Year 4	Year 5	Project
Guideway Construction ^{3,4}	570	1,067	660	1,222	172	3,690
Base Alternative Atlantic Station (Relocated/Reconfigured)	129	322	212	0	0	663
Design Option Atlantic/Pomona Station Option	129	322	212	0	0	663
Base Alternative Montebello Aerial	0	64	334	0	0	399
Design Option Montebello At-Grade	0	72	139	0	0	211
MSF Construction ⁵	0	249	401	440	284	1,374
Commerce MSF Site Option	0	321	423	354	0	1,099
Montebello MSF Site Option	0	249	401	440	284	1,374
Station Construction	339	969	796	383	116	2,601
Parking Construction	0	0	0	48	39	86
Street Widening and TPSS	0	39	204	482	436	1,162
Maximum Total Emissions^{3,4,5}	908	2,324	2,061	2,575	1,046	8,914
30-Year Amortized Emissions (Commerce MSF Site Option)						288
30-Year Amortized Emissions (Montebello MSF Site Option)						297

Note:

- 1 Emissions from hauling and vendor trips and construction worker commuting included in project element emission totals.
- 2 Construction of Alternative 1 would occur over 5 years. Emissions are calculated from calendar year 2022 emission factors. Emissions for project construction stated on or after January 1, 2022 would be less than or equal to the emissions presented.
- 3 Only the aerial alignment in Montebello (base alternative) or the at-grade alignment (Montebello At-Grade Option) would be constructed. Total emissions assume the base alternative construction as emissions would be higher.
- 4 Only the Atlantic station (relocated/reconfigured) (base alternative) or the Atlantic/Pomona station (design option) would be constructed. Because comparable excavation for the Atlantic/Pomona Station Option would already be required under the base alternative for the TBM receiving pit, there would not be a material difference in overall construction GHG emissions.
- 5 Only one MSF site option would be constructed. Total emissions assume the Montebello MSF site option construction as emissions would be higher.

Key:

 CO₂e = carbon dioxide equivalent; MSF = maintenance and storage facility; N/A = not applicable; TPSS = transportation power substation

Design Options

Atlantic/Pomona Station Option

As presented in **Table 7-10**, GHG emissions associated with construction of the Atlantic/Pomona Station Option would be the same as those of the base Alternative 1 Atlantic Station (relocated/reconfigured). While the Atlantic/Pomona Station Option, the TBM receiving pit, and the alignment north of the proposed Atlantic/Whittier station would be located at a different position, the magnitude of excavation activity which would be required to implement the Atlantic/Pomona Station Option would be essentially the same as that required under the base Alternative 1 for the excavation of the TBM receiving pit and underground-to-at-grade transition of the alignment. Substantial additional construction is not anticipated for the Atlantic/Pomona Station Option and construction GHG

emissions would not materially differ from the base Alternative 1. Therefore, construction of Alternative 1 with the Atlantic/Pomona Station Option would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change that would be less than significant.

Montebello At-Grade Option

As presented in **Table 7-10**, GHG emissions associated with construction of the Montebello At-Grade Option would be less than those of the base alternative, and implementation of this design option would result in no meaningful change to the Project’s incremental contribution to climate change. Therefore, construction of Alternative 1 with the Montebello At-Grade Option would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change that would be less than significant.

7.1.2 Alternative 2 Atlantic to Commerce/Citadel IOS

7.1.2.1 Operational Impacts

Operational emissions associated with Alternative 2 would include indirect emissions from electricity needed to operate the LRVs, new stations, and an MSF, as well as direct emissions from highway traffic after construction is completed and the Project is implemented.

7.1.2.1.1 Regional Highway Traffic Emissions

Direct operational GHG emissions from regional highway traffic were estimated following the methodology described in **Section 4.2**. The Project would provide an alternative to automobile transportation in the region; therefore, it was necessary to evaluate highway traffic to assess how the Project would increase or decrease operational emissions from highway vehicles. **Table 7-11** provides a summary of estimated direct GHG emissions under the Washington Alternative.

Table 7-11. Alternative 2 Annual Regional Highway Traffic GHG Emissions

Source	CO ₂	CH ₄	N ₂ O	Total ¹
VMT	n/a	n/a	n/a	185,725,038,000
Emission Factor (grams per mile)	252	0.007	0.012	n/a
Emissions (metric tons per year)	46,845,155	1,387	2,178	n/a
GWP	1	25	298	n/a
CO ₂ e Emissions ² (metric tons per year)	46,845,155	34,685	649,063	47,528,903

Notes:

¹ Totals may vary due to rounding.

² CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

Key:

CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; GWP = Global Warming Potential; N/A = not applicable;

N₂O = nitrous oxide; VMT = vehicle miles traveled

7.1.2.1.2 Light Rail, Station, Parking, and Maintenance and Storage Facility Operational Emissions

Indirect operational GHG emissions would occur from the generation of electricity used to operate the LRVs, the lighting, train control, and other functions of the LRV stations, and lighting and other equipment at the MSF. There would be no new project parking facilities under Alternative 2. Emissions associated with electrical generation were estimated using baseline emission factors for the SCE utility provider. Emissions were also estimated assuming that the provider would achieve its preferred 84 percent clean energy portfolio by 2030. A small amount of direct operational GHG emissions would also occur from operation of the MSF and would include natural gas combustion for comfort heating and water use. Operational GHG emissions associated with vehicle trips for workers at the MSF and stations would be accounted for in the regional traffic emissions presented previously. **Table 7-12** and **Table 7-13** provide a summary of estimated indirect emissions associated with the LRV operation and station operation, respectively. **Table 7-14** presents estimated indirect emissions associated with train control. **Table 7-15** provides a summary of estimated direct and indirect GHG emissions associated with the Commerce MSF site option.

Table 7-12. Alternative 2 Annual LRV Operations GHG Emissions

Source	CO ₂	CH ₄	N ₂ O	Total ¹
Electricity Used (kWh)	n/a	n/a	n/a	1,130,672
Emission Factor (pounds per kWh)	0.39	0.000033	0.000004	n/a
Emissions (metric tons per year)	201	0.017	0.002	n/a
GWP	1	25	298	n/a
CO ₂ e Emissions ² (metric tons per year)	201	<1	1	202
CO ₂ e Emissions ² (metric tons per year) (Adjusted for 84% clean energy) ³	66	<1	<1	66

Notes:

¹ Totals may vary due to rounding.

² CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

³ GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.

Key:

CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; GWP = Global Warming Potential; kWh = kilowatt-hour;

N/A = not applicable; N₂O = nitrous oxide

Table 7-13. Alternative 2 Annual Station Operations GHG Emissions

Station	Annual Consumption (kWh per year) ¹	Emissions (metric tons per year)			
		CO ₂	CH ₄	N ₂ O	Total ²
Atlantic (relocated/reconfigured)	75,072	13	0.001	<0.001	n/a
Atlantic/Whittier	75,072	13	0.001	<0.001	n/a
Commerce/Citadel	75,072	13	0.001	<0.001	n/a
GWP		1	25	298	n/a
Total CO ₂ e Emissions ³ (metric tons per year)		40	<1	<1	40
Total CO ₂ e Emissions ³ (metric tons per year) (Adjusted for 84% clean energy) ⁴		13	<1	<1	13

Notes:

1 Infrastructure energy consumption includes lighting, operation of elevators or escalators for elevated or sub-grade stations, and other station-related operational electrical demands.

2 Totals may vary due to rounding.

3 CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

4 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.

Key:

CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; GWP = Global Warming Potential; kWh = kilowatt-hour;

N/A = not applicable; N₂O = nitrous oxide

Table 7-14. Alternative 2 Annual Train Control Operations GHG Emissions

Infrastructure	Annual Consumption (kWh per year)	Emissions (metric tons per year)			
		CO ₂	CH ₄	N ₂ O	Total ¹
Train Control	117,500	21	0.002	<0.001	n/a
GWP		1	25	298	n/a
Total CO ₂ e Emissions ² (metric tons per year)		21	<1	<1	21
Total CO ₂ e Emissions ² (metric tons per year) (Adjusted for 84% clean energy) ³		7	<1	<1	7

Source: Chester & Horvath, 2008.

Notes:

1 Totals may vary due to rounding.

2 CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

3 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.

Key:

CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; GWP = Global Warming Potential; kWh = kilowatt-hour;

N/A = not applicable; N₂O = nitrous oxide

Table 7-15. Alternative 2 Commerce MSF Site Option Operations GHG Emissions

Source	Emissions (metric tons per year)			
	CO ₂	CH ₄	N ₂ O	Total ³
MSF Natural Gas ¹	8	<0.001	<0.001	n/a
MSF Electricity	134	0.011	0.001	n/a
MSF Water Usage	108	1.342	0.033	n/a
GWP	1	25	298	n/a
Total CO ₂ e Emissions ² (metric tons per year)	249	34	10	293
Total CO ₂ e Emissions ² (metric tons per year) (Adjusted for 84% clean energy) ⁴	159	34	10	203

Notes:

1 Operational emissions from the MSF include natural gas combustion for comfort heating and cooling.

 2 CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

3 Totals may vary due to rounding.

4 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.

Key:

 CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; GWP = Global Warming Potential; kWh = kilowatt-hour;

 MSF = maintenance and storage facility; N/A = not applicable; N₂O = nitrous oxide

7.1.2.1.3 Total Operational Emissions for Alternative 2

Total operational emissions from Alternative 2, including the LRVs, stations, train control, and the Commerce MSF site option, are summarized in **Table 7-16**. This alternative would reduce highway traffic VMT and the associated GHG emissions as compared to 2042 without Project Conditions; however, the operation of the LRVs, stations, train control, and MSF would increase demand for electricity. Overall, a net decrease in regional operational GHG emissions would be expected as compared to 2042 without Project Conditions. Implementation of Alternative 2 would reduce regional VMT by 1,590,000 miles annually. Overall, operation of Alternative 2 with the Commerce MSF site option was estimated to reduce total GHG emissions by 118 metric tons CO₂e per year. Regional traffic emission estimates are based on VMT projections associated only with implementation of Alternative 2, and do not account for increased ridership (VMT reductions) from potential future transportation system improvements, such as those which may occur from improved bus, pedestrian, bike, and other FLM enhancements or from increased mixed-use development in the DSA. Additionally, GHG estimates from electricity generation account for an 84 percent clean energy portfolio anticipated to be achieved by SCE, the local utility provider, by 2030. However, California SB 100 requires public utility providers to achieve 100 percent renewable energy by 2045. Thus, even with the 84 percent clean energy adjustment, the analysis would be conservative as SCE will continue to integrate renewable electricity sources between the portfolio target year of 2030 and the California 100 percent RPS deadline year of 2045. By 2045, GHG emissions presented for the light rail operation, station operation, train control, and parking facilities project elements, which are associated with electrical generation, would be reduced to zero, and GHG emissions from MSF operations would also be reduced, resulting in additional annual GHG reductions starting in 2045.

As indicated previously, SCAQMD generally recommends that construction emissions be amortized over a period of 30 years. However, the project lifetime would be expected to be considerably longer than 30 years, and therefore the construction contribution to annual emissions would be lower than presented in this analysis. When amortized over 30 years, construction emissions would contribute 157 metric tons CO₂e per year, resulting in total annual emissions of 39 metric tons CO₂e per year.

California’s RPS sets a target of 100 percent renewable grid power by 2045, three years after the Project horizon year. As discussed previously, as grid power becomes increasingly renewable, additional GHG benefits from operation would be expected.

While annual emissions including amortized construction would increase on the project level, the Project is a component of the RTP and contributes to California’s goal to increase mass transit under the AB 32 Scoping Plan. Implementation of Alternative 2 would enhance regional transportation systems and contribute to planning efforts to reduce VMT and GHG emissions from transportation sources. Thus, operation of Alternative 2 would be consistent with the State’s long-term climate strategies and the Project’s incremental contribution to climate change would be less than significant.

Table 7-16. Alternative 2 with Commerce MSF Site Option Total Operational GHG Emissions

Source	Emissions (metric tons CO ₂ e per year) ^{1,2}			
	CO ₂	CH ₄	N ₂ O	Total ³
Regional Traffic	46,845,155	34,685	649,063	47,528,903
Light Rail Operation	66	<1	<1	66
Station Operation	13	<1	<1	13
Train Control	7	<1	<1	7
MSF Operation	159	34	10	203
Total Emissions ³	46,845,400	34,718	649,074	47,529,192
Increment based on Existing Conditions (2019) ^{4,5}	(8,921,598)	(43,332)	(310,329)	(9,275,260)
Increment based on 2042 without Project Conditions ^{4,6}	(156)	34	5	(118)

Notes:

1 CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

2 Emissions associated with electrical consumption are adjusted for SCE’s preferred clean energy portfolio anticipated to be met by 2030.

3 Totals may vary due to rounding.

4 Emission reductions (beneficial impacts) are shown in parentheses.

5 Increment calculated as the difference between the total emissions for Alternative 2 and the total emissions for the Existing Conditions, presented in **Table 6-2**.

6 Increment calculated as the difference between the total emissions for Alternative 2 and the total emissions for 2042 without Project Conditions, presented in **Table 9-1**.

Key:

CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; MSF = maintenance and storage facility; N₂O = nitrous oxide

Design Option

Atlantic/Pomona Station Option

As described above, the operation of the base Alternative 2 would result in a slight increase in overall GHG emissions at the project level after accounting for the amortized construction emissions. The Project would be consistent with state and regional climate strategies to increase mass transit, and would thus result in an incremental contribution to climate change that would be less than significant. While the Atlantic/Pomona Station option would slightly alter the configuration of Alternative 2, it would not be expected to increase or decrease ridership of the light rail system, nor would it be expected to appreciably increase or decrease VMT relative to the base Alternative 2. Therefore, operation of Alternative 2 with the Atlantic/Pomona Station Option would result in no meaningful

difference in operational GHG emissions as compared to the base Alternative 2, nor would it alter the Project's contribution to the state and regional mass transit climate strategies. Therefore, operation of Alternative 2 with the Atlantic/Pomona Station Option would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change that would be less than significant.

7.1.2.2 Construction Impacts

Construction GHG emission sources under Alternative 2 include exhaust from construction worker motor vehicles traveling to and from the project site, exhaust from delivery and hauling trucks traveling to and from the project site, and exhaust from heavy-duty construction equipment operating on-site. **Table 7-17** details the annual GHG emissions associated with construction of Alternative 2 and the Commerce MSF site option. Consistent with SCAQMD guidance, construction GHG emissions are amortized over the project lifetime, assumed to be 30 years, to be combined with annual operational emissions. When amortized over 30 years, construction emissions would contribute 157 metric tons CO₂e per year. As indicated in **Section 7.1.2.1.3**, the incremental contribution to climate change from construction of Alternative 2, including amortized construction emissions, would be less than significant.

Table 7-17. Alternative 2 Annual Construction GHG Emissions

Project Element ¹	Emissions of CO ₂ e (metric tons per year) ²					
	Year 1	Year 2	Year 3	Year 4	Year 5	Project
Guideway Construction ³	570	1,002	31	0	0	1,602
Base Alternative Atlantic Station (Relocated/Reconfigured)	129	322	212	0	0	663
Design Option Atlantic/Pomona Station Option	129	322	212	0	0	663
MSF Construction	0	321	423	354	0	1,099
Station Construction	339	969	647	0	0	1,955
Street Widening and TPSS	0	39	0	0	0	39
Maximum Total Emissions³	908	2,331	1,102	354	0	4,696
30-Year Amortized Emissions						157

Note:

1 Emissions from hauling and vendor trips and construction worker commuting included in project element emission totals.

2 Construction of Alternative 2 would occur over 4 years. Emissions are calculated from calendar year 2022 emission factors. Emissions for project construction stated on or after January 1, 2022 would be less than or equal to the emissions presented.

3 Only the Atlantic station (relocated/reconfigured) (base alternative) or the Atlantic/Pomona station (design option) would be constructed. Because comparable excavation for the Atlantic/Pomona Station Option would already be required under the base alternative for the TBM receiving pit, there would not be a material difference in overall construction GHG emissions.

Key:

CO₂e = carbon dioxide equivalent; MSF = maintenance and storage facility; N/A = not applicable; TPSS = transportation power substation

Design Option

Atlantic/Pomona Station Option

As presented in **Table 7-17**, GHG emissions associated with construction of the Atlantic/Pomona Station Option would be the same as those of the base Alternative 2 Atlantic Station (relocated/reconfigured). While the Atlantic/Pomona Station Option, the TBM receiving pit, and the alignment north of the proposed Atlantic/Whittier station would be located at a different position, the magnitude of excavation activity which would be required to implement the Atlantic/Pomona Station Option would be essentially the same as that required under the base Alternative 1 for the excavation of the TBM receiving pit and underground-to-at-grade transition of the alignment. Substantial additional construction is not anticipated for the Atlantic/Pomona Station Option and construction GHG emissions would not be expected to materially differ as compared to the base Alternative 2. Therefore, construction of Alternative 2 with the Atlantic/Pomona Station Option would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change that would be less than significant.

7.1.3 Alternative 3 Atlantic to Greenwood IOS

7.1.3.1 Operational Impacts

Operational emissions associated with Alternative 3 would include indirect emissions from electricity needed to operate the LRVs, new stations, an MSF site option, and parking facilities, as well as direct emissions from highway traffic after construction is completed and the Project is implemented.

7.1.3.1.1 Regional Highway Traffic Emissions

Direct operational GHG emissions from regional highway traffic were estimated following the methodology described in **Section 4.2**. The Project would provide an alternative to automobile transportation in the region; therefore, it was necessary to evaluate highway traffic to assess how the Project would increase or decrease operational emissions from highway vehicles. **Table 7-18** provides a summary of estimated direct GHG emissions under Alternative 3.

Table 7-18. Alternative 3 Annual Regional Highway Traffic GHG Emissions

Source	CO ₂	CH ₄	N ₂ O	Total ¹
VMT	n/a	n/a	n/a	185,724,084,000
Emission Factor (grams per mile)	252	0.007	0.012	n/a
Emissions (metric tons per year)	46,844,914	1,387	2,178	n/a
GWP	1	25	298	n/a
CO ₂ e Emissions ² (metric tons per year)	46,844,914	34,684	649,060	47,528,659

Notes:

¹ Totals may vary due to rounding.

² CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

Key:

CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; GWP = Global Warming Potential; N/A = not applicable;

N₂O = nitrous oxide; VMT = vehicle miles traveled

7.1.3.1.2 Light Rail, Station, Parking, and Maintenance and Storage Facility Operational Emissions

Indirect operational GHG emissions would occur from the generation of electricity used to operate the LRVs, the lighting, train control, and other functions of the LRV stations, lighting at parking facilities, and lighting and other equipment at the MSF. Emissions associated with electrical generation were estimated using baseline emission factors for the SCE utility provider. Emissions were also estimated assuming that the provider would achieve its preferred 84 percent clean energy portfolio by 2030. A small amount of direct operational GHG emissions would also occur from operation of the MSF and would include natural gas combustion for comfort heating and water use. Operational GHG emissions associated with vehicle trips for workers at the MSF and stations would be accounted for in the regional traffic emissions presented previously. **Table 7-19** and **Table 7-20** provide a summary of estimated indirect emissions associated with the LRV operation and station operation, respectively. **Table 7-21** provides a summary of estimated indirect emissions associated with parking facilities' operations. **Table 7-22** presents estimated indirect emissions associated with train control. **Table 7-23** and **Table 7-24** provide a summary of estimated direct and indirect GHG emissions associated with each of the MSF site options.

Table 7-19. Alternative 3 Annual LRV Operations GHG Emissions

Source	CO ₂	CH ₄	N ₂ O	Total ¹
Electricity Used (kWh)	n/a	n/a	n/a	2,035,210
Emission Factor (pounds per kWh)	0.39	0.000033	0.000004	n/a
Emissions (metric tons per year)	361	0.030	0.004	n/a
GWP	1	25	298	n/a
CO ₂ e Emissions ² (metric tons per year)	361	1	1	363
CO ₂ e Emissions ² (metric tons per year) (Adjusted for 84% clean energy) ³	118	<1	<1	119

Notes:

¹ Totals may vary due to rounding.

² CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

³ GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.

Key:

CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; GWP = Global Warming Potential; kWh = kilowatt-hour;

N/A = not applicable; N₂O = nitrous oxide

Table 7-20. Alternative 3 Annual Station Operations GHG Emissions

Station	Annual Consumption (kWh per year) ¹	Emissions (metric tons per year)			
		CO ₂	CH ₄	N ₂ O	Total ²
Atlantic (relocated/reconfigured)	75,072	13	0.001	<0.001	n/a
Atlantic/Whittier	75,072	13	0.001	<0.001	n/a
Commerce/Citadel	75,072	13	0.001	<0.001	n/a
Greenwood	26,772	5	<0.001	<0.001	n/a
GWP		1	25	298	n/a
Total CO ₂ e Emissions ³ (metric tons per year)		45	<1	<1	45
Total CO ₂ e Emissions ³ (metric tons per year) (Adjusted for 84% clean energy) ⁴		15	<1	<1	15

Notes:

1 Infrastructure energy consumption includes lighting, operation of elevators or escalators for elevated or sub-grade stations, and other station-related operational electrical demands.

2 Totals may vary due to rounding.

3 CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

4 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.

Key:

CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; GWP = Global Warming Potential; kWh = kilowatt-hour;

N/A = not applicable; N₂O = nitrous oxide

Table 7-21. Alternative 3 Annual Parking Facility Operations GHG Emissions

Parking Facility	Annual Consumption (kWh per year) ¹	Emissions (metric tons per year)			
		CO ₂	CH ₄	N ₂ O	Total ²
Greenwood Ave	51,800	9	0.001	<0.001	n/a
GWP		1	25	298	n/a
Total CO ₂ e Emissions ³ (metric tons per year)		9	<1	<1	9
Total CO ₂ e Emissions ³ (metric tons per year) (Adjusted for 84% clean energy) ⁴		3	<1	<1	3

Notes:

1 Infrastructure energy consumption includes lighting and other parking facility-related operational electrical demands.

2 Totals may vary due to rounding.

3 CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

4 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.

Key:

CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; GWP = Global Warming Potential; kWh = kilowatt-hour;

N/A = not applicable; N₂O = nitrous oxide



Table 7-22. Alternative 3 Annual Train Control Operations GHG Emissions

Infrastructure	Annual Consumption (kWh per year)	Emissions (metric tons per year)			
		CO ₂	CH ₄	N ₂ O	Total ¹
Train Control	211,500	38	0.003	<0.001	n/a
GWP		1	25	298	n/a
Total CO ₂ e Emissions ² (metric tons per year)		38	<1	<1	38
Total CO ₂ e Emissions ² (metric tons per year) (Adjusted for 84% clean energy) ³		12	<1	<1	12

Source: Chester & Horvath, 2008.

Notes:

1 Totals may vary due to rounding.

2 CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

3 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.

Key:

CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; GWP = Global Warming Potential; kWh = kilowatt-hour;

N/A = not applicable; N₂O = nitrous oxide

Table 7-23. Alternative 3 Commerce MSF Site Option Operations GHG Emissions

Source	Emissions (metric tons per year)			
	CO ₂	CH ₄	N ₂ O	Total ³
MSF Electricity	134	0.011	0.001	n/a
MSF Water Usage	108	1.342	0.033	n/a
GWP	1	25	298	n/a
Total CO ₂ e Emissions ² (metric tons per year)	249	34	10	293
Total CO ₂ e Emissions ² (metric tons per year) (Adjusted for 84% clean energy) ⁴	159	34	10	203

Notes:

1 Operational emissions from the MSF include natural gas combustion for comfort heating and cooling.

2 CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

3 Totals may vary due to rounding.

4 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.

Key:

CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; GWP = Global Warming Potential; kWh = kilowatt-hour;

MSF = maintenance and storage facility; N/A = not applicable; N₂O = nitrous oxide

Table 7-24. Alternative 3 Montebello MSF Site Option Operations GHG Emissions

Source	Emissions (metric tons per year)			
	CO ₂	CH ₄	N ₂ O	Total ³
MSF Natural Gas ¹	8	0.000	0.000	n/a
MSF Electricity	138	0.012	0.001	n/a
MSF Water Usage	108	1.342	0.033	n/a
GWP	1	25	298	n/a
Total CO ₂ e Emissions ² (metric tons per year)	253	34	10	297
Total CO ₂ e Emissions ² (metric tons per year) (Adjusted for 84% clean energy) ⁴	161	34	10	204

Notes:

1 Operational emissions from the MSF include natural gas combustion for comfort heating and landscaping.

 2 CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

3 Totals may vary due to rounding.

4 GHG emissions from electricity generation include 84 percent zero-carbon energy portfolio estimated to be achieved by 2030.

Key:

 CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; GWP = Global Warming Potential; kWh = kilowatt-hour;

 MSF = maintenance and storage facility; N/A = not applicable; N₂O = nitrous oxide

7.1.3.1.3 Total Operational Emissions for Alternative 3

Total operational emissions from Alternative 3, including the LRVs, stations, parking facilities, train control, and the MSF site options, are summarized in **Table 7-25** and **Table 7-26**. This alternative would reduce highway traffic VMT and the associated GHG emissions as compared to 2042 without Project Conditions; however, the operation of the LRVs, stations, train control, parking facilities, and MSF would increase demand for electricity. Overall, a net decrease in regional operational GHG emissions would be expected as compared to 2042 without Project Conditions. Implementation of Alternative 3 would reduce regional VMT by 2,544,000 miles annually. Overall, operation of Alternative 3 was estimated to reduce total GHG emissions by 299 metric tons CO₂e per year with the Commerce MSF site option, or 298 metric tons CO₂e per year with the Montebello MSF site option. Regional traffic emission estimates are based on VMT projections associated only with implementation of Alternative 3, and do not account for increased ridership (VMT reductions) from potential future transportation system improvements, such as those which may occur from improved bus, pedestrian, bike, and other FLM enhancements or from increased mixed-use development in the DSA. Additionally, GHG estimates from electricity generation account for an 84 percent clean energy portfolio anticipated to be achieved by SCE, the local utility provider, by 2030. However, California SB 100 requires public utility providers to achieve 100 percent renewable energy by 2045. Thus, even with the 84 percent clean energy adjustment, the analysis would be conservative, as SCE will continue to integrate renewable electricity sources between the portfolio target year of 2030 and the California 100 percent RPS deadline year of 2045. By 2045, GHG emissions presented for the light rail operation, station operation, train control, and parking facilities project elements, which are associated with electrical generation, would be reduced to zero, and GHG emissions from MSF operations would also be reduced, resulting in additional annual GHG reductions starting in 2045.

As indicated previously, SCAQMD generally recommends that construction emissions be amortized over a period of 30 years. However, the project lifetime would be expected to be considerably longer than 30 years, and therefore the construction contribution to annual emissions would be lower than presented in this analysis. When amortized over 30 years, construction emissions would contribute an additional 183 metric tons CO_{2e} per year with the Commerce MSF site option or 192 metric tons CO_{2e} per year with the Montebello MSF site option, resulting in total annual emission reductions of 116 metric tons CO_{2e} per year for the Commerce MSF site option or 106 metric tons CO_{2e} per year for the Montebello MSF site option. California's RPS sets a target of 100 percent renewable grid power by 2045, three years after the Project horizon year. As discussed previously, as grid power becomes increasingly renewable, additional GHG benefits from operation would be expected.

In addition to emissions decreases on the project level, the Project is a component of the RTP and contributes to California's goal to increase mass transit under the AB 32 Scoping Plan. Implementation of Alternative 3 would enhance regional transportation systems and contribute to planning efforts to reduce VMT and GHG emissions from transportation sources. Thus, operation of Alternative 3 would be consistent with the State's long-term climate strategies and the incremental contribution to climate change from Alternative 3 would be less than significant.

Table 7-25. Alternative 3 with Commerce MSF Site Option Total Operational GHG Emissions

Source	Emissions (metric tons CO _{2e} per year) ^{1,2}			
	CO ₂	CH ₄	N ₂ O	Total ³
Regional Traffic	46,844,914	34,684	649,060	47,528,659
Light Rail Operation	118	<1	<1	119
Station Operation	15	<1	<1	15
Train Control	12	<1	<1	12
Parking Facilities	3	<1	<1	3
MSF Operation	159	34	10	203
Total Emissions ³	46,845,222	34,718	649,070	47,529,011
Increment based on Existing Conditions (2019) ^{4,5}	(8,921,776)	(43,332)	(310,332)	(9,275,441)
Increment based on 2042 without Project Conditions ^{4,6}	(334)	33	1	(299)

Notes:

1 CO_{2e} emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO_{2e} equals emissions of non-CO₂ pollutant multiplied by its GWP).

2 Emissions associated with electrical consumption are adjusted for SCE's preferred clean energy portfolio anticipated to be met by 2030.

3 Totals may vary due to rounding.

4 Emission reductions (beneficial impacts) are shown in parentheses.

5 Increment calculated as the difference between the total emissions for Alternative 3 and the total emissions for the Existing Conditions, presented in **Table 6-2**.

6 Increment calculated as the difference between the total emissions for Alternative 3 and the total emissions for the 2042 without Project Conditions, presented in **Table 9-1**.

Key:

CO₂ = carbon dioxide; CO_{2e} = carbon dioxide equivalent; CH₄ = methane; MSF = maintenance and storage facility; N₂O = nitrous oxide

Table 7-26. Alternative 3 with Montebello MSF Site Option Total Operational GHG Emissions

Source	Emissions (metric tons CO ₂ e per year) ^{1,2}			
	CO ₂	CH ₄	N ₂ O	Total ³
Regional Traffic	46,844,914	34,684	649,060	47,528,659
Light Rail Operation	118	<1	<1	119
Station Operation	15	<1	<1	15
Train Control	12	<1	<1	12
Parking Facilities	3	<1	<1	3
MSF Operation	161	34	10	204
Total Emissions ³	46,845,223	34,718	649,070	47,529,012
Increment based on Existing Conditions (2019) ^{4,5}	(8,921,775)	(43,332)	(310,332)	(9,275,440)
Increment based on 2042 without Project Conditions ^{4,6}	(333)	33	1	(298)

Notes:

1 CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

2 Emissions associated with electrical consumption are adjusted for SCE's preferred clean energy portfolio anticipated to be met by 2030.

3 Totals may vary due to rounding.

4 Emission reductions (beneficial impacts) are shown in parentheses.

5 Increment calculated as the difference between the total emissions for Alternative 3 and the total emissions for the Existing Conditions, presented in **Table 6-2**.

6 Increment calculated as the difference between the total emissions for Alternative 3 and the total emissions for 2042 without Project Conditions, presented in **Table 9-1**.

Key:

CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; MSF = maintenance and storage facility; N₂O = nitrous oxide

Design Options

Atlantic/Pomona Station Option

As described above, the operation of the base Alternative 3 would result in a decrease in GHG emissions at the project level. The Project would be consistent with state and regional climate strategies to increase mass transit, and would thus result in an incremental contribution to climate change that would be less than significant. While the Atlantic/Pomona Station option would slightly alter the configuration of Alternative 3, it would not be expected to increase or decrease ridership of the light rail system, nor would it be expected to appreciably increase or decrease VMT relative to the base Alternative 3. Therefore, operation of Alternative 3 with the Atlantic/Pomona Station Option would result in no meaningful difference in operational GHG emissions as compared to the base Alternative 3, nor would it alter the Project's contribution to the state and regional mass transit climate strategies. Therefore, operation Alternative 3 with the Atlantic/Pomona Station Option would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change that would be less than significant.

Montebello At-Grade Option

As described above, the operation of the base Alternative 3 would result in a decrease in GHG emissions at the project level. The Project would be consistent with state and regional climate

strategies to increase mass transit, and would thus result in an incremental contribution to climate change which would be less than significant. While the Montebello At-Grade option would slightly alter the configuration of Alternative 3, it would not be expected to increase or decrease ridership of the light rail system, nor would it be expected to appreciably increase or decrease VMT relative to the base Alternative 3. Therefore, implementation of Alternative 3 with the Montebello At-Grade Option would result in no meaningful difference in operational GHG emissions as compared to the base alternative, nor would it alter the Project's contribution to the state and regional mass transit climate strategies. Therefore, operation of Alternative 3 with the Montebello At-Grade Option would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change that would be less than significant.

7.1.3.2 Construction Impacts

Construction GHG emission sources under Alternative 3 include exhaust from construction worker motor vehicles traveling to and from the project site, exhaust from delivery and hauling trucks traveling to and from the project site, and exhaust from heavy-duty construction equipment operating on-site. **Table 7-27** details the annual GHG emissions associated with construction of Alternative 3 and the MSF site options. Consistent with SCAQMD guidance, construction GHG emissions are amortized over the project lifetime, assumed to be 30 years, to be combined with annual operational emissions. When amortized over 30 years, construction emissions would contribute an additional 183 metric tons CO₂e per year with the Commerce MSF site option or 192 metric tons CO₂e per year with the Montebello MSF site option. As indicated in **Section 7.1.3.1.3**, the incremental contribution to climate change from construction of Alternative 3, including amortized construction emissions, would be less than significant.

Table 7-27. Alternative 3 Annual Construction GHG Emissions

Project Element ¹	Emissions of CO ₂ e (metric tons per year) ²					
	Year 1	Year 2	Year 3	Year 4	Year 5	Project
Guideway Construction ^{3,4}	570	1,067	365	0	0	2,001
Base Alternative Atlantic (Relocated/Reconfigured)	129	322	212	0	0	663
Design Option Atlantic/Pomona Station Option	129	322	212	0	0	663
Base Alternative Montebello Aerial	0	64	334	0	0	399
Design Option Montebello At-Grade	0	72	139	0	0	211
MSF Construction ⁵	0	249	401	440	284	1,374
Commerce MSF Site Option	0	321	423	354	0	1,099
Montebello MSF Site Option	0	249	401	440	284	1,374
Station Construction	339	969	796	75	0	2,178
Parking Construction	0	0	0	17	0	17
Street Widening and TPSS	0	39	142	0	0	182
Maximum Total Emissions^{3,4,5}	908	2,324	1,704	532	284	5,752
30-Year Amortized Emissions (Commerce MSF Site Option)						183
30-Year Amortized Emissions (Montebello MSF Site Option)						192

Note:

- 1 Emissions from hauling and vendor trips and construction worker commuting included in project element emission totals.
- 2 Construction of Alternative 3 would occur over 5 years. Emissions are calculated from calendar year 2022 emission factors. Emissions for project construction started on or after January 1, 2022 would be less than or equal to the emissions presented.
- 3 Only the aerial alignment in Montebello (base Alternative) or the at-grade alignment (Montebello At-Grade Option) would be constructed. Total emissions assume the base Alternative construction as emissions would be higher.
- 4 Only the Atlantic (relocated/reconfigured) (base alternative) or the Atlantic/Pomona (design option) station would be constructed. Because comparable excavation for the Atlantic/Pomona Station Option would already be required under the base alternative for the TBM receiving pit, there would not be a material difference in overall construction GHG emissions.
- 5 Only one MSF site option would be constructed. Total emissions assume the Montebello MSF site option construction as emissions would be higher.

Key:

 CO₂e = carbon dioxide equivalent; MSF = maintenance and storage facility; N/A = not applicable; TPSS = transportation power substation

Design Options

Atlantic/Pomona Station Option

As presented in **Table 7-27**, GHG emissions associated with construction of the Atlantic/Pomona Station Option would be the same as those of the base Alternative 3 Atlantic Station (relocated/reconfigured). While the Atlantic/Pomona Station Option, the TBM receiving pit, and the alignment north of the proposed Atlantic/Whittier station would be located at a different position, the magnitude of excavation activity which would be required to implement the Atlantic/Pomona Station Option would be essentially the same as that required under the base Alternative 1 for the excavation of the TBM receiving pit and underground-to-at-grade transition of the alignment. Substantial additional construction is not anticipated under the Atlantic/Pomona Station Option and construction GHG emissions would not be expected to materially differ as compared to the base Alternative 3.

Therefore, construction of Alternative 3 with the Atlantic/Pomona Station Option would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change that would be less than significant.

Montebello At-Grade Option

As presented in **Table 7-27**, GHG emissions associated with construction of Alternative 3 with the Montebello At-Grade Option would be less than those of the base Alternative 3, and implementation of this design option would result in no meaningful change to the Project's incremental contribution to climate change. Therefore, construction of Alternative 3 with the Montebello At-Grade Option would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change that would be less than significant.

7.1.4 Maintenance and Storage Facilities

7.1.4.1 Operational Impacts

As detailed in **Sections 7.1.1.1, 7.1.2.1, and 7.1.3.1** the operation of the Project would contribute to the state and regional mass transit climate strategies and would result in a less than significant incremental contribution to climate change. An MSF is an essential element of maintaining a reliable light rail system and was included in the assessment of Project operations GHG emissions impacts.

Therefore, operation of an MSF would contribute to the state and regional mass transit climate strategies and would result in a less than significant incremental contribution to climate change.

7.1.4.1.1 Commerce MSF

As presented previously, operation of the Commerce MSF site option would emit 203 metric tons CO_{2e} annually, representing approximately less than one percent of Project-related emissions under any Build Alternative.

7.1.4.1.2 Montebello MSF

As presented previously, operation of the Montebello MSF site option would emit 204 metric tons CO_{2e} annually, representing approximately less than one percent of Project-related emissions under Alternatives 1 and 3.

Design Option

Montebello MSF At-Grade Option

As described above, the operation of the Project would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change which would be less than significant. While the Montebello MSF At-Grade Option would slightly alter the configuration of the Montebello MSF site option, it would not be expected to increase or decrease ridership of the light rail system, nor would it be expected to appreciably increase or

decrease VMT relative to the Montebello MSF site option. Thus, implementation of the Montebello MSF At-Grade Option would result in no meaningful difference in operational GHG emissions as compared to the base Montebello MSF site option, nor would it alter the Project's contribution to the state and regional mass transit climate strategies. Therefore, operation of the Montebello MSF At-Grade Option would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change which would be less than significant.

7.1.4.2 Construction Impacts

As detailed in **Sections 7.1.1.2, 7.1.2.2,** and **o** the construction of the Project would contribute to the state and regional mass transit climate strategies and would result in a less than significant incremental contribution to climate change. An MSF is an essential element of maintaining a reliable light rail system and was included in the assessment of Project construction GHG emissions impacts.

Therefore, construction of an MSF would contribute to the state and regional mass transit climate strategies and would result in a less than significant incremental contribution to climate change.

7.1.4.2.1 Commerce MSF

As presented previously, construction of the Commerce MSF site option would emit 1,099 metric tons CO₂e in total, or 37 metric tons CO₂e amortized over the Project lifetime. When added to Project operational emissions, construction emissions of the Commerce MSF site option represent less than one percent of Project-related GHG emissions under any Build Alternative.

7.1.4.2.2 Montebello MSF

As presented previously, operation of the Montebello MSF site option would emit 1,374 metric tons CO₂e in total, or 46 metric tons CO₂e amortized over the Project lifetime. When added to Project operational emissions, construction emissions of the Montebello MSF site option represent less than one percent of Project-related GHG emissions under Alternatives 1 and 3.

Design Option

Montebello MSF At-Grade Option

As presented in **Table 7-10** and **Table 7-27**, GHG emissions associated with construction of the Montebello MSF At-Grade Option would be less than those of the base Montebello MSF site option, and implementation of this design option would result in no meaningful change to the Project's incremental contribution to climate change. Therefore, construction of the Montebello MSF At-Grade Option would be consistent with state and regional climate strategies to increase mass transit and would thus result in an incremental contribution to climate change which would be less than significant.

7.2 Impact GHG-2: Conflicts

Impact GHG-2: Would a Build Alternative conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

A universal GHG emission reduction focus of the 2017 Climate Change Scoping Plan Update, 2020 RTP/SCS, and Metro and City of Los Angeles Climate Action Plans is the reduction of GHG emissions associated with passenger vehicle VMT. In the 2017 Climate Change Scoping Plan Update, three key means of reducing these emissions are identified: increased vehicle efficiency; reducing fuel carbon content; and reducing VMT. CARB has specifically identified VMT reduction as a key measure in ensuring SB 375 targets are achieved acknowledging that State emission targets would be unachievable without stymieing statewide VMT growth.

7.2.1 Alternative 1 Washington Boulevard

7.2.1.1 Construction and Operational Impacts

The implementation of Alternative 1 would support a larger regional effort to facilitate and enhance mass transit in the SoCAB. The Project is identified in the 2020 RTP/SCS as a major transit capital project and is included in the plan's regional growth and transportation projections.

At the project level, the implementation of Alternative 1 would reduce regional VMT by 3,180,000 miles annually. Alternative 1 would be consistent with the 2020 RTP/SCS and other relevant GHG reduction plans in that it would support the VMT reduction strategies of those plans. Additionally, the Project, alongside other transit improvement projects planned to be implemented throughout the region, would facilitate broader adoption of mass transit and contribute to regional VMT reductions, and the associated GHG emission reductions, as projected in the 2020 RTP/SCS. Therefore, implementation of Alternative 1 would result in a less than significant impact with respect to GHG emission reduction plans.

Design Options

Atlantic/Pomona Station Option

As detailed previously, the Project would be consistent with the GHG reduction strategies of applicable plans, policies, and regulations by facilitating regional adoption of mass transit and reducing regional VMT. Implementation of Alternative 1 with the Atlantic/Pomona Station Option would result in no change to VMT reduction projections as compared to the base Alternative 1, nor would it alter the Project's consistency with the GHG reduction strategies of applicable plans, policies, and regulations. Therefore, implementation of Alternative 1 with the Atlantic/Pomona Station Option would result in a less than significant impact with respect to GHG emission reduction plans.

Montebello At-Grade Option

As detailed previously, the Project would be consistent with the GHG reduction strategies of applicable plans, policies, and regulations by facilitating regional adoption of mass transit and

reducing regional VMT. Implementation of Alternative 1 with the Montebello At-Grade Option would result in no change to VMT reduction projections as compared to the base Alternative 1, nor would it alter the Project's consistency with the GHG reduction strategies of applicable plans, policies, and regulations. Therefore, implementation of Alternative 1 with the Montebello At-Grade Option would result in a less than significant impact with respect to GHG emission reduction plans.

7.2.2 Alternative 2 Atlantic to Commerce/Citadel IOS

7.2.2.1 Construction and Operational Impacts

The implementation of Alternative 2 would support a larger regional effort to facilitate and enhance mass transit in the SoCAB. The Project is identified in the 2020 RTP/SCS as a major transit capital project and is included in the plan's regional growth and transportation projections.

At the project level, the implementation of Alternative 2 would reduce regional VMT by 1,590,000 miles annually. Alternative 2 would be consistent with the 2020 RTP/SCS and other relevant GHG reduction plans in that it would support the VMT reduction strategies of those plans. Additionally, the Project, alongside other transit improvement projects planned to be implemented throughout the region, would facilitate broader adoption of mass transit and contribute to regional VMT reductions, and the associated GHG emission reductions, as projected in the 2020 RTP/SCS. Therefore, implementation of Alternative 2 would result in a less than significant impact with respect to GHG emission reduction plans.

Design Option

Atlantic/Pomona Station Option

As detailed previously, the Project would be consistent with the GHG reduction strategies of applicable plans, policies, and regulations by facilitating regional adoption of mass transit and reducing regional VMT. Implementation of Alternative 2 with the Atlantic/Pomona Station Option would result in no change to VMT reduction projections as compared to the base Alternative 2, nor would it alter the Project's consistency with the GHG reduction strategies of applicable plans, policies, and regulations. Therefore, implementation of Alternative 2 with the Atlantic/Pomona Station Option would result in a less than significant impact with respect to GHG emission reduction plans.

7.2.3 Alternative 3 Atlantic to Greenwood IOS

7.2.3.1 Construction and Operational Impacts

The implementation of Alternative 3 would support a larger regional effort to facilitate and enhance mass transit in the SoCAB. The Project is identified in the 2020 RTP/SCS as a major transit capital project and is included in the plan's regional growth and transportation projections.

At the project level, the implementation of Alternative 3 would reduce regional VMT by 2,544,000 miles annually. Alternative 3 would be consistent with the 2020 RTP/SCS and other relevant GHG reduction plans in that it would support the VMT reduction strategies of those plans. Additionally, the Project, alongside other transit improvement projects planned to be implemented throughout the region, would facilitate broader adoption of mass transit and contribute to regional VMT reductions, and the associated GHG emission reductions, as projected in the 2020 RTP/SCS. Therefore, implementation of Alternative 3 would result in a less than significant impact with respect to GHG emission reduction plans.

Design Options

Atlantic/Pomona Station Option

As detailed previously, the Project would be consistent with the GHG reduction strategies of applicable plans, policies, and regulations by facilitating regional adoption of mass transit and reducing regional VMT. Implementation of the Atlantic/Pomona Station Option would result in no change to Project VMT reduction projections as compared to the base Alternative 3, nor would it alter the Project's consistency with the GHG reduction strategies of applicable plans, policies, and regulations. Therefore, implementation of Alternative 3 with the Atlantic/Pomona Station Option would result in a less than significant impact with respect to GHG emission reduction plans.

Montebello At-Grade Option

As detailed previously, the Project would be consistent with the GHG reduction strategies of applicable plans, policies, and regulations by facilitating regional adoption of mass transit and reducing regional VMT. Implementation of the Montebello At-Grade Option would result in no change to Project VMT reduction projections as compared to the base Alternative 3, nor would it alter the Project's consistency with the GHG reduction strategies of applicable plans, policies, and regulations. Therefore, implementation of Alternative 3 with the Montebello At-Grade Option would result in a less than significant impact with respect to GHG emission reduction plans.

7.2.4 Maintenance and Storage Facilities

7.2.4.1 Construction and Operational Impacts

As stated in **Sections 0, 7.2.2, and 7.2.3**, the implementation of the Project would be consistent with the GHG emission reduction strategies of the 2020 RTP/SCS and other applicable plans, policies, and regulations. Further, the Commerce and Montebello MSF site options would be designed and constructed in compliance with Title 24 and CALGreen Building Code regulatory requirements for energy efficiency and sustainability.

7.2.4.1.1 Commerce MSF

While the Commerce MSF site option would generate approximately 1,099 metric tons CO₂e during construction (37 metric tons per year when amortized over the project lifespan) and 203 metric tons CO₂e annually from operation, an MSF is an essential element in supporting the reliable operation of

an LRT system and would be necessary for the implementation and operation of the Project. Therefore, implementation of the Commerce MSF site option would result in a less than significant impact with respect to GHG emission reduction plans.

7.2.4.1.2 Montebello MSF

While the Montebello MSF site option would generate approximately 1,374 metric tons CO₂e during construction (46 metric tons per year when amortized over the project lifespan) and 204 metric tons CO₂e annually from operation, an MSF is an essential element in supporting the reliable operation of an LRT system and would be necessary for the implementation and operation of the Project. Therefore, implementation of the Montebello MSF site option would result in a less than significant impact with respect to GHG emission reduction plans.

Design Option

Montebello MSF At-Grade Option

As described above, an MSF is an essential element in supporting the reliable operation of an LRT system and would be necessary for the implementation and operation of the Project. Therefore, implementation of the Montebello MSF At-Grade Option would result in a less than significant impact with respect to GHG emission reduction plans.

8.0 MITIGATION MEASURES AND IMPACTS AFTER MITIGATION

Emissions of GHGs including for amortized construction emissions under Alternative 1 and Alternative 3 would be less than those of both the existing conditions and 2042 without Project Conditions, while overall emissions of GHG including for amortized construction emissions under Alternative 2 would be less than those of the existing conditions but greater than those of 2042 without Project Conditions (see **Table 7-8, Table 7-9, Table 7-16, Table 7-25, and Table 7-26**). All Build Alternatives are consistent with CARB's Scoping Plan and SB 375 by increasing regional transportation capacity and decreasing emissions from passenger vehicles. The Project would be an important project in the region's need to increase land-use and transportation planning consistent with SB 375 and is identified in SCAG's 2016 RTP/SCS. Emissions of GHGs would be less than significant and no mitigation measures are required for the Project.

8.1 Impact GHG-1: Emission Generation

Impact GHG-1: Would a Build Alternative generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

8.1.1 Alternative 1 Washington Boulevard

As discussed in **Section 7.1.1**, operation and construction of the base Alternative 1 or Alternative 1 with the Atlantic/Pomona Station Option and/or the Montebello At-Grade Option would have a less than significant impact under Impact GHG-1; therefore, no mitigation measures would be required.

8.1.2 Alternative 2 Atlantic to Commerce/Citadel IOS

As discussed in **Section 7.1.2**, operation and construction of base Alternative 2 or Alternative 2 with the Atlantic/Pomona Station Option would have a less than significant impact under Impact GHG-1; therefore, no mitigation measures would be required.

8.1.3 Alternative 3 Atlantic to Greenwood IOS

As discussed in **Section 7.1.3**, operation and construction of the base Alternative 3 or Alternative 3 with the Atlantic/Pomona Station Option and/or the Montebello At-Grade Option would have a less than significant impact under Impact GHG-1; therefore, no mitigation measures would be required.

8.1.4 Maintenance and Storage Facilities

As discussed in **Section 7.1.4**, operation and construction of either the Commerce MSF site option, the Montebello MSF site option, or the Montebello MSF At-Grade Option, would have a less than significant impact under Impact GHG-1; therefore, no mitigation measures would be required.

8.2 Impact GHG-2: Conflicts

Impact GHG-2: Would a Build Alternative conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?

8.2.1 Alternative 1 Washington Boulevard

As discussed in **Section 7.2.1**, operation and construction of the base Alternative 1 or Alternative 1 with the Atlantic/Pomona Station Option and/or the Montebello At-Grade Option would have a less than significant impact under Impact GHG-2; therefore, no mitigation measures would be required.

8.2.2 Alternative 2 Atlantic to Commerce/Citadel IOS

As discussed in **Section 7.2.2**, operation and construction of base Alternative 2 or Alternative 2 with the Atlantic/Pomona Station Option would have a less than significant impact under Impact GHG-2; therefore, no mitigation measures would be required.

8.2.3 Alternative 3 Atlantic to Greenwood IOS

As discussed in **Section 7.2.3**, operation and construction of the base Alternative 3 or Alternative 3 with the Atlantic/Pomona Station Option and/or the Montebello At-Grade Option would have a less than significant impact under Impact GHG-2; therefore, no mitigation measures would be required.

8.2.4 Maintenance and Storage Facilities

As discussed in **Section 7.2.4**, operation and construction of either the Commerce MSF site option, the Montebello MSF site option, or the Montebello MSF At-Grade Option would have a less than significant impact under Impact GHG-2; therefore, no mitigation measures would be required.



8.3 Mitigation Measure Applicability

As described above, none of the Build Alternatives, including design options, and/or MSF site options would have significant impacts relative to climate change and greenhouse gas emissions. Therefore, no mitigation measures are required.

9.0 NO PROJECT ALTERNATIVE

9.1 No Project Alternative

The No Project Alternative assumes that Project-related improvements to the regional transit system would not be made. As a result, it represents a future condition where any changes from existing conditions would occur due to growth in regional traffic and other planned service changes.

9.1.1 Description

The No Project Alternative establishes impacts that would reasonably be expected to occur in the foreseeable future if the Project were not approved. The No Project Alternative includes existing projects from the regional base year (2019) and planned regional projects in operation in the horizon year (2042).

9.1.2 Impacts

9.1.2.1 Impact GHG-1: Emission Generation

Impact GHG-1: Would a Build Alternative generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

Operational emissions associated with the No Project Alternative would include direct emissions from highway traffic without implementation of the Project. No new LRVs, stations, MSF, or parking facilities would be constructed under the No Project Alternative.

Direct operational GHG emissions from regional highway traffic were estimated following the methodology described in **Section 4.2**. Since the Project would provide an alternative to automobile transportation in the region, it was necessary to evaluate highway traffic under the No Project Alternative to assess how the Project would increase or decrease operational emissions from highway vehicles. **Table 9-1** provides a summary of estimated direct GHG emissions under the No Project Alternative.

Table 9-1. No Project Alternative Annual Regional Highway Traffic GHG Emissions

Source	CO ₂	CH ₄	N ₂ O	Total ¹
VMT	n/a	n/a	n/a	185,726,628,000
Emission Factor (grams per mile)	252	0.007	0.012	n/a
Emissions (metric tons per year)	46,845,556	1,387	2,178	n/a
GWP	1	25	298	n/a
CO ₂ e Emissions ² (metric tons per year)	46,845,556	34,685	649,069	47,529,310
Increment based on Existing Conditions (2019) ³	(8,921,443)	(43,366)	(310,334)	(9,275,142)

Notes:

¹ Totals may vary due to rounding.

² CO₂e emissions are weighted by the GWP for each non-CO₂ pollutant (i.e., CO₂e equals emissions of non-CO₂ pollutant multiplied by its GWP).

³ Emission reductions (beneficial impacts) are shown in parentheses.

Key:

CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; CH₄ = methane; GWP = Global Warming Potential; N/A = not applicable;

N₂O = nitrous oxide; VMT = vehicle miles traveled

Since the No Project Alternative would be the same as the projected future conditions baseline, there would be no increase in GHG emissions relative to the baseline on the project level under the No Project Alternative. However, the Project is a component of the RTP, and the No Project Alternative would not be consistent with the RTP or California's goal to increase mass transit under the AB 32 Scoping Plan. Thus, the No Project Alternative would be inconsistent with the State's long-term climate strategies and the No Project Alternative's incremental contribution to climate change would be significant and unavoidable.

9.1.2.2 Impact GHG-2: Conflicts

Impact GHG-2: Would a Build Alternative conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?

A universal GHG emission reduction focus of the 2017 Climate Change Scoping Plan Update, 2020 RTP/SCS, and Metro and City of Los Angeles Climate Action Plans is the reduction of GHG emissions associated with passenger vehicle VMT. In the 2017 Climate Change Scoping Plan Update, three key means of reducing these emissions are identified: increased vehicle efficiency; reducing fuel carbon content; and reducing VMT. CARB has specifically identified VMT reduction as a key measure in ensuring SB 375 targets are achieved acknowledging that State emission targets would be unachievable without stymieing statewide VMT growth.

The implementation of the No Project Alternative would not support the larger regional effort to facilitate and enhance mass transit in the SoCAB. Since the Project is identified in the 2020 RTP/SCS as a major transit capital project and is included in the plan's regional growth and transportation projections, the No Project Alternative would be inconsistent with the 2020 RTP/SCS.

The No Project Alternative would be the same as the projected future conditions baseline. Therefore, at the project level, the implementation of No Project Alternative would result in no change to regional VMT. The No Project Alternative would be inconsistent with the 2020 RTP/SCS and other relevant GHG reduction plans which rely on VMT reduction as a key strategy in the reduction of GHG emissions. The No Project Alternative would not facilitate broader adoption of mass transit or contribute to regional VMT reductions or the associated GHG emission reductions, as projected in the

2020 RTP/SCS. Therefore, implementation of the No Project Alternative would result in a significant and unavoidable impact with respect to GHG emission reduction plans.

10.0 SUMMARY OF ALTERNATIVES

As discussed previously, each of the Project Build Alternatives would result in a less than significant impact to GHG emissions and a less than significant impact to GHG emission reduction plan conflicts. See **Table 10-1** below.

Table 10-1. Significant/Adverse Impacts Remaining After Mitigation

Impact Topic	No Project Alternative	Alternative 1	Alternative 2	Alternative 3	MSF
Impact GHG-1: Emission Generation	Significant and unavoidable	Less than Significant	Less than Significant	Less than Significant	Less than Significant
Impact GHG-2: Conflicts	Significant and unavoidable	Less than Significant	Less than Significant	Less than Significant	Less than Significant

10.1 No Project

Although CEQA typically requires significance to be evaluated in relationship to existing conditions, 2042 without Project Conditions serves as the environmental baseline in this analysis. This projected future conditions baseline was used to provide a clear delineation of Project-related impacts. If compared to existing conditions, the No Project Alternative would result in a decrease in operational GHG emissions. This reduction reflects emission reductions associated with improvements to passenger vehicle emission control technologies expected in the region irrespective of the Project offsetting emission increases associated with traffic growth.

10.2 Alternative 1 Washington Boulevard + MSF

The base Alternative 1 would result in a decrease in the total of direct and indirect GHG emissions as compared to 2042 without Project Conditions. This alternative would include emissions from two possible MSF site options—Commerce or Montebello. The total expected annual reduction in GHG emissions, after amortizing construction emissions over a project lifetime of 30 years and adding the amortized value to operational emissions, would be 11.9 metric tons CO₂e per year for the Commerce MSF site option or 1.4 metric tons CO₂e per year for the Montebello MSF site option. In addition to the GHG emissions reduction, this alternative would be consistent with the requirements of CARB's Scoping Plan, SB 375, and the 2020 RTP/SCS and therefore, GHG emissions under Alternative 1 with an MSF site option would be less than significant.

Thus, the operation and construction of the base Alternative 1 and either the Commerce MSF site option or Montebello MSF site option would have a less than significant impact under Impact GHG-1 (Emission Generation) and GHG-2 (Conflicts).

10.2.1 Alternative 1 Washington + MSF + Design Options

As discussed in **Sections 7.1.1.1** and **7.1.1.2**, Alternative 1 with the Atlantic/Pomona Station Option and/or the Montebello At-Grade Option and either the Commerce site option, Montebello MSF site option, or the Montebello MSF At-Grade Option would result in no meaningful difference in overall Project GHG emissions as compared to the base alternative. Further, Alternative 1 with the design option would not alter Alternative 1's consistency with the requirements of CARB's Scoping Plan, SB 375, or the 2020 RTP/SCS and therefore, GHG emissions under Alternative 1 incorporating the Montebello At-Grade Option and an MSF site option, including the design options, would be less than significant.

Thus, the operation and construction of Alternative 1 with the Atlantic/Pomona Station Option and/or the Montebello At-Grade Option and either the Commerce site option, Montebello MSF site option, or the Montebello MSF At-Grade Option would have a less than significant impact under Impact GHG-1 (Emission Generation) and GHG-2 (Conflicts).

10.3 Alternative 2 Atlantic to Commerce/Citadel IOS + MSF

The base Alternative 2 would result in an increase in the total of direct and indirect GHG emissions as compared to 2042 without Project Conditions. This alternative would include emissions from one possible MSF site option—Commerce. The total expected annual increase in GHG emissions, after amortizing construction emissions over a project lifetime of 30 years and adding the amortized value to operational emissions, would be 39 metric tons CO₂e per year. Although GHG emissions would increase, this alternative would be consistent with the requirements of CARB's Scoping Plan, SB 375, and the 2020 RTP/SCS and therefore, GHG emissions under Alternative 2 with the Commerce MSF site option would be less than significant.

Thus, the operation and construction of the base Alternative 2 and the Commerce MSF site option would have a less than significant impact under Impact GHG-1 (Emission Generation) and GHG-2 (Conflicts).

10.3.1 Alternative 2 Atlantic to Commerce/Citadel IOS + MSF + Design Options

As discussed in **Sections 7.1.2.1** and **7.1.2.2**, Alternative 2 with the Atlantic/Pomona Station Option would not result in a substantial difference in Project GHG emissions as compared to the base alternative. Further, Alternative 2 with the design option would not alter Alternative 2's consistency with the requirements of CARB's Scoping Plan, SB 375, or the 2020 RTP/SCS and therefore, GHG emissions under Alternative 2 incorporating the Atlantic/Pomona Station Option would be less than significant.

Thus, the operation and construction of Alternative 2 with the Atlantic/Pomona Station Option and the Commerce MSF site option would have a less than significant impact under Impact GHG-1 (Emission Generation) and GHG-2 (Conflicts).

10.4 Alternative 3 Atlantic to Greenwood IOS + MSF

The base Alternative 3 would result in a decrease in the total of direct and indirect GHG emissions as compared to 2042 without Project Conditions. This alternative would include emissions from two possible MSF site options—Commerce or Montebello. The total expected annual decrease in GHG emissions, after amortizing construction emissions over a project lifetime of 30 years and adding the amortized value to operational emissions, would be 116 metric tons CO₂e per year for the Commerce MSF site option or 106 metric tons CO₂e per year for the Montebello MSF site option. In addition to the GHG emissions reductions, this alternative would be consistent with the requirements of CARB's Scoping Plan, SB 375, and the 2020 RTP/SCS and therefore, GHG emissions under Alternative 3 with an MSF site option would be less than significant.

The operation and construction of the base Alternative 3 and either the Commerce MSF site option or Montebello MSF site option would have a less than significant impact under Impact GHG-1 (Emission Generation) and GHG-2 (Conflicts).

10.4.1 Alternative 3 Atlantic to Greenwood + MSF + Design Options

As discussed in **Sections 7.1.3.1** and **7.1.3.2**, Alternative 3 with the Atlantic/Pomona Station Option and/or the Montebello At-Grade Option and either the Commerce site option, Montebello MSF site option, or the Montebello MSF At-Grade Option would result in no meaningful difference in overall Project GHG emissions as compared to the base alternative. Further, the design option would not alter Alternative 3's consistency with the requirements of CARB's Scoping Plan, SB 375, or the 2020 RTP/SCS and therefore, GHG emissions under Alternative 3 with the Montebello At-Grade Option and an MSF site option, including design options, would be less than significant.

Thus, the operation and construction of Alternative 3 with the Atlantic/Pomona Station Option and/or the Montebello At-Grade Option and either the Commerce site option, Montebello MSF site option, or the Montebello MSF At-Grade Option would have a less than significant impact under Impact GHG-1 (Emission Generation) and GHG-2 (Conflicts).

11.0 PREPARERS QUALIFICATIONS

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Gwen Pelletier	Principal Environmental Scientist/Task Leader	MS – Environmental Studies, California State University, Fullerton, 2005 BS – Biochemistry, California State University, Fullerton, 2000	21

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ATTACHMENT A – CONSTRUCTION EMISSION CALCULATIONS

KEY

Base Alternative Feature
Design Option

Alternative 1 - Washington - Annual GHG Emissions

Construction Activity	Start Date	End Date	Sheet	Annual Regional Emissions (metric tons per year)				
				2022	2023	2024	2025	2026
==== Construction Start =====								
Saybrook Ave Site Clearing - Demolition	1/1/2022	1/27/2022	demo_util_siteprep	28.53	0.00	0.00	0.00	0.00
Guideway, Underground - Trenching, Retaining Wall, Fill Construction	1/28/2022	8/2/2022	guideway_underground_transition	180.70	0.00	0.00	0.00	0.00
==== Guideway, Aerial =====								
Gayhart, Davie, and Garfield Site Clearing	8/3/2022	1/27/2023	demo_util_siteprep	162.16	30.03	0.00	0.00	0.00
Guideway, Aerial - Track	10/27/2022	11/1/2023	guideway_aerial	70.49	326.94	0.00	0.00	0.00
==== Commerce MSF =====								
MSF - Commerce Site Clearing	3/8/2023	5/21/2024	demo_util_siteprep	0.00	321.32	153.15	0.00	0.00
MSF - Commerce - Construction	5/22/2024	10/22/2025	msf	0.00	0.00	270.20	354.12	0.00
==== TPSS =====								
Davie TPSS	1/28/2023	6/16/2023	tpss	0.00	39.45	0.00	0.00	0.00
==== Montebello MSF =====								
MSF - Montebello Site Clearing	5/13/2023	11/13/2024	demo_util_siteprep	0.00	249.25	342.34	0.00	0.00
MSF - Montebello - Construction	11/14/2024	8/25/2026	msf	0.00	0.00	58.74	439.71	283.63
==== Greenwood Station =====								
Greenwood Station - Site Clearing	4/26/2024	5/2/2024	demo_util_siteprep	0.00	0.00	7.51	0.00	0.00
Greenwood Station - Site Clearing	4/26/2024	5/16/2024	demo_util_siteprep	0.00	0.00	22.52	0.00	0.00
Greenwood Station - Station Construction (Aerial)	5/17/2024	5/16/2025	station_aerial	0.00	0.00	125.89	75.23	0.00
==== Greenwood Parking =====								
Parking	5/17/2025	6/4/2025	parking	0.00	0.00	0.00	16.73	0.00
==== Guideway, Aerial - Greenwood / Montebello =====								
Guideway, Aerial - Track	11/2/2023	11/6/2024	guideway_aerial	0.00	64.49	334.44	0.00	0.00
==== Guideway, At-Grade - Greenwood / Montebello =====								
Guideway, At-Grade - Construction, 1 mile	11/2/2023	2/19/2024	guideway_grade_site	0.00	72.09	60.35	0.00	0.00
Guideway, At-Grade - Track, 1 mile	2/20/2024	6/6/2024	guideway_grade_rail	0.00	0.00	78.60	0.00	0.00
==== Street Widening =====								
Street Widening - Washington Greenwood	5/17/2024	6/12/2024	roadways	0.00	0.00	23.29	0.00	0.00
Street Widening - Washington S Montebello	6/13/2024	10/25/2024	roadways	0.00	0.00	118.89	0.00	0.00
==== Guideway, At-Grade =====								
Guideway, At-Grade - Construction, 1 mile	11/7/2024	2/24/2025	guideway_grade_site	0.00	0.00	67.06	65.38	0.00
Guideway, At-Grade - Track, 1 mile	11/14/2024	3/3/2025	guideway_grade_rail	0.00	0.00	35.27	44.34	0.00
Guideway, At-Grade - Construction, 1 mile	2/10/2025	5/28/2025	guideway_grade_site	0.00	0.00	0.00	130.76	0.00
Guideway, At-Grade - Track, 1 mile	3/4/2025	6/19/2025	guideway_grade_rail	0.00	0.00	0.00	78.60	0.00
Guideway, At-Grade - Construction, 1 mile	5/14/2025	8/29/2025	guideway_grade_site	0.00	0.00	0.00	130.76	0.00
Guideway, At-Grade - Track, 1 mile	6/20/2025	10/7/2025	guideway_grade_rail	0.00	0.00	0.00	78.60	0.00
Guideway, At-Grade - Construction, 1 mile	8/15/2025	12/2/2025	guideway_grade_site	0.00	0.00	0.00	130.76	0.00
Guideway, At-Grade - Track, 1 mile	10/8/2025	1/23/2026	guideway_grade_rail	0.00	0.00	0.00	62.48	17.13
Guideway, At-Grade - Construction, 1 mile	11/18/2025	3/5/2026	guideway_grade_site	0.00	0.00	0.00	55.32	77.12
Guideway, At-Grade - Track, 1 mile	1/24/2026	5/12/2026	guideway_grade_rail	0.00	0.00	0.00	0.00	77.59
==== Street Widening =====								
Street Widening - Washington Carob	10/26/2024	12/20/2024	roadways	0.00	0.00	49.03	0.00	0.00
==== TPSS =====								
Carob TPSS - Site Clearing	12/21/2024	12/23/2024	demo_util_siteprep	0.00	0.00	1.50	0.00	0.00
Carob TPSS	12/24/2024	5/13/2025	tpss	0.00	0.00	2.76	37.48	0.00
==== Street Widening =====								
Street Widening - Washington S 5th	12/24/2024	1/15/2025	roadways	0.00	0.00	8.58	13.48	0.00
Street Widening - Washington S 4th	1/16/2025	2/18/2025	roadways	0.00	0.00	0.00	29.42	0.00
Street Widening - Washington Bluff	2/19/2025	4/2/2025	roadways	0.00	0.00	0.00	38.00	0.00

KEY

Base Alternative Feature
Design Option

Alternative 1 - Washington - Annual GHG Emissions

Construction Activity	Start Date	End Date	Sheet	Annual Regional Emissions (metric tons per year)				
				2022	2023	2024	2025	2026
=== Rio Hondo Crossing ===								
Bridge Demolition	9/12/2024	12/11/2024	demo_util_siteprep	0.00	0.00	97.60	0.00	0.00
Rio Hondo Crossing	10/28/2024	7/11/2025	guideway_aerial	0.00	0.00	71.99	206.96	0.00
=== Street Widening ===								
Street Widening - Washington After Rio Hondo Bridge	7/12/2025	10/22/2025	roadways	0.00	0.00	0.00	89.47	0.00
Street Widening - Washington Paramount	10/23/2025	12/8/2025	roadways	0.00	0.00	0.00	40.45	0.00
Street Widening - Washington Crossway	12/9/2025	12/12/2025	roadways	0.00	0.00	0.00	4.90	0.00
=== TPSS ===								
Crossway TPSS - Site Clearing	12/13/2025	12/17/2025	demo_util_siteprep	0.00	0.00	0.00	4.50	0.00
Crossway TPSS	12/18/2025	2/25/2026	tpss	0.00	0.00	0.00	4.34	15.78
=== Street Widening ===								
Street Widening - Washington After Crossway TPSS	12/13/2025	3/2/2026	roadways	0.00	0.00	0.00	17.16	52.70
=== Rosemead Station ===								
Rosemead Station - Site Clearing	3/5/2025	3/14/2025	demo_util_siteprep	0.00	0.00	0.00	12.01	0.00
Rosemead Station - Site Clearing	3/5/2025	3/7/2025	demo_util_siteprep	0.00	0.00	0.00	4.50	0.00
Rosemead Station - Station Construction (At-Grade)	3/15/2025	8/1/2025	station_grade	0.00	0.00	0.00	66.36	0.00
=== Rosemead Parking ===								
Parking	8/2/2025	8/22/2025	parking	0.00	0.00	0.00	19.30	0.00
=== Street Widening ===								
Street Widening - Washington Rosemead	3/3/2026	6/10/2026	roadways	0.00	0.00	0.00	0.00	88.25
Street Widening - Washington Bequette	6/11/2026	6/17/2026	roadways	0.00	0.00	0.00	0.00	6.13
Street Widening - Washington Passons	6/18/2026	7/28/2026	roadways	0.00	0.00	0.00	0.00	35.54
=== TPSS ===								
Cord TPSS - Site Clearing	7/29/2026	7/30/2026	demo_util_siteprep	0.00	0.00	0.00	0.00	3.00
Cord TPSS	7/31/2026	10/8/2026	tpss	0.00	0.00	0.00	0.00	19.73
=== San Gabriel Crossing ===								
San Gabriel Crossing	12/12/2024	8/11/2025	guideway_aerial	0.00	0.00	22.50	238.46	0.00
=== Street Widening ===								
Street Widening - Washington N Pioneer	8/12/2025	10/9/2025	roadways	0.00	0.00	0.00	52.70	0.00
Street Widening - Washington Norwalk	10/10/2025	4/6/2026	roadways	0.00	0.00	0.00	73.54	83.35
=== Norwalk Station ===								
Norwalk Station - Site Clearing	7/15/2025	7/31/2025	demo_util_siteprep	0.00	0.00	0.00	19.52	0.00
Norwalk Station - Site Clearing	7/15/2025	7/28/2025	demo_util_siteprep	0.00	0.00	0.00	15.02	0.00
Norwalk Station - Station Construction (At-Grade)	8/1/2025	12/19/2025	station_grade	0.00	0.00	0.00	67.03	0.00
=== Norwalk Parking ===								
Parking	12/20/2025	1/8/2026	parking	0.00	0.00	0.00	11.58	7.72
=== TPSS ===								
Norwalk TPSS	12/20/2025	2/26/2026	tpss	0.00	0.00	0.00	3.55	16.18
=== Street Widening ===								
Street Widening - Washington Duchess	4/7/2026	6/30/2026	roadways	0.00	0.00	0.00	0.00	74.77
Street Widening - Washington Vanport	7/1/2026	8/13/2026	roadways	0.00	0.00	0.00	0.00	39.22
Street Widening - Washington Broadway	7/15/2025	9/15/2025	roadways	0.00	0.00	0.00	55.16	0.00
=== TPSS ===								
Appledale TPSS - Site Clearing	12/3/2025	12/5/2025	demo_util_siteprep	0.00	0.00	0.00	4.50	0.00
Appledale TPSS	12/6/2025	1/15/2026	tpss	0.00	0.00	0.00	7.50	4.34
=== Lambert Station ===								

KEY

Base Alternative Feature
Design Option

Alternative 1 - Washington - Annual GHG Emissions

Construction Activity	Start Date	End Date	Sheet	Annual Regional Emissions (metric tons per year)				
				2022	2023	2024	2025	2026
Lambert Station - Site Clearing	9/24/2025	12/22/2025	demo_util_siteprep	0.00	0.00	0.00	96.10	0.00
Lambert Station - Station Construction (At-Grade)	12/23/2025	5/12/2026	station_grade	0.00	0.00	0.00	5.31	62.38
==== Lambert Parking =====								
Parking	5/13/2026	6/15/2026	parking	0.00	0.00	0.00	0.00	30.88
==== TPSS =====								
Lambert TPSS	12/23/2025	5/12/2026	tpss	0.00	0.00	0.00	3.16	37.09
==== Street Widening =====								
Street Widening - Washington Lambert	12/23/2025	1/15/2026	roadways	0.00	0.00	0.00	9.81	13.48
==== Guideway, Sub-Grade - Start =====								
Guideway, Sub-Grade - Track	10/1/2022	10/23/2023	guideway_underground	55.65	180.64	0.00	0.00	0.00
Guideway, Sub-Grade - Track	1/29/2023	2/19/2024	guideway_underground	0.00	206.32	30.82	0.00	0.00
==== Atlantic Station =====								
Atlantic Station - Site Clearing	9/17/2022	10/17/2022	demo_util_siteprep	31.53	0.00	0.00	0.00	0.00
Atlantic Station - Site Clearing	9/17/2022	10/21/2022	demo_util_siteprep	37.54	0.00	0.00	0.00	0.00
Atlantic Station - Excavation	10/22/2022	4/21/2023	station_underground_cutcover	59.94	95.90	0.00	0.00	0.00
Atlantic Station - Construction	4/22/2023	8/23/2024	station_underground	0.00	225.96	212.22	0.00	0.00
==== Guideway, Sub-Grade - End =====								
Guideway, Underground - Trenching, Retaining Wall, Fill Construction	10/19/2022	9/23/2023	guideway_underground_transition	72.01	258.14	0.00	0.00	0.00
==== Commerce Station =====								
Commerce Station - Site Clearing	8/3/2022	8/31/2022	demo_util_siteprep	31.53	0.00	0.00	0.00	0.00
Commerce Station - Site Clearing	8/3/2022	9/2/2022	demo_util_siteprep	34.53	0.00	0.00	0.00	0.00
Commerce Station - Excavation	9/3/2022	3/3/2023	station_underground_cutcover	101.90	53.94	0.00	0.00	0.00
Commerce Station - Construction	3/4/2023	7/5/2024	station_underground	0.00	269.65	168.53	0.00	0.00
==== TPSS =====								
Commerce TPSS - Site Clearing	7/6/2024	7/9/2024	demo_util_siteprep	0.00	0.00	3.00	0.00	0.00
Commerce TPSS	7/10/2024	11/27/2024	tpss	0.00	0.00	39.85	0.00	0.00
==== Whittier Station =====								
Whittier Station - Site Clearing	9/3/2022	9/16/2022	demo_util_siteprep	15.02	0.00	0.00	0.00	0.00
Whittier Station - Site Clearing	9/3/2022	9/14/2022	demo_util_siteprep	12.01	0.00	0.00	0.00	0.00
Whittier Station - Excavation	9/17/2022	3/17/2023	station_underground_cutcover	89.91	65.93	0.00	0.00	0.00
Whittier Station - Construction	3/18/2023	7/19/2024	station_underground	0.00	257.17	181.01	0.00	0.00
==== TPSS =====								
Whittier TPSS - Site Clearing	7/20/2024	7/23/2024	demo_util_siteprep	0.00	0.00	3.00	0.00	0.00
Whittier TPSS	7/24/2024	12/11/2024	tpss	0.00	0.00	39.85	0.00	0.00

KEY

Base Alternative Feature
Design Variation

Total

Alternative 2. Atlantic to Citadel IOS - Annual GHG Emissions

Construction Activity	Start Date	End Date	Sheet	Annual Regional Emissions (metric tons per year)			
				2022	2023	2024	2025
==== Construction Start =====							
Saybrook Ave Site Clearing - Demolition	1/1/2022	1/27/2022	demo_util_siteprep	28.53	0.00	0.00	0.00
Guideway, Underground - Trenching, Retaining Wall, Fill Construction	1/28/2022	8/2/2022	guideway_underground_transition	180.70	0.00	0.00	0.00
==== Guideway, Aerial =====							
Gayhart, Davie, and Garfield Site Clearing	8/3/2022	1/27/2023	demo_util_siteprep	162.16	30.03	0.00	0.00
Guideway, Aerial - Track	10/27/2022	11/1/2023	guideway_aerial	70.49	326.94	0.00	0.00
==== Commerce MSF =====							
MSF - Commerce Site Clearing	3/8/2023	5/21/2024	demo_util_siteprep	0.00	321.32	153.15	0.00
MSF - Commerce - Construction	5/22/2024	10/22/2025	msf	0.00	0.00	270.20	354.12
==== TPSS =====							
Davie TPSS	1/28/2023	6/16/2023	tpss	0.00	39.45	0.00	0.00
==== Guideway, Sub-Grade - Start =====							
Guideway, Sub-Grade - Track	10/1/2022	10/23/2023	guideway_underground	55.65	180.64	0.00	0.00
Guideway, Sub-Grade - Track	1/29/2023	2/19/2024	guideway_underground	0.00	206.32	30.82	0.00
==== Atlantic Station =====							
Atlantic Station - Site Clearing	9/17/2022	10/17/2022	demo_util_siteprep	31.53	0.00	0.00	0.00
Atlantic Station - Site Clearing	9/17/2022	10/21/2022	demo_util_siteprep	37.54	0.00	0.00	0.00
Atlantic Station - Excavation	10/22/2022	4/21/2023	station_underground_cutcover	59.94	95.90	0.00	0.00
Atlantic Station - Construction	4/22/2023	8/23/2024	station_underground	0.00	225.96	212.22	0.00
==== Guideway, Sub-Grade - End =====							
Guideway, Underground - Trenching, Retaining Wall, Fill Construction	10/19/2022	9/23/2023	guideway_underground_transition	72.01	258.14	0.00	0.00
==== Commerce Station =====							
Commerce Station - Site Clearing	8/3/2022	8/31/2022	demo_util_siteprep	31.53	0.00	0.00	0.00
Commerce Station - Site Clearing	8/3/2022	9/2/2022	demo_util_siteprep	34.53	0.00	0.00	0.00
Commerce Station - Excavation	9/3/2022	3/3/2023	station_underground_cutcover	101.90	53.94	0.00	0.00
Commerce Station - Construction	3/4/2023	7/5/2024	station_underground	0.00	269.65	168.53	0.00
==== TPSS =====							
Commerce TPSS - Site Clearing	7/6/2024	7/9/2024	demo_util_siteprep	0.00	0.00	3.00	0.00
Commerce TPSS	7/10/2024	11/27/2024	tpss	0.00	0.00	39.85	0.00
==== Whittier Station =====							
Whittier Station - Site Clearing	9/3/2022	9/16/2022	demo_util_siteprep	15.02	0.00	0.00	0.00
Whittier Station - Site Clearing	9/3/2022	9/14/2022	demo_util_siteprep	12.01	0.00	0.00	0.00
Whittier Station - Excavation	9/17/2022	3/17/2023	station_underground_cutcover	89.91	65.93	0.00	0.00
Whittier Station - Construction	3/18/2023	7/19/2024	station_underground	0.00	257.17	181.01	0.00
==== TPSS =====							
Whittier TPSS - Site Clearing	7/20/2024	7/23/2024	demo_util_siteprep	0.00	0.00	3.00	0.00
Whittier TPSS	7/24/2024	12/11/2024	tpss	0.00	0.00	39.85	0.00

KEY

Base Alternative Feature
Design Variation

Total

Alternative 3. Atlantic to Greenwood IOS - Annual GHG Emissions

Construction Activity	Start Date	End Date	Sheet	Annual Regional Emissions (metric tons per year)			
				2022	2023	2024	2025
==== Construction Start =====							
Saybrook Ave Site Clearing - Demolition	1/1/2022	1/27/2022	demo_util_siteprep	28.53	0.00	0.00	0.00
Guideway, Underground - Trenching, Retaining Wall, Fill Construction	1/28/2022	8/2/2022	guideway_underground_transition	180.70	0.00	0.00	0.00
==== Guideway, Aerial =====							
Gayhart, Davie, and Garfield Site Clearing	8/3/2022	1/27/2023	demo_util_siteprep	162.16	30.03	0.00	0.00
Guideway, Aerial - Track	10/27/2022	11/1/2023	guideway_aerial	70.49	326.94	0.00	0.00
==== Commerce MSF =====							
MSF - Commerce Site Clearing	3/8/2023	5/21/2024	demo_util_siteprep	0.00	321.32	153.15	0.00
MSF - Commerce - Construction	5/22/2024	10/22/2025	msf	0.00	0.00	270.20	354.12
==== TPSS =====							
Davie TPSS	1/28/2023	6/16/2023	tpss	0.00	39.45	0.00	0.00
==== Montebello MSF =====							
MSF - Commerce Site Clearing	5/13/2023	11/13/2024	demo_util_siteprep	0.00	249.25	342.34	0.00
MSF - Commerce - Construction	11/14/2024	8/25/2026	msf	0.00	0.00	58.74	439.71
==== Greenwood Station =====							
Greenwood Station - Site Clearing	4/26/2024	5/2/2024	demo_util_siteprep	0.00	0.00	7.51	0.00
Greenwood Station - Site Clearing	4/26/2024	5/16/2024	demo_util_siteprep	0.00	0.00	22.52	0.00
Greenwood Station - Station Construction (Aerial)	5/17/2024	5/16/2025	station_aerial	0.00	0.00	125.89	75.23
==== Greenwood Parking =====							
Parking	5/17/2025	6/4/2025	parking	0.00	0.00	0.00	16.73
==== Guideway, Aerial - Greenwood / Montebello =====							
Guideway, Aerial - Track	11/2/2023	11/6/2024	guideway_aerial	0.00	64.49	334.44	0.00
==== Guideway, At-Grade - Greenwood / Montebello =====							
Guideway, At-Grade - Construction, 1 mile	11/2/2023	2/19/2024	guideway_grade_site	0.00	72.09	60.35	0.00
Guideway, At-Grade - Track, 1 mile	2/20/2024	6/6/2024	guideway_grade_rail	0.00	0.00	78.60	0.00
==== Street Widening =====							
Street Widening - Washington Greenwood	5/17/2024	6/12/2024	roadways	0.00	0.00	23.29	0.00
Street Widening - Washington S Montebello	6/13/2024	10/25/2024	roadways	0.00	0.00	118.89	0.00
==== Guideway, Sub-Grade - Start =====							
Guideway, Sub-Grade - Track	10/1/2022	10/23/2023	guideway_underground	55.65	180.64	0.00	0.00
Guideway, Sub-Grade - Track	1/29/2023	2/19/2024	guideway_underground	0.00	206.32	30.82	0.00
==== Atlantic Station =====							
Atlantic Station - Site Clearing	9/17/2022	10/17/2022	demo_util_siteprep	31.53	0.00	0.00	0.00
Atlantic Station - Site Clearing	9/17/2022	10/21/2022	demo_util_siteprep	37.54	0.00	0.00	0.00
Atlantic Station - Excavation	10/22/2022	4/21/2023	station_underground_cutcover	59.94	95.90	0.00	0.00
Atlantic Station - Construction	4/22/2023	8/23/2024	station_underground	0.00	225.96	212.22	0.00
==== Guideway, Sub-Grade - End =====							
Guideway, Underground - Trenching, Retaining Wall, Fill Construction	10/19/2022	9/23/2023	guideway_underground_transition	72.01	258.14	0.00	0.00
==== Commerce Station =====							
Commerce Station - Site Clearing	8/3/2022	8/31/2022	demo_util_siteprep	31.53	0.00	0.00	0.00
Commerce Station - Site Clearing	8/3/2022	9/2/2022	demo_util_siteprep	34.53	0.00	0.00	0.00

KEY

Base Alternative Feature
Design Variation

Total

Alternative 3. Atlantic to Greenwood IOS - Annual GHG Emissions

Construction Activity	Start Date	End Date	Sheet	Annual Regional Emissions (metric tons per year)			
				2022	2023	2024	2025
Commerce Station - Excavation	9/3/2022	3/3/2023	station_underground_cutc over	101.90	53.94	0.00	0.00
Commerce Station - Construction	3/4/2023	7/5/2024	station_underground	0.00	269.65	168.53	0.00
==== TPSS =====							
Commerce TPSS - Site Clearing	7/6/2024	7/9/2024	demo_util_siteprep	0.00	0.00	3.00	0.00
Commerce TPSS	7/10/2024	11/27/2024	tpss	0.00	0.00	39.85	0.00
==== Whittier Station =====							
Whittier Station - Site Clearing	9/3/2022	9/16/2022	demo_util_siteprep	15.02	0.00	0.00	0.00
Whittier Station - Site Clearing	9/3/2022	9/14/2022	demo_util_siteprep	12.01	0.00	0.00	0.00
Whittier Station - Excavation	9/17/2022	3/17/2023	station_underground_cutc over	89.91	65.93	0.00	0.00
Whittier Station - Construction	3/18/2023	7/19/2024	station_underground	0.00	257.17	181.01	0.00
==== TPSS =====							
Whittier TPSS - Site Clearing	7/20/2024	7/23/2024	demo_util_siteprep	0.00	0.00	3.00	0.00
Whittier TPSS	7/24/2024	12/11/2024	tpss	0.00	0.00	39.85	0.00

Alternative 1
Construction Schedule

Eastside Transit Corridor Phase 2
Appendix A - Construction Emission Calculations

Start Date End Date
total construction 1/1/2022 10/8/2026 57 months
operationally essential construction 1/1/2022 10/8/2026 57 months (excl. MSF, Parking, Street Widening)

Base Alternative Feature
Design Option

Note: Additional delays during the aerial, at-grade, and bridge-construction construction activities associated with road closures and the mobilization of construction equipment in an urban setting would result in longer, lower-intensity construction than presented. Emissions are estimated assuming no delays to capture the highest intensity (maximum daily emissions) which could reasonably result from the Project. Construction would not be expected to exceed 72 months including anticipated delays.

Alternative 1, Washington

Construction Activity	Start Date	End Date	denotes manually linked cell		spaces for parking		see <sqft> tab	Notes	Based on CalEEMod defaults			CalEEMod Reference
			Modeled Duration (days)	Actual Duration (days)	Modeled Area (sqft)	Actual Area (sqft)	Worker Trips/day		Vendor Trips/day	Hauling Trips/day		
Carob TPSS - Site Clearing	12/21/2024	12/23/2024	30	1	100,000.00	1,000	n/a		40	0	11	demo_util_siteprep
Carob TPSS	12/24/2024	5/13/2025	100	100	12,000	12,000	n/a		5	2	0	tpss
=== Street Widening ===												
Street Widening - Washington S 5th	12/24/2024	1/15/2025	40	16	5,000	2,000	n/a		17	1	0	roadways
Street Widening - Washington S 4th	1/16/2025	2/18/2025	40	23	5,000	2,800	n/a		17	1	0	roadways
Street Widening - Washington Bluff	2/19/2025	4/2/2025	40	30	5,000	3,700	n/a		17	1	0	roadways
=== Rio Hondo Crossing ===												
Bridge Demolition	9/12/2024	12/11/2024	30	64	100,000.00	213,000	square footage includes demo at San Gabriel River as well		40	0	11	demo_util_siteprep
Rio Hondo Crossing	10/28/2024	7/11/2025	132	184	79,200	110,000	n/a		33	13	0	guideway_aerial
=== Street Widening ===												
Street Widening - Washington After Rio Hondo Bridge	7/12/2025	10/22/2025	40	73	5,000	9,100	n/a		17	1	0	roadways
Street Widening - Washington Paramount	10/23/2025	12/8/2025	40	32	5,000	4,000	n/a		17	1	0	roadways
Street Widening - Washington Crossway	12/9/2025	12/12/2025	40	3	5,000	350	n/a		17	1	0	roadways
=== TPSS ===												
Crossway TPSS - Site Clearing	12/13/2025	12/17/2025	30	3	100,000.00	8,000	n/a		40	0	11	demo_util_siteprep
Crossway TPSS	12/18/2025	2/25/2026	100	49	12,000	5,800	n/a		5	2	0	tpss
=== Street Widening ===												
Street Widening - Washington After Crossway TPSS	12/13/2025	3/2/2026	40	56	5,000	7,000	n/a		17	1	0	roadways
=== Rosemead Station ===												
Rosemead Station - Site Clearing	3/5/2025	3/14/2025	30	7	100,000.00	22,500	STAGING OPTION 1		40	0	11	demo_util_siteprep
Rosemead Station - Site Clearing	3/5/2025	3/7/2025	30	2	100,000.00	5,600	STAGING OPTION 2		40	0	11	demo_util_siteprep
Rosemead Station - Station Construction (At-Grade)	3/15/2025	8/1/2025	100	100	8,100	8,100	n/a		6	2	0	station_grade
=== Rosemead Parking ===												
Parking	8/2/2025	8/22/2025	13	15	370.00	410	VALUE IN SQFT COLUMN IS COUNT OF SPACES, NOT SQFT.		62	24	0	parking
=== Street Widening ===												
Street Widening - Washington Rosemead	3/3/2026	6/10/2026	40	71	5,000	8,850	n/a		17	1	0	roadways
Street Widening - Washington Bequette	6/11/2026	6/17/2026	40	4	5,000	400	n/a		17	1	0	roadways
Street Widening - Washington Passons	6/18/2026	7/28/2026	40	28	5,000	3,450	n/a		17	1	0	roadways
=== TPSS ===												
Cord TPSS - Site Clearing	7/29/2026	7/30/2026	30	1	100,000.00	2,600	n/a		40	0	11	demo_util_siteprep
Cord TPSS	7/31/2026	10/8/2026	100	49	12,000	5,800	n/a		5	2	0	tpss
=== San Gabriel Crossing ===												
San Gabriel Crossing	12/12/2024	8/11/2025	132	172	79,200	103,000	n/a		33	13	0	guideway_aerial
=== Street Widening ===												
Street Widening - Washington N Pioneer	8/12/2025	10/9/2025	40	42	5,000	5,150	n/a		17	1	0	roadways
Street Widening - Washington Norwalk	10/10/2025	4/6/2026	40	126	5,000	15,750	n/a		17	1	0	roadways
=== Norwalk Station ===												
Norwalk Station - Site Clearing	7/15/2025	7/31/2025	30	12	100,000.00	37,250	STAGING OPTION 1		40	0	11	demo_util_siteprep
Norwalk Station - Site Clearing	7/15/2025	7/28/2025	30	9	100,000.00	28,750	STAGING OPTION 2		40	0	11	demo_util_siteprep
Norwalk Station - Station Construction (At-Grade)	8/1/2025	12/19/2025	100	100	8,100	8,100	n/a		6	2	0	station_grade
=== Norwalk Parking ===												
Parking	12/20/2025	1/8/2026	13	14	370.00	390	VALUE IN SQFT COLUMN IS COUNT OF SPACES, NOT SQFT.		62	24	0	parking
=== TPSS ===												
Norwalk TPSS	12/20/2025	2/26/2026	100	49	12,000	5,800	n/a		5	2	0	tpss

Alternative 1
Construction Schedule

Eastside Transit Corridor Phase 2
Appendix A - Construction Emission Calculations

Construction Activity	Start Date	End Date	Modeled Duration (days)	Actual Duration (days)	Modeled Area (sqft)	Actual Area (sqft)	Notes	Based on CalEEMod defaults			CalEEMod Reference	
								Worker Trips/day	Vendor Trips/day	Hauling Trips/day		
<p>Alternative 1, Washington</p> <p>total construction 1/1/2022 10/8/2026 57 months operationally essential construction 1/1/2022 10/8/2026 57 months (excl. MSF, Parking, Street Widening)</p> <p>Note: Additional delays during the aerial, at-grade, and bridge-construction construction activities associated with road closures and the mobilization of construction equipment in an urban setting would result in longer, lower-intensity construction than presented. Emissions are estimated assuming no delays to capture the highest intensity (maximum daily emissions) which could reasonably result from the Project. Construction would not be expected to exceed 72 months including anticipated delays.</p>												
<p>denotes manually linked cell spaces for parking see <sqft> tab</p>												
<p>==== Street Widening =====</p>												
Street Widening - Washington Duchess	4/7/2026	6/30/2026	40	60	5,000	7,400	n/a	17	1	0	roadways	
Street Widening - Washington Vanport	7/1/2026	8/13/2026	40	31	5,000	3,800	n/a	17	1	0	roadways	
Street Widening - Washington Broadway	7/15/2025	9/15/2025	40	44	5,000	5,500	n/a	17	1	0	roadways	
<p>==== TPSS =====</p>												
Appledale TPSS - Site Clearing	12/3/2025	12/5/2025	30	2	100,000.00	3,600	n/a	40	0	11	demo_util_siteprep	
Appledale TPSS	12/6/2025	1/15/2026	100	29	12,000	3,400	n/a	5	2	0	tpss	
<p>==== Lambert Station =====</p>												
Lambert Station - Site Clearing	9/24/2025	12/22/2025	30	63	100,000.00	208,500	Finish when alignment finishes	40	0	11	demo_util_siteprep	
Lambert Station - Station Construction (At-Grade)	12/23/2025	5/12/2026	100	100	8,100	8,100	Finish when alignment finishes	6	2	0	station_grade	
<p>==== Lambert Parking =====</p>												
Parking	5/13/2026	6/15/2026	13	23	370.00	650	VALUE IN SQFT COLUMN IS COUNT OF SPACES, NOT SQFT.	62	24	0	parking	
<p>==== TPSS =====</p>												
Lambert TPSS	12/23/2025	5/12/2026	100	100	12,000	12,000	n/a	5	2	0	tpss	
<p>==== Street Widening =====</p>												
Street Widening - Washington Lambert	12/23/2025	1/15/2026	40	17	5,000	2,100	n/a	17	1	0	roadways	
<p>==== Guideway, Sub-Grade - Start =====</p>												
Guideway, Sub-Grade - Track	10/1/2022	10/23/2023	23	276	14,000	168,000	modeled as one month (approximately 1/4 mile of boring); 3 miles total start of second boring machine	16	4	45	guideway_underground	
Guideway, Sub-Grade - Track	1/29/2023	2/19/2024	23	276	14,000	168,000		16	4	45	guideway_underground	
<p>==== Atlantic Station =====</p>												
Atlantic Station - Site Clearing	9/17/2022	10/17/2022	30	21	100,000.00	68,840	STAGING OPTION 1	40	0	11	demo_util_siteprep	
Atlantic Station - Site Clearing	9/17/2022	10/21/2022	30	25	100,000.00	80,850	STAGING OPTION 2	40	0	11	demo_util_siteprep	
Atlantic Station - Excavation	10/22/2022	4/21/2023	130	130	13,500	13,500	NOTE: Staging must be complete before Sub-Grade - End so that staging can support that effort as well; Station must be after TBM is done.	13	0	25	station_underground_cut cover	
Atlantic Station - Construction	4/22/2023	8/23/2024	350	350	8,100	8,100	per ACE team recommendation, maximum duration used in modeling	8	3	0	station_underground	
<p>==== Guideway, Sub-Grade - End =====</p>												
Guideway, Underground - Trenching, Retaining Wall, Fill Construction	10/19/2022	9/23/2023	132	243	37,000	68,000	Beginning of excavation near Atlantic Station to receive TBM; Assumed complete at least one month before first TBM arrives.	25	0	32	guideway_underground_transition	
<p>==== Commerce Station =====</p>												
Commerce Station - Site Clearing	8/3/2022	8/31/2022	30	20	100,000.00	64,500	STAGING OPTION 1	40	0	11	demo_util_siteprep	
Commerce Station - Site Clearing	8/3/2022	9/2/2022	30	22	100,000.00	70,250	STAGING OPTION 2	40	0	11	demo_util_siteprep	
Commerce Station - Excavation	9/3/2022	3/3/2023	130	130	13,500	13,500		13	0	25	station_underground_cut cover	
Commerce Station - Construction	3/4/2023	7/5/2024	350	350	8,100	8,100	per ACE team recommendation, maximum duration used in modeling	8	3	0	station_underground	
<p>==== TPSS =====</p>												
Commerce TPSS - Site Clearing	7/6/2024	7/9/2024	30	2	100,000.00	3,600	n/a	40	0	11	demo_util_siteprep	
Commerce TPSS	7/10/2024	11/27/2024	100	100	12,000	12,000	n/a	5	2	0	tpss	
<p>==== Whittier Station =====</p>												
Whittier Station - Site Clearing	9/3/2022	9/16/2022	30	10	100,000.00	30,750	STAGING OPTION 1	40	0	11	demo_util_siteprep	
Whittier Station - Site Clearing	9/3/2022	9/14/2022	30	8	100,000.00	25,500	STAGING OPTION 2	40	0	11	demo_util_siteprep	
Whittier Station - Excavation	9/17/2022	3/17/2023	130	130	13,500	13,500		13	0	25	station_underground_cut cover	
Whittier Station - Construction	3/18/2023	7/19/2024	350	350	8,100	8,100	per ACE team recommendation, maximum duration used in modeling	8	3	0	station_underground	
<p>==== TPSS =====</p>												
Whittier TPSS - Site Clearing	7/20/2024	7/23/2024	30	2	100,000.00	3,600	n/a	40	0	11	demo_util_siteprep	
Whittier TPSS	7/24/2024	12/11/2024	100	100	12,000	12,000	n/a	5	2	0	tpss	

Alternative 3
Construction Schedule

Eastside Transit Corridor Phase 2
Appendix A - Construction Emission Calculations

Start Date End Date
total construction 1/1/2022 8/25/2026 56 months
operationally essential construction 1/1/2022 5/16/2025 40 months (excl. MSF, Parking, Street Widening)

Base Alternative Feature
Design Option

Alternative 3, Atlantic to Greenwood IOS - Daily Localized Emissions Thresholds

Construction Activity	Start Date	End Date	denotes manually linked cell Modeled Duration (days)	Actual Duration (days)	spaces for parking Modeled Area (sqft)	see <sqft> tab Actual Area (sqft)	Notes	Based on CalEEMod defaults			CalEEMod Reference
								Worker Trips/day	Vendor Trips/day	Hauling Trips/day	
==== Construction Start =====											
Saybrook Ave Site Clearing - Demolition	1/1/2022	1/27/2022	30	19	100,000.00	62,250	Saybrook site cleared first to allow set up for both underground and aerial guideway	40	0	11	demo_util_siteprep
Guideway, Underground - Trenching, Retaining Wall, Fill Construction	1/28/2022	8/2/2022	132	132	37,000	37,000	Beginning of excavation near Saybrook to set up TBM	25	0	32	guideway_underground_t ransition
==== Guideway, Aerial =====											
Gayhart, Davie, and Garfield Site Clearing	8/3/2022	1/27/2023	30	127	100,000.00	422,900	Site cleared in preparation for aerial guideway	40	0	11	demo_util_siteprep
Guideway, Aerial - Track	10/27/2022	11/1/2023	132	264	79,200	158,400	Assumed to start once the Gayhart and Davie sites have been cleared, 1-mile (incl. MSF lead-in)	33	13	0	guideway_aerial
==== Commerce MSF =====											
MSF - Commerce Site Clearing	3/8/2023	5/21/2024	30	314	100,000.00	1,045,444	n/a	40	0	11	demo_util_siteprep
MSF - Commerce - Construction	5/22/2024	10/22/2025	370	370	1,046,000	1,045,444	Assumed half the total MSF site area to be substantially developed	89	29	0	msf
==== TPSS =====											
Davie TPSS	1/28/2023	6/16/2023	100	100	12,000	12,000	n/a	5	2	0	tpss
==== Montebello MSF =====											
MSF - Commerce Site Clearing	5/13/2023	11/13/2024	30	393	100,000.00	1,306,805	n/a	40	0	11	demo_util_siteprep
MSF - Commerce - Construction	11/14/2024	8/25/2026	370	463	1,046,000	1,306,805	Assumed half the total MSF site area to be meaningfully developed	89	29	0	msf
==== Greenwood Station =====											
Greenwood Station - Site Clearing	4/26/2024	5/2/2024	30	4	100,000.00	12,700	STAGING OPTION 1	40	0	11	demo_util_siteprep
Greenwood Station - Site Clearing	4/26/2024	5/16/2024	30	14	100,000.00	45,750	STAGING OPTION 2	40	0	11	demo_util_siteprep
Greenwood Station - Station Construction (Aerial)	5/17/2024	5/16/2025	260	260	8,100	8,100	n/a	4	1	0	station_aerial
==== Greenwood Parking =====											
Parking	5/17/2025	6/4/2025	13	13	370.00	370	VALUE IN SQFT COLUMN IS COUNT OF SPACES, NOT SQFT.	62	24	0	parking
==== Guideway, Aerial - Greenwood / Montebello =====											
Guideway, Aerial - Track	11/2/2023	11/6/2024	132	264	79,200	158,400	approximately 1-mile aerial crossing option	33	13	0	guideway_aerial
==== Guideway, At-Grade - Greenwood / Montebello =====											
Guideway, At-Grade - Construction, 1 mile	11/2/2023	2/19/2024	77	77	264,000	264,000	approximately 1-mile at-grade crossing option; this is the extra buffer on either side of the track	18	0	32	guideway_grade_site
Guideway, At-Grade - Track, 1 mile	2/20/2024	6/6/2024	77	77	132,000	132,000	approximately 1-mile at-grade crossing option	55	22	0	guideway_grade_rail
==== Street Widening =====											
Street Widening - Washington Greenwood	5/17/2024	6/12/2024	40	18	5,000	2,200	n/a	17	1	0	roadways
Street Widening - Washington S Montebello	6/13/2024	10/25/2024	40	96	5,000	12,000	n/a	17	1	0	roadways
==== Guideway, Sub-Grade - Start =====											
Guideway, Sub-Grade - Track	10/1/2022	10/23/2023	23	276	14,000	168,000	modeled as one month (approximately 1/4 mile of boring); 3 miles total	16	4	45	guideway_underground
Guideway, Sub-Grade - Track	1/29/2023	2/19/2024	23	276	14,000	168,000	start of second boring machine	16	4	45	guideway_underground
==== Atlantic Station =====											
Atlantic Station - Site Clearing	9/17/2022	10/17/2022	30	21	100,000.00	68,840	STAGING OPTION 1	40	0	11	demo_util_siteprep
Atlantic Station - Site Clearing	9/17/2022	10/21/2022	30	25	100,000.00	80,850	STAGING OPTION 2	40	0	11	demo_util_siteprep
Atlantic Station - Excavation	10/22/2022	4/21/2023	130	130	13,500	13,500	NOTE: Staging must be complete before Sub-Grade - End so that staging can support that effort as well; Station must be after TBM is done.	13	0	25	station_underground_cut cover
Atlantic Station - Construction	4/22/2023	8/23/2024	350	350	8,100	8,100	per ACE team recommendation, maximum duration used in modeling	8	3	0	station_underground
==== Guideway, Sub-Grade - End =====											
Guideway, Underground - Trenching, Retaining Wall, Fill Construction	10/19/2022	9/23/2023	132	243	37,000	68,000	Beginning of excavation near Atlantic Station to receive TBM; Assumed complete at least one month before first TBM arrives.	25	0	32	guideway_underground_t ransition
==== Commerce Station =====											
Commerce Station - Site Clearing	8/3/2022	8/31/2022	30	20	100,000.00	64,500	STAGING OPTION 1	40	0	11	demo_util_siteprep
Commerce Station - Site Clearing	8/3/2022	9/2/2022	30	22	100,000.00	70,250	STAGING OPTION 2	40	0	11	demo_util_siteprep
Commerce Station - Excavation	9/3/2022	3/3/2023	130	130	13,500	13,500		13	0	25	station_underground_cut cover
Commerce Station - Construction	3/4/2023	7/5/2024	350	350	8,100	8,100	per ACE team recommendation, maximum duration used in modeling	8	3	0	station_underground
==== TPSS =====											

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 2:05 PM

Guideway - Underground - Los Angeles-South Coast County, Summer

Guideway - Underground
Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Enclosed Parking Structure	14.00	1000sqft	0.32	14,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	33
Climate Zone	9			Operational Year	2050
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	0	CH4 Intensity (lb/MWhr)	0	N2O Intensity (lb/MWhr)	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CONSTRUCTION

Land Use - one, approximately 21-foot diameter bored tunnels at a rate of 30 feet per day; one month

Construction Phase - Project-specified duration

Off-road Equipment - Includes equipment for construction and operation-related utility work; "Other Construction Equipment" represents the electric TBM;

Off-road Equipment - Electric tunnel bore

Off-road Equipment - task-specific equipment to support behind TBM (other equipment is electric TBM)

Trips and VMT - Off-Site emissions addressed outside of CalEEMod

Grading - Assumed 100% of tunnel area exported

Construction Off-road Equipment Mitigation - SCAQMD Rule 403 for Large Operations (NOT MITIGATION)

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 2:05 PM

Guideway - Underground - Los Angeles-South Coast County, Summer

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

	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
Year	lb/day										lb/day					
2024	0.2361	2.0343	1.9839	5.1600e-003	0.0000	0.0811	0.0811	0.0000	0.0770	0.0770	0.0000	494.2455	494.2455	0.1176	0.0000	497.1850
Maximum	0.2361	2.0343	1.9839	5.1600e-003	0.0000	0.0811	0.0811	0.0000	0.0770	0.0770	0.0000	494.2455	494.2455	0.1176	0.0000	497.1850

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Underground Utilities	Site Preparation	1/1/2024	1/31/2024	5	23	
2	Tunnel Bore	Building Construction	1/1/2024	1/31/2024	5	23	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.32

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 2:05 PM

Guideway - Underground - Los Angeles-South Coast County, Summer

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Underground Utilities	Cement and Mortar Mixers	1	1.00	9	0.56
Underground Utilities	Concrete/Industrial Saws	1	2.00	81	0.73
Tunnel Bore	Other Construction Equipment	1	24.00	0	0.00
Underground Utilities	Forklifts	1	2.00	89	0.20
Underground Utilities	Rubber Tired Loaders	1	4.00	203	0.36

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Underground Utilities - 2024

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					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.2361	2.0343	1.9839	5.1600e-003		0.0811	0.0811		0.0770	0.0770	0.0000	494.2455	494.2455	0.1176		497.1850
Total	0.2361	2.0343	1.9839	5.1600e-003	0.0000	0.0811	0.0811	0.0000	0.0770	0.0770	0.0000	494.2455	494.2455	0.1176		497.1850

3.3 Tunnel Bore - 2024

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 2:51 PM

Guideway - Trenching, Retaining Wall, Fill Construction - Los Angeles-South Coast County, Summer

Guideway - Trenching, Retaining Wall, Fill Construction
Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	37.00	1000sqft	0.85	37,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	33
Climate Zone	9			Operational Year	2050
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	0	CH4 Intensity (lb/MWhr)	0	N2O Intensity (lb/MWhr)	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CONSTRUCTION

Land Use - distances estimated using Google Earth

Construction Phase - project schedule - 6 months

Off-road Equipment - task-specific equipment

Trips and VMT - Off-Site emissions addressed outside of CalEEMod

Grading - 37,000 sqft area measured in Google Earth; 50-ft assumed depth to start boring; excavate half due to incline

Construction Off-road Equipment Mitigation - SCAQMD Rule 403 for Large Operations (NOT MITIGATION)

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 2:51 PM

Guideway - Trenching, Retaining Wall, Fill Construction - Los Angeles-South Coast County, Summer

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

	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
Year	lb/day										lb/day					
2024	0.9079	8.6792	11.5389	0.0187	0.0114	0.4017	0.4132	1.7300e-003	0.3713	0.3730	0.0000	1,779.7825	1,779.7825	0.5590	0.0000	1,793.7570
Maximum	0.9079	8.6792	11.5389	0.0187	0.0114	0.4017	0.4132	1.7300e-003	0.3713	0.3730	0.0000	1,779.7825	1,779.7825	0.5590	0.0000	1,793.7570

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Guideway Trenching, Retaining Wall, Fill Construction	Grading	1/1/2024	7/2/2024	5	132	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.85

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 2:51 PM

Guideway - Trenching, Retaining Wall, Fill Construction - Los Angeles-South Coast County, Summer

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Guideway Trenching, Retaining Wall, Fill	Skid Steer Loaders	1	7.00	65	0.37
Guideway Trenching, Retaining Wall, Fill	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Guideway Trenching, Retaining Wall, Fill	Excavators	1	6.00	158	0.38
Guideway Trenching, Retaining Wall, Fill	Cranes	1	4.00	231	0.29
Guideway Trenching, Retaining Wall, Fill	Rollers	1	4.00	80	0.38
Guideway Trenching, Retaining Wall, Fill	Cement and Mortar Mixers	2	6.00	9	0.56
Guideway Trenching, Retaining Wall, Fill	Forklifts	2	6.00	89	0.20

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Guideway Trenching, Retaining Wall, Fill Construction - 2024

	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					0.0114	0.0000	0.0114	1.7300e-003	0.0000	1.7300e-003			0.0000			0.0000
Off-Road	0.9079	8.6792	11.5389	0.0187		0.4017	0.4017		0.3713	0.3713	0.0000	1,779.7825	1,779.7825	0.5590		1,793.7570
Total	0.9079	8.6792	11.5389	0.0187	0.0114	0.4017	0.4132	1.7300e-003	0.3713	0.3730	0.0000	1,779.7825	1,779.7825	0.5590		1,793.7570

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 4:14 PM

Guideway, At-Grade, Site Preparation - Los Angeles-South Coast County, Summer

Guideway, At-Grade, Site Preparation
Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	264.00	1000sqft	6.06	264,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	33
Climate Zone	9			Operational Year	2050
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	0	CH4 Intensity (lb/MWhr)	0	N2O Intensity (lb/MWhr)	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CONSTRUCTION

Land Use - 12.5-ft width per rail (2x), 12.5-ft buffer assumed (2x), 1-mile length segment

Construction Phase - Estimated duration for 1-mile segment: 4 months

Trips and VMT - Off-Site emissions addressed outside of CalEEMod

Grading - Assumed import/export of material/ballast (2-ft depth for rail-area only)

Construction Off-road Equipment Mitigation - Watering is required by SCAQMD rules and is not considered mitigation.

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 4:14 PM

Guideway, At-Grade, Site Preparation - Los Angeles-South Coast County, Summer

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

	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
Year	lb/day										lb/day					
2024	1.3642	11.4236	13.6299	0.0272	1.2889	0.5155	1.8043	0.6584	0.4851	1.1435	0.0000	2,614.3404	2,614.3404	0.6635	0.0000	2,630.9287
Maximum	1.3642	11.4236	13.6299	0.0272	1.2889	0.5155	1.8043	0.6584	0.4851	1.1435	0.0000	2,614.3404	2,614.3404	0.6635	0.0000	2,630.9287

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2024	4/16/2024	5	77	

Acres of Grading (Site Preparation Phase): 19.25

Acres of Grading (Grading Phase): 0

Acres of Paving: 6.06

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 4:14 PM

Guideway, At-Grade, Site Preparation - Los Angeles-South Coast County, Summer

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Air Compressors	1	8.00	78	0.48
Site Preparation	Concrete/Industrial Saws	1	4.00	81	0.73
Site Preparation	Excavators	1	7.00	158	0.38
Site Preparation	Off-Highway Trucks	1	4.00	402	0.38
Site Preparation	Rubber Tired Dozers	1	4.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	2	6.00	97	0.37

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2024

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					1.2889	0.0000	1.2889	0.6584	0.0000	0.6584			0.0000			0.0000
Off-Road	1.3642	11.4236	13.6299	0.0272		0.5155	0.5155		0.4851	0.4851	0.0000	2,614.3404	2,614.3404	0.6635		2,630.9287
Total	1.3642	11.4236	13.6299	0.0272	1.2889	0.5155	1.8043	0.6584	0.4851	1.1435	0.0000	2,614.3404	2,614.3404	0.6635		2,630.9287

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 4:33 PM

Guideway, At-Grade, Construction - Los Angeles-South Coast County, Summer

Guideway, At-Grade, Construction
Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	132.00	1000sqft	3.03	132,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	33
Climate Zone	9			Operational Year	2050
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	0	CH4 Intensity (lb/MWhr)	0	N2O Intensity (lb/MWhr)	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CONSTRUCTION

Land Use - 12.5-ft width per rail (2x), 1-mile length segment

Construction Phase - Estimated duration for 1-mile segment: 4 months

Trips and VMT - Off-Site emissions addressed outside of CalEEMod

Construction Off-road Equipment Mitigation - Watering is required by SCAQMD rules and is not considered mitigation.

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 4:33 PM

Guideway, At-Grade, Construction - Los Angeles-South Coast County, Summer

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

	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
Year	lb/day										lb/day					
2024	0.6177	4.5140	5.4106	8.5800e-003	0.0000	0.1970	0.1970	0.0000	0.1885	0.1885	0.0000	735.9261	735.9261	0.1588	0.0000	739.8963
Maximum	0.6177	4.5140	5.4106	8.5800e-003	0.0000	0.1970	0.1970	0.0000	0.1885	0.1885	0.0000	735.9261	735.9261	0.1588	0.0000	739.8963

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Rail Construction	Building Construction	1/14/2024	4/30/2024	5	77	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 3.03

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 4:33 PM

Guideway, At-Grade, Construction - Los Angeles-South Coast County, Summer

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Rail Construction	Cement and Mortar Mixers	4	6.00	9	0.56
Rail Construction	Forklifts	2	8.00	89	0.20
Rail Construction	Welders	1	8.00	46	0.45
Rail Construction	Aerial Lifts	1	4.00	63	0.31

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Rail Construction - 2024

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	0.6177	4.5140	5.4106	8.5800e-003		0.1970	0.1970		0.1885	0.1885	0.0000	735.9261	735.9261	0.1588		739.8963
Total	0.6177	4.5140	5.4106	8.5800e-003		0.1970	0.1970		0.1885	0.1885	0.0000	735.9261	735.9261	0.1588		739.8963

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 1:18 PM

Guideway - Aerial - Los Angeles-South Coast County, Summer

Guideway - Aerial
Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unenclosed Parking Structure	79.20	1000sqft	1.82	79,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	33
Climate Zone	9			Operational Year	2050
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	0	CH4 Intensity (lb/MWhr)	0	N2O Intensity (lb/MWhr)	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CONSTRUCTION

Land Use - 0.5-mile long x 30-ft wide elevated rail

Construction Phase - Total elevated trackwork duration (12 months) divided by modeled elevated guideway (1-mile) => 12 months / mile (half mile modeled)

Off-road Equipment - task-specific equipment

Trips and VMT - Off-Site emissions addressed outside of CalEEMod

Construction Off-road Equipment Mitigation - SCAQMD Rule 403 for Large Operations (NOT MITIGATION)

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 1:18 PM

Guideway - Aerial - Los Angeles-South Coast County, Summer

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

	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
Year	lb/day										lb/day					
2024	1.2124	11.1245	9.7176	0.0253	0.0000	0.4539	0.4539	0.0000	0.4269	0.4269	0.0000	2,405.0642	2,405.0642	0.6396	0.0000	2,421.0542
Maximum	1.2124	11.1245	9.7176	0.0253	0.0000	0.4539	0.4539	0.0000	0.4269	0.4269	0.0000	2,405.0642	2,405.0642	0.6396	0.0000	2,421.0542

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Guideway Construction	Building Construction	1/1/2024	7/2/2024	5	132	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 1.82

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 1:18 PM

Guideway - Aerial - Los Angeles-South Coast County, Summer

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Guideway Construction	Air Compressors	1	6.00	78	0.48
Guideway Construction	Bore/Drill Rigs	1	4.00	221	0.50
Guideway Construction	Cement and Mortar Mixers	2	8.00	9	0.56
Guideway Construction	Concrete/Industrial Saws	1	2.00	81	0.73
Guideway Construction	Cranes	2	6.00	231	0.29
Guideway Construction	Forklifts	1	6.00	89	0.20
Guideway Construction	Aerial Lifts	2	4.00	63	0.31
Guideway Construction	Rubber Tired Loaders	1	4.00	203	0.36

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Guideway Construction - 2024

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	1.2124	11.1245	9.7176	0.0253		0.4539	0.4539		0.4269	0.4269	0.0000	2,405.0642	2,405.0642	0.6396		2,421.0542
Total	1.2124	11.1245	9.7176	0.0253		0.4539	0.4539		0.4269	0.4269	0.0000	2,405.0642	2,405.0642	0.6396		2,421.0542

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 3:03 PM

Station - Underground - Station Construction - Los Angeles-South Coast County, Summer

Station - Underground - Station Construction
Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Enclosed Parking with Elevator	8.10	1000sqft	0.19	8,100.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	33
Climate Zone	9			Operational Year	2050
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	0	CH4 Intensity (lb/MWhr)	0	N2O Intensity (lb/MWhr)	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CONSTRUCTION

Land Use - Station assumed to be 270 feet long with 30-foot wide platform

Construction Phase - Total underground station construction duration (48 months) divided by total underground station count (3) = 16 months/station

Off-road Equipment - task-specific equipment

Trips and VMT - Off-Site emissions addressed outside of CalEEMod

Architectural Coating - station architectural coating

Construction Off-road Equipment Mitigation - SCAQMD Rule 403 for Large Operations (NOT MITIGATION)

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 3:03 PM

Station - Underground - Station Construction - Los Angeles-South Coast County, Summer

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

	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
Year	lb/day										lb/day					
2024	1.4310	11.6700	12.8557	0.0274		0.4667	0.4667		0.4476	0.4476	0.0000	2,527.0786	2,527.0786	0.5325		2,540.3917
2025	1.3443	10.8997	12.7825	0.0274		0.4116	0.4116		0.3945	0.3945	0.0000	2,527.0161	2,527.0161	0.5274		2,540.2009
Maximum	1.431	11.67	12.8557	0.0274	#VALUE!	0.4667	0.4667	#VALUE!	0.4476	0.4476	0	2527.0786	2527.0786	0.5325	#VALUE!	2540.3917

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Station Construction	Building Construction	1/1/2024	5/2/2025	5	350	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.19

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 3:03 PM

Station - Underground - Station Construction - Los Angeles-South Coast County, Summer

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Station Construction	Forklifts	2	6.00	89	0.20
Station Construction	Cranes	1	4.00	231	0.29
Station Construction	Cement and Mortar Mixers	2	6.00	9	0.36
Station Construction	Bore/Drill Rigs	1	4.00	221	0.50
Architectrual Coating	Air Compressors	1	6.00	78	0.48
Station Construction	Skid Steer Loaders	1	6.00	65	0.37
Station Construction	Generator Sets	1	8.00	84	0.74
Station Construction	Welders	2	8.00	46	0.45
Station Construction	Rubber Tired Loaders	1	4.00	203	0.36

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Station Construction - 2024

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	1.4310	11.6700	12.8557	0.0274		0.4667	0.4667		0.4476	0.4476	0.0000	2,527.0786	2,527.0786	0.5325		2,540.3917
Total	1.4310	11.6700	12.8557	0.0274		0.4667	0.4667		0.4476	0.4476	0.0000	2,527.0786	2,527.0786	0.5325		2,540.3917

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 3:03 PM

Station - Underground - Station Construction - Los Angeles-South Coast County, Summer

3.2 Station Construction - 2025

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	1.3443	10.8997	12.7825	0.0274		0.4116	0.4116		0.3945	0.3945	0.0000	2,527.0161	2,527.0161	0.5274		2,540.2009
Total	1.3443	10.8997	12.7825	0.0274		0.4116	0.4116		0.3945	0.3945	0.0000	2,527.0161	2,527.0161	0.5274		2,540.2009

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 2:36 PM

Station - Underground - Cut and Cover - Los Angeles-South Coast County, Summer

Station - Underground - Cut and Cover
Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Enclosed Parking with Elevator	13.50	1000sqft	0.31	13,500.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	33
Climate Zone	9			Operational Year	2050
Utility Company	User Defined				
CO2 Intensity (lb/MW hr)	0	CH4 Intensity (lb/MW hr)	0	N2O Intensity (lb/MW hr)	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CONSTRUCTION

Land Use - Station assumed to be 270 feet long with 30-foot width platform (50-ft width modeled to ensure excavation fully captured)

Construction Phase - Total cut and cover duration (18 months) divided by total underground station count (3) = 6 months/station

Off-road Equipment - task-specific equipment

Trips and VMT - Off-Site emissions addressed outside of CalEEMod

Grading - per ACE drawings, 190 ft grade minus 130 ft base of station = 60 ft depth excavation total; 20-ft of cover

Construction Off-road Equipment Mitigation - SCAQMD Rule 403 for Large Operations (NOT MITIGATION)

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 2:36 PM

Station - Underground - Cut and Cover - Los Angeles-South Coast County, Summer

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

	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
Year	lb/day										lb/day					
2024	0.7127	7.0124	9.4791	0.0188	0.0136	0.2956	0.3092	2.0500e-003	0.2720	0.2740	0.0000	1,816.8725	1,816.8725	0.5876	0.0000	1,831.5628
Maximum	0.7127	7.0124	9.4791	0.0188	0.0136	0.2956	0.3092	2.0500e-003	0.2720	0.2740	0.0000	1,816.8725	1,816.8725	0.5876	0.0000	1,831.5628

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Cut and Cover Construction	Grading	1/1/2024	6/28/2024	5	130	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.31

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 2:36 PM

Station - Underground - Cut and Cover - Los Angeles-South Coast County, Summer

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Cut and Cover Construction	Graders	0	0.00	0	0.00
Cut and Cover Construction	Skid Steer Loaders	1	7.00	65	0.37
Cut and Cover Construction	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Cut and Cover Construction	Bore/Drill Rigs	1	4.00	221	0.50
Cut and Cover Construction	Excavators	1	6.00	158	0.38
Cut and Cover Construction	Cranes	1	4.00	231	0.29

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Cut and Cover Construction - 2024

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					0.0136	0.0000	0.0136	2.0500e-003	0.0000	2.0500e-003			0.0000			0.0000
Off-Road	0.7127	7.0124	9.4791	0.0188		0.2956	0.2956		0.2720	0.2720	0.0000	1,816.8725	1,816.8725	0.5876		1,831.5628
Total	0.7127	7.0124	9.4791	0.0188	0.0136	0.2956	0.3092	2.0500e-003	0.2720	0.2740	0.0000	1,816.8725	1,816.8725	0.5876		1,831.5628

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 3:50 PM

Station - At-Grade - Los Angeles-South Coast County, Summer

Station - At-Grade
Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unenclosed Parking with Elevator	8.10	1000sqft	0.19	8,100.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	33
Climate Zone	9			Operational Year	2050
Utility Company	User Defined				
CO2 Intensity (lb/MW hr)	0	CH4 Intensity (lb/MW hr)	0	N2O Intensity (lb/MW hr)	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CONSTRUCTION

Land Use - Surface station assumed to be 270 feet long with 30 feet of platform

Construction Phase - Total at-grade station construction duration (18 months) divided by total at-grade station count (3) = 6 months/station

Off-road Equipment - Project-specific equipment

Trips and VMT - Off-Site emissions addressed outside of CalEEMod

Architectural Coating - architectural coating

Construction Off-road Equipment Mitigation - SCAQMD Rule 403 for Large Operations (NOT MITIGATION)

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 3:50 PM

Station - At-Grade - Los Angeles-South Coast County, Summer

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

	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
Year	lb/day										lb/day					
2024	0.7699	6.8620	7.9350	0.0140	0.0000	0.2955	0.2955	0.0000	0.2799	0.2799	0.0000	1,301.5418	1,301.5418	0.2932	0.0000	1,308.8717
Maximum	0.7699	6.8620	7.9350	0.0140	0.0000	0.2955	0.2955	0.0000	0.2799	0.2799	0.0000	1,301.5418	1,301.5418	0.2932	0.0000	1,308.8717

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Station Construction	Building Construction	1/1/2024	5/17/2024	5	100	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.19

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 3:50 PM

Station - At-Grade - Los Angeles-South Coast County, Summer

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Station Construction	Forklifts	1	8.00	89	0.20
Station Construction	Cranes	1	4.00	231	0.29
Station Construction	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Station Construction	Generator Sets	1	4.00	84	0.74
Station Construction	Welders	1	4.00	46	0.45
Station Construction	Cement and Mortar Mixers	2	6.00	9	0.56
Station Construction	Aerial Lifts	1	4.00	63	0.31

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Station Construction - 2024

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	0.7699	6.8620	7.9350	0.0140		0.2955	0.2955		0.2799	0.2799	0.0000	1,301.5418	1,301.5418	0.2932		1,308.8717
Total	0.7699	6.8620	7.9350	0.0140		0.2955	0.2955		0.2799	0.2799	0.0000	1,301.5418	1,301.5418	0.2932		1,308.8717

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 1:36 PM

Station - Aerial - Los Angeles-South Coast County, Summer

Station - Aerial
Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unenclosed Parking with Elevator	8.10	1000sqft	0.19	8,100.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	33
Climate Zone	9			Operational Year	2050
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	0	CH4 Intensity (lb/MWhr)	0	N2O Intensity (lb/MWhr)	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CONSTRUCTION

Land Use - Station assumed to be 270 feet long with 30-foot wide platform

Construction Phase - project-specific duration

Off-road Equipment - task-specific equipment (groundwork equipment such as loaders not included since this work would occur under the initial guideway installation)

Trips and VMT - Off-Site emissions addressed outside of CalEEMod

Architectural Coating - station architectural coating

Construction Off-road Equipment Mitigation - SCAQMD Rule 403 for Large Operations (NOT MITIGATION)

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 1:36 PM

Station - Aerial - Los Angeles-South Coast County, Summer

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

	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
Year	lb/day										lb/day					
2024	0.8974	7.84854	9.644105	0.0169485	#VALUE!	0.324245	0.324245	#VALUE!	0.311245	0.311245	0	1588.54801	1588.54801	0.287795	#VALUE!	1595.74292
Maximum	0.8974	7.84854	9.644105	0.0169485	#VALUE!	0.324245	0.324245	#VALUE!	0.311245	0.311245	0	1588.54801	1588.54801	0.287795	#VALUE!	1595.74292

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Building Construction	Building Construction	1/1/2024	12/27/2024	5	260	
2	Architectural Coatings	Architectural Coating	5/18/2024	6/5/2024	5	13	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.19

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 486 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Building Construction	Forklifts	2	6.00	89	0.20
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Generator Sets	1	8.00	84	0.74
Architectural Coatings	Air Compressors	1	6.00	78	0.48
Building Construction	Welders	1	8.00	46	0.45
Building Construction	Aerial Lifts	2	6.00	63	0.31

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 1:36 PM

Station - Aerial - Los Angeles-South Coast County, Summer

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Building Construction - 2024

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	0.8797	7.7876	9.5536	0.0168		0.3212	0.3212		0.3082	0.3082	0.0000	1,574.4756	1,574.4756	0.2870		1,581.6507
Total	0.8797	7.7876	9.5536	0.0168		0.3212	0.3212		0.3082	0.3082	0.0000	1,574.4756	1,574.4756	0.2870		1,581.6507

3.3 Architectural Coatings - 2024

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	0.1733					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609	0.0000	281.4481	281.4481	0.0159		281.8443
Total	0.3540	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609	0.0000	281.4481	281.4481	0.0159		281.8443

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 10:41 AM

Staging - 100,000sqft - Los Angeles-South Coast County, Summer

Staging - 100,000sqft
Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	100.00	1000sqft	2.30	100,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	33
Climate Zone	9			Operational Year	2050
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	0	CH4 Intensity (lb/MWhr)	0	N2O Intensity (lb/MWhr)	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CONSTRUCTION

Construction Phase - CalEEMod defaults for 100,000sqft is 3 days for Site Prep and 20 days for Demolition (23 days total); increased duration to simulate lower-intensity site clearing

Off-road Equipment - assumed lower-intensity longer-duration demolition than CalEEMod default

Trips and VMT - Off-Site emissions addressed outside of CalEEMod

Demolition - assumed about 75% of site prep includes demolition

Construction Off-road Equipment Mitigation - SCAQMD Rule 403 for Large Operations (NOT MITIGATION)

Off-road Equipment - task-specific equipment

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 10:41 AM

Staging - 100,000sqft - Los Angeles-South Coast County, Summer

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

	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
Year	lb/day										lb/day					
2024	1.225533333	10.39306667	12.27573333	0.023933333	0.63986667	0.4634	1.1032	0.096866667	0.43586667	0.532733333	0	2269.648	2269.648	0.59053333	#VALUE!	2284.41127
Maximum	1.225533333	10.39306667	12.27573333	0.023933333	0.63986667	0.4634	1.1032	0.096866667	0.43586667	0.532733333	0	2269.648	2269.648	0.59053333	#VALUE!	2284.41127

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demo, Site Prep, Util	Demolition	1/1/2024	2/9/2024	5	30	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 2.3

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 10:41 AM

Staging - 100,000sqft - Los Angeles-South Coast County, Summer

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demo, Site Prep, Util	Concrete/Industrial Saws	1	4.00	81	0.73
Demo, Site Prep, Util	Rubber Tired Dozers	1	4.00	247	0.40
Demo, Site Prep, Util	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Demo, Site Prep, Util	Air Compressors	1	8.00	78	0.48
Demo, Site Prep, Util	Excavators	1	7.00	158	0.38
Demo, Site Prep, Util	Off-Highway Trucks	1	4.00	402	0.38
Demo, Site Prep, Util	Cement and Mortar Mixers	4	6.00	9	0.56
Demo, Site Prep, Util	Pavers	1	4.00	130	0.42
Demo, Site Prep, Util	Forklifts	2	4.00	89	0.20
Demo, Site Prep, Util	Cranes	1	2.00	231	0.29
Demo, Site Prep, Util	Aerial Lifts	1	6.00	63	0.31

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demo, Site Prep, Util - 2024

	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					0.9598	0.0000	0.9598	0.1453	0.0000	0.1453			0.0000			0.0000
Off-Road	1.8383	15.5896	18.4136	0.0359		0.6951	0.6951		0.6538	0.6538	0.0000	3,404.4720	3,404.4720	0.8858		3,426.6169
Total	1.8383	15.5896	18.4136	0.0359	0.9598	0.6951	1.6548	0.1453	0.6538	0.7991	0.0000	3,404.4720	3,404.4720	0.8858		3,426.6169

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 9:46 AM

MSF - Los Angeles-South Coast County, Summer

MSF
Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-Rail	177.00	1000sqft	4.06	177,000.00	0
Other Non-Asphalt Surfaces	869.00	1000sqft	19.95	869,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	33
Climate Zone	9			Operational Year	2026
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	CH4 Intensity (lb/MWhr)	0.033	N2O Intensity (lb/MWhr)	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CONSTRUCTION & OPERATION

Land Use - land-use info based on ACE site drawings

Construction Phase - Demo & Site Prep run separately; caleemod default

Off-road Equipment - task-specific equipment

Trips and VMT - Off-Site emissions addressed outside of CalEEMod

Construction Off-road Equipment Mitigation - SCAQMD Rule 403 for Large Operations (NOT MITIGATION)

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 9:46 AM

MSF - Los Angeles-South Coast County, Summer

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

	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
Year	lb/day										lb/day					
2024	6.0308	8.5187	8.2582	0.0154	#VALUE!	0.3989	0.3989	#VALUE!	0.3718	0.3718	0.0000	1414.3735	1414.3735	0.4089	#VALUE!	1424.5979
2025	5.9820	7.9304	8.2029	0.0154	#VALUE!	0.3567	0.3567	#VALUE!	0.3329	0.3329	0.0000	1414.6430	1414.6430	0.4090	#VALUE!	1424.8695
Maximum	6.0308	8.5187	8.2582	0.0154	#VALUE!	0.3989	0.3989	#VALUE!	0.3718	0.3718	0.0000	1414.6430	1414.6430	0.4090	#VALUE!	1424.8695

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Architectural Coatings	Architectural Coating	5/31/2025	6/27/2025	5	20	
2	Building Construction	Building Construction	1/1/2024	5/30/2025	5	370	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 19.95

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 265,500; Non-Residential Outdoor: 88,500; Striped Parking Area: 52,140 (Architectural Coating –

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 9:46 AM

MSF - Los Angeles-South Coast County, Summer

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Architectural Coatings	Air Compressors	1	6.00	78	0.48
Building Construction	Cement and Mortar Mixers	4	8.00	9	0.56

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Architectural Coatings - 2025

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	94.1230					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515	0.0000	281.4481	281.4481	0.0154		281.8319
Total	94.2938	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515	0.0000	281.4481	281.4481	0.0154		281.8319

3.3 Building Construction - 2024

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	0.9338	8.4568	8.1604	0.0152		0.3961	0.3961		0.3690	0.3690	0.0000	1,399.1601	1,399.1601	0.4081		1,409.3637
Total	0.9338	8.4568	8.1604	0.0152		0.3961	0.3961		0.3690	0.3690	0.0000	1,399.1601	1,399.1601	0.4081		1,409.3637

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 9:46 AM

MSF - Los Angeles-South Coast County, Summer

3.3 Building Construction - 2025

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	0.8850	7.8685	8.1051	0.0152		0.3539	0.3539		0.3301	0.3301	0.0000	1,399.4296	1,399.4296	0.4082		1,409.6353
Total	0.8850	7.8685	8.1051	0.0152		0.3539	0.3539		0.3301	0.3301	0.0000	1,399.4296	1,399.4296	0.4082		1,409.6353

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 3:36 PM

Parking - Los Angeles-South Coast County, Summer

Parking
Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	370.00	Space	3.33	148,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	33
Climate Zone	9			Operational Year	2050
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	0	CH4 Intensity (lb/MWhr)	0	N2O Intensity (lb/MWhr)	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CONSTRUCTION

Land Use -

Construction Phase - 3 months for all surface parking (1820 spaces); 370 spaces at Greenwood (20% of construction time; ~13 days); note that this duration does not include site

Off-road Equipment - Project-specific equipment; pavement breakers included in Staging - Site Clearing

Trips and VMT - Off-Site emissions addressed outside of CalEEMod

Construction Off-road Equipment Mitigation - SCAQMD Rule 403 for Large Operations (NOT MITIGATION)

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 3:36 PM

Parking - Los Angeles-South Coast County, Summer

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

	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
Year	lb/day										lb/day					
2024	4.5139	5.7143	7.3183	0.0125	0.0000	0.2767	0.2767	0.0000	0.2612	0.2612	0.0000	1,174.1328	1,174.1328	0.2879	0.0000	1,181.3308
Maximum	4.5139	5.7143	7.3183	0.0125	0.0000	0.2767	0.2767	0.0000	0.2612	0.2612	0.0000	1,174.1328	1,174.1328	0.2879	0.0000	1,181.3308

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Parking	Building Construction	1/1/2024	1/17/2024	5	13	
2	Paving	Paving	1/1/2024	1/17/2024	5	13	
3	Striping	Architectural Coating	1/1/2024	1/17/2024	5	13	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 3.33

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 8,880 (Architectural Coating – sqft

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 3:36 PM

Parking - Los Angeles-South Coast County, Summer

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Parking	Cranes	1	2.00	231	0.29
Parking	Forklifts	2	6.00	89	0.20
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Striping	Air Compressors	1	6.00	78	0.48

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Parking - 2024

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	0.2242	2.2014	2.1526	3.7400e-003		0.1130	0.1130		0.1040	0.1040	0.0000	361.7481	361.7481	0.1170		364.6730
Total	0.2242	2.2014	2.1526	3.7400e-003		0.1130	0.1130		0.1040	0.1040	0.0000	361.7481	361.7481	0.1170		364.6730

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 3:36 PM

Parking - Los Angeles-South Coast County, Summer

3.3 Paving - 2024

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	0.2718	2.2941	3.3555	5.7700e-003		0.1028	0.1028		0.0963	0.0963	0.0000	530.9367	530.9367	0.1551		534.8136
Paving	0.6711					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	0.9429	2.2941	3.3555	5.7700e-003		0.1028	0.1028		0.0963	0.0963	0.0000	530.9367	530.9367	0.1551		534.8136

3.4 Striping - 2024

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	3.1661					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609	0.0000	281.4481	281.4481	0.0159		281.8443
Total	3.3468	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609	0.0000	281.4481	281.4481	0.0159		281.8443

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 5:52 PM

Street Widening - Los Angeles-South Coast County, Summer

Street Widening
Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	4.00	1000sqft	0.09	4,000.00	0
Other Non-Asphalt Surfaces	1.00	1000sqft	0.02	1,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	33
Climate Zone	9			Operational Year	2050
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	0	CH4 Intensity (lb/MWhr)	0	N2O Intensity (lb/MWhr)	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CONSTRUCTION

Land Use - Assumed 20% as concrete sidewalks

Construction Phase - Total street widening duration (36 months) divided by total street widening area (100,000sqft) = 0.9 months/5000sqft (5000sqft modeled)

Off-road Equipment - task-specific equipment (air compressor for jackhammers; crushing/proc. equip for milling machine; rollers for compacting); most equipment would not

Off-road Equipment - task-specific equipment (air compressor for striping)

Trips and VMT - off-site emissions estimated outside of CalEEMod

Construction Off-road Equipment Mitigation - SCAQMD Rule 403 for Large Operations (NOT MITIGATION)

Off-road Equipment - task-specific equipment (air compressors for jackhammers)

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 5:52 PM

Street Widening - Los Angeles-South Coast County, Summer

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

	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
Year	lb/day										lb/day					
2024	1.3553	10.5802	15.6486	0.0249	0.0000	0.5034	0.5034	0.0000	0.4806	0.4806	0.0000	2,339.2705	2,339.2705	0.5035	0.0000	2,351.8579
Maximum	1.3553	10.5802	15.6486	0.0249	0.0000	0.5034	0.5034	0.0000	0.4806	0.4806	0.0000	2,339.2705	2,339.2705	0.5035	0.0000	2,351.8579

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	General Construction	Building Construction	1/1/2024	2/23/2024	5	40	
2	Striping	Architectural Coating	1/1/2024	2/23/2024	5	40	
3	Paving	Paving	1/1/2024	2/23/2024	5	40	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.11

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 300 (Architectural Coating – sqft)

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 5:52 PM

Street Widening - Los Angeles-South Coast County, Summer

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
General Construction	Crushing/Proc. Equipment	1	2.00	85	0.78
General Construction	Excavators	1	4.00	158	0.38
General Construction	Forklifts	1	6.00	89	0.20
General Construction	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Striping	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
General Construction	Air Compressors	1	8.00	78	0.48
General Construction	Aerial Lifts	1	4.00	63	0.31

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 General Construction - 2024

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	0.6694	5.3989	8.7633	0.0134		0.2578	0.2578		0.2463	0.2463	0.0000	1,285.6291	1,285.6291	0.2712		1,292.4087
Total	0.6694	5.3989	8.7633	0.0134		0.2578	0.2578		0.2463	0.2463	0.0000	1,285.6291	1,285.6291	0.2712		1,292.4087

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 5:52 PM

Street Widening - Los Angeles-South Coast County, Summer

3.3 Striping - 2024

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	0.0348					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609	0.0000	281.4481	281.4481	0.0159		281.8443
Total	0.2155	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609	0.0000	281.4481	281.4481	0.0159		281.8443

3.4 Paving - 2024

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	0.4644	3.9625	5.0752	8.5400e-003		0.1847	0.1847		0.1734	0.1734	0.0000	772.1934	772.1934	0.2165		777.6049
Paving	5.9000e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	0.4703	3.9625	5.0752	8.5400e-003		0.1847	0.1847		0.1734	0.1734	0.0000	772.1934	772.1934	0.2165		777.6049

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 8:51 AM

TPSS - Los Angeles-South Coast County, Summer

TPSS
Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	12.00	1000sqft	0.28	12,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	33
Climate Zone	9			Operational Year	2050
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	0	CH4 Intensity (lb/MWhr)	0	N2O Intensity (lb/MWhr)	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CONSTRUCTION

Off-road Equipment - task-specific equipment; crane used only for installation of pre-fab TPSS unit

Trips and VMT - off-site emissions estimated outside of CalEEMod

Construction Off-road Equipment Mitigation - SCAQMD Rule 403 for Large Operations (NOT MITIGATION)

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 8:51 AM

TPSS - Los Angeles-South Coast County, Summer

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

	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
Year	lb/day										lb/day					
2024	0.3778	3.3814	4.5800	7.6800e-003	5.0000e-005	0.1571	0.1571	2.0000e-005	0.1454	0.1454	0.0000	729.3299	729.3299	0.2278	2.7000e-004	735.1039
Maximum	0.3778	3.3814	4.5800	7.6800e-003	5.0000e-005	0.1571	0.1571	2.0000e-005	0.1454	0.1454	0.0000	729.3299	729.3299	0.2278	2.7000e-004	735.1039

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Building Construction	Building Construction	1/1/2024	5/20/2024	5	100	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.28

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft

CalEEMod Version: CalEEMod.2020.4.0

Date: 3/29/2022 8:51 AM

TPSS - Los Angeles-South Coast County, Summer

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Building Construction	Cement and Mortar Mixers	1	6.00	9	0.56
Building Construction	Forklifts	1	4.00	89	0.20
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Cranes	1	2.00	231	0.29
Building Construction	Excavators	1	4.00	158	0.38

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Building Construction - 2024

	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	0.3721	3.3794	4.5591	7.6700e-003		0.1570	0.1570		0.1453	0.1453	0.0000	728.3976	728.3976	0.2273		734.0791
Total	0.3721	3.3794	4.5591	7.6700e-003		0.1570	0.1570		0.1453	0.1453	0.0000	728.3976	728.3976	0.2273		734.0791

ATTACHMENT B – OPERATIONS EMISSION CALCULATIONS

Agency	Electric Propulsion (mi/kWh)	Southern California Edison Energy Intensity (CalEEMod)	
Los Angeles County Metro (Light Rail)	0.119	CO2 Intensity (lb/MWhr)	390.98
<i>Reference: https://www.transit.dot.gov/ntd/data-product/2019-fuel-and-energy</i>		CH4 Intensity (lb/MWhr)	0.033
		N2O Intensity (lb/MWhr)	0.004

Global Warming Potentials

From Intergovernmental Panel on Climate Change (IPCC) fourth assessment report (AR4).

Use of AR4 consistent with USEPA (<https://www.epa.gov/ghgemissions/understanding-global-warming-potentials>) and CARB (<https://ww2.arb.ca.gov/ghg-gwps>) recommendations for consistency with existing inventories.

Operational Greenhouse Gas (GHG) Emissions & Energy Demand	Alternative 1 - Washington			Alternative 2 - Atlantic to Citadel IOS			Alternative 3 - Atlantic to Greenwood IOS		
	CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O
Alignment Length	9.5 miles			2.5 miles			4.5 miles		
Weekday Frequency (trains per day)	168			168			168		
Weekend Frequency (trains per day)	98			98			98		
Annual Project Light Rail Miles	511,290			134,550			242,190		
LA Metro Light Rail Energy Factor (kWh/mile)	8.40			8.40			8.40		
Total Energy Demand (kWh/yr)	4,296,555			1,130,672			2,035,210		
Total Energy Demand (billionBTU)	14.66			3.86			6.94		
Total CO₂ Emissions (metric tons per year)	762	0.064	0.0078	201	0.017	0.0021	361	0.030	0.0037
Global Warming Potential	1	25	298	1	25	298	1	25	298
Total CO₂e Emissions (metric tons per year)	766			202			363		
Total CO₂e Emissions (metric tons per year)	628			165			297		
<i>(Adjusted for 2030 Renewable Portfolio Standard [60%])</i>									

	Alternative 1 - Washington		Alternative 2 - Atlantic to Citadel IOS		Alternative 3 - Atlantic to Greenwood IOS	
Miles per Train	9.50	miles	2.50	miles	4.50	miles
Trains per Year	53,820	trains	53,820	trains	53,820	trains
Miles per Year	511,290	miles	134,550	miles	242,190	miles

**Daily Train Schedule
(Trains per Hour)**

Time	Alternative 1 - Washington		Alternative 2 - Atlantic to Citadel IOS		Alternative 3 - Atlantic to Greenwood IOS	
	Weekdays	Weekends	Weekdays	Weekends	Weekdays	Weekends
4:00 AM	6	1.5	6	1.5	6	1.5
4:30 AM	6	1.5	6	1.5	6	1.5
5:00 AM	6	1.5	6	1.5	6	1.5
5:30 AM	6	1.5	6	1.5	6	1.5
6:00 AM	6	1.5	6	1.5	6	1.5
6:30 AM	6	1.5	6	1.5	6	1.5
7:00 AM	6	2	6	2	6	2
7:30 AM	6	2	6	2	6	2
8:00 AM	6	2	6	2	6	2
8:30 AM	6	2	6	2	6	2
9:00 AM	6	3	6	3	6	3
9:30 AM	6	3	6	3	6	3
10:00 AM	6	3	6	3	6	3
10:30 AM	6	3	6	3	6	3
11:00 AM	6	3	6	3	6	3
11:30 AM	6	3	6	3	6	3
12:00 PM	3	3	3	3	3	3
12:30 PM	3	3	3	3	3	3
1:00 PM	3	3	3	3	3	3
1:30 PM	3	3	3	3	3	3
2:00 PM	3	3	3	3	3	3
2:30 PM	3	3	3	3	3	3
3:00 PM	3	3	3	3	3	3
3:30 PM	3	3	3	3	3	3
4:00 PM	3	3	3	3	3	3
4:30 PM	3	3	3	3	3	3
5:00 PM	3	3	3	3	3	3
5:30 PM	3	3	3	3	3	3
6:00 PM	3	3	3	3	3	3
6:30 PM	3	2	3	2	3	2
7:00 PM	3	2	3	2	3	2
7:30 PM	3	1.5	3	1.5	3	1.5
8:00 PM	2	1.5	2	1.5	2	1.5
8:30 PM	2	1.5	2	1.5	2	1.5
9:00 PM	2	1.5	2	1.5	2	1.5
9:30 PM	2	1.5	2	1.5	2	1.5
10:00 PM	2	1.5	2	1.5	2	1.5
10:30 PM	2	1.5	2	1.5	2	1.5
11:00 PM	2	1.5	2	1.5	2	1.5
11:30 PM	2	1.5	2	1.5	2	1.5
12:00 AM	2	1.5	2	1.5	2	1.5
12:30 AM	2	1.5	2	1.5	2	1.5
1:00 AM	2	1.5	2	1.5	2	1.5
1:30 AM	2	1.5	2	1.5	2	1.5

Infrastructure	Energy	Unit	Reference
At-Grade Station - Lighting	24,150	kWh/station-yr	CalEEMod
Aerial Station - Lighting & Elevators/Escalators	26,772	kWh/station-yr	CalEEMod
Underground Station - Lighting & Elevators/Escalators	75,072	kWh/station-yr	CalEEMod
Train Control	47,000	kWh/trackmile-yr	Chester & Horvath

Reference: Chester, M. and A. Horvath. 2008. *Environmental Life-cycle Assessment of Passenger Transportation: A Detailed Methodology for Energy, Greenhouse Gas and Criteria Pollutant Inventories of Automobiles, Buses, Light Rail, heavy Rail and Air v.2.* March 1.

Operational Energy Demand			Alternative 1 - Washington	Alternative 2 - Atlantic to Citadel IOS	Alternative 3 - Atlantic to Greenwood IOS
Alignment Length			9.5 miles	2.5 miles	4.5 miles
Train Control (kWh/year)			446,500	117,500	211,500
Station Lighting & Elevators/Escalators (kWh/year)	Atlantic Blvd	<i>Underground</i>	75,072	75,072	75,072
	Whittier Blvd	<i>Underground</i>	75,072	75,072	75,072
	Commerce/Citadel	<i>Underground</i>	75,072	75,072	75,072
	Greenwood Ave	<i>Aerial</i>	26,772	--	26,772
	Rosemead Blvd	<i>At-Grade</i>	24,150	--	--
	Norwalk Blvd	<i>At-Grade</i>	24,150	--	--
	Lambert Rd	<i>At-Grade</i>	24,150	--	--
	Total Energy Demand (kWh)			770,938	342,716
Total Energy Demand (billionBTU)			2.63	1.17	1.58

Note: Elevators/Escalators are assumed for Aerial and Underground stations only.

Operational Greenhouse Gas (GHG) Emissions			Alternative 1 - Washington			Alternative 2 - Atlantic to Citadel IOS			Alternative 3 - Atlantic to Greenwood IOS		
			CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O
Alignment Length			9.5 miles			2.5 miles			4.5 miles		
Train Control (metric tons per year)			79.2	0.007	0.0008	20.8	0.002	0.0002	37.5	0.003	0.0004
Station Lighting & Elevators/Escalators (metric tons per year)	Atlantic Blvd	<i>Underground</i>	13.3	0.001	0.0001	13.3	0.001	0.0001	13.3	0.001	0.0001
	Whittier Blvd	<i>Underground</i>	13.3	0.001	0.0001	13.3	0.001	0.0001	13.3	0.001	0.0001
	Commerce/Citadel	<i>Underground</i>	13.3	0.001	0.0001	13.3	0.001	0.0001	13.3	0.001	0.0001
	Greenwood Ave	<i>Aerial</i>	4.7	< 0.001	< 0.0001	--	--	--	4.7	< 0.001	< 0.0001
	Rosemead Blvd	<i>At-Grade</i>	4.3	< 0.001	< 0.0001	--	--	--	--	--	--
	Norwalk Blvd	<i>At-Grade</i>	4.3	< 0.001	< 0.0001	--	--	--	--	--	--
	Lambert Rd	<i>At-Grade</i>	4.3	< 0.001	< 0.0001	--	--	--	--	--	--
Total CO ₂ Emissions (metric tons per year)			137	0.012	0.0014	61	0.005	0.0006	82	0.007	0.0008
Global Warming Potential 1			25	298		25	298		25	298	
Total CO ₂ e Emissions (metric tons per year)			137			61			83		
Total CO ₂ e Emissions (metric tons per year)			45			20			27		
(Adjusted for 84% clean energy)											

Southern California Edison Energy Intensity (CalEEMod)

CO ₂ Intensity (lb/MW/hr)	390.98
CH ₄ Intensity (lb/MW/hr)	0.033
N ₂ O Intensity (lb/MW/hr)	0.004

Global Warming Potentials

From Intergovernmental Panel on Climate Change (IPCC) fourth assessment report (AR4).
Use of AR4 consistent with USEPA (<https://www.epa.gov/ghgemissions/understanding-global-warming-potentials>) and CARB (<https://ww2.arb.ca.gov/ghg-gwps>) recommendations for consistency with existing inventories.

Infrastructure	Criteria Emissions/Energy Consumptions	Reference
Parking Lot Lighting	140 kWh/space-yr	CalEEMod
Average Time Parked	10 hours/space-day	Professional Judgement

Operational Energy Demand			Alternative 1 - Washington	Alternative 2 - Atlantic to Citadel IOS	Alternative 3 - Atlantic to Greenwood IOS
Parking Lighting (kWh/year)	Atlantic Blvd	<i>no new spaces</i>	--	--	--
	Whittier Blvd	<i>no new spaces</i>	--	--	--
	Commerce/Citadel	<i>no new spaces</i>	--	--	--
	Greenwood Ave	<i>270 - 370 new spaces</i>	51,800	--	51,800
	Rosemead Blvd	<i>300 - 410 new spaces</i>	57,400	--	--
	Norwalk Blvd	<i>380 - 390 new spaces</i>	54,600	--	--
	Lambert Rd	<i>470 - 650 new spaces</i>	91,000	--	--
	Total Energy Demand (kWh)			254,800	0
Total Energy Demand (billionBTU)			0.87	0.00	0.18

Operational Greenhouse Gas (GHG) Emissions			Alternative 1 - Washington			Alternative 2 - Atlantic to Citadel IOS			Alternative 3 - Atlantic to Greenwood IOS		
			CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O
Parking Lighting (metric tons per year)	Atlantic Blvd	<i>no new spaces</i>	--	--	--	--	--	--	--	--	--
	Whittier Blvd	<i>no new spaces</i>	--	--	--	--	--	--	--	--	--
	Commerce/Citadel	<i>no new spaces</i>	--	--	--	--	--	--	--	--	--
	Greenwood Ave	<i>270 - 370 new spaces</i>	9.2	0.001	0.0001	--	--	--	9.2	0.001	0.0001
	Rosemead Blvd	<i>300 - 410 new spaces</i>	10.2	0.001	0.0001	--	--	--	--	--	--
	Norwalk Blvd	<i>380 - 390 new spaces</i>	9.7	0.001	0.0001	--	--	--	--	--	--
	Lambert Rd	<i>470 - 650 new spaces</i>	16.1	0.001	0.0002	--	--	--	--	--	--
	Total CO ₂ Emissions (metric tons per year)			45	0.004	0.0005	--	--	--	9	0.001
Global Warming Potential 1			25	298		1	25	298	1	25	298
Total CO ₂ e Emissions (metric tons per year)			45			--			9		
Total CO ₂ e Emissions (metric tons per year) (Adjusted for 84% clean energy)			15			--			3		

Southern California Edison Energy Intensity (CalEEMod)

CO2 Intensity (lb/MWhr)	390.98
CH4 Intensity (lb/MWhr)	0.033
N2O Intensity (lb/MWhr)	0.004

Global Warming Potentials
From Intergovernmental Panel on Climate Change (IPCC) fourth assessment report (AR4).
Use of AR4 consistent with USEPA (<https://www.epa.gov/ghgemissions/understanding-global-warming-potentials>) and CARB (<https://ww2.arb.ca.gov/ghg-gwps>) recommendations for consistency with existing inventories.

Infrastructure	Criteria Emissions/Energy Consumptions	Reference
MSF bldg Electrical Demand	3.83 kWh/sqft-yr	CalEEMod
MSF bldg Natural Gas Demand	0.86 kBTU/sqft-yr	CalEEMod
Commerce MSF Yard	868,444 sqft	NOTE. YARD ENERGY DEMAND ASSUMED ONE QUARTER THAT OF TYPICAL PARKING LOT
Montebello MSF Yard	1,129,805 sqft	(PROFESSIONAL JUDGEMENT - SOME, BUT NOT EXTENSIVE YARD LIGHTING ASSUMED)
Both MSF Bldg Footprint	177,000 sqft	ESP2_3.6.3.PLN.Final_Washington_LRT_Alignment_ACE%2010282021.pdf (T-MSF-328)

Operational Energy Demand	Alternative 1 - Washington	Alternative 2 - Atlantic to Citadel IOS	Alternative 3 - Atlantic to Greenwood IOS
Commerce MSF Option	753,899	753,899	753,899
Energy Demand			
Stationary - Electricity (kWh per year)			
Stationary - Natural Gas (kBTU per year)	152,220	152,220	152,220
Total Stationary (billionBTU per year)	2.72	2.72	2.72
Montebello MSF Option	776,768	--	776,768
Energy Demand			
Stationary - Electricity (kWh per year)			
Stationary - Natural Gas (kBTU per year)	152,220	--	152,220
Total Stationary (billionBTU per year)	2.80	--	2.80
Maximum Energy Demand (billionBTU)	2.80	2.72	2.80

Global Warming Potentials

From Intergovernmental Panel on Climate Change (IPCC) fourth assessment report (AR4).

Use of AR4 consistent with USEPA (<https://www.epa.gov/ghgemissions/understanding-global-warming-potentials>) and CARB (<https://ww2.arb.ca.gov/ghg-gwps>) recommendations for consistency with existing inventories.

Operational Greenhouse Gas (GHG) Emissions -	Alternative 1 - Washington			Alternative 2 - Atlantic to Citadel IOS			Alternative 3 - Atlantic to Greenwood IOS		
	CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O
Commerce MSF Electrical GHG Emissions	134	0.011	0.0014	134	0.011	0.0014	134	0.011	0.0014
Commerce MSF Natural Gas GHG Emissions	8	< 0.001	0.0002	8	< 0.001	0.0002	8	< 0.001	0.0002
Commerce MSF Water Use GHG Emissions	108	1.342	0.0325	108	1.342	0.0325	108	1.342	0.0325
Maximum GHG Emissions	249	1.353	0.0340	249	1.353	0.0340	249	1.353	0.0340
Global Warming Potential 1	25	298	298	1	25	298	1	25	298
Total CO₂e Emissions (metric tons per year)	293			293			293		
Total CO₂e Emissions (metric tons per year)	203			203			203		

Operational Greenhouse Gas (GHG) Emissions -	Alternative 1 - Washington			Alternative 2 - Atlantic to Citadel IOS			Alternative 3 - Atlantic to Greenwood IOS		
	CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O
Montebello MSF Electrical GHG Emissions	138	0.012	0.0014	--	--	--	138	0.012	0.0014
Montebello MSF Natural Gas GHG Emissions	8	< 0.001	0.0002	--	--	--	8	< 0.001	0.0002
Montebello MSF Water Use GHG Emissions	108	1.342	0.0325	--	--	--	108	1.342	0.0325
Maximum GHG Emissions	253	1.353	0.0341	0	< 0.001	< 0.0001	253	1.353	0.0341
Global Warming Potential 1	25	298	298	1	25	298	1	25	298
Total CO₂e Emissions (metric tons per year)	297			--			297		
Total CO₂e Emissions (metric tons per year)	204			--			204		

	2017 Existing Conditions	2042 No Build	Alt1 2042 Washington to Lambert	Alt2 2042 Washington to Commerce IOS	Alt3 2042 Washington to Rosemead IOS
Regional					
Vehicle Miles Traveled (VMT)	475,761,000	584,046,000	584,036,000	584,041,000	584,038,000
Vehicle Hours Traveled (VHT)	14,414,000	19,474,000	19,472,000	19,473,000	19,473,000
Average Vehicle Speed (mph)	33	30	30	30	30
AM Peak Vehicle Trips	8,298,500	9,821,900	9,820,429	9,821,010	9,820,614
PM Peak Vehicle Trips	11,113,200	13,109,253	13,107,629	13,108,241	13,107,833
Project Area					
VMT	12,070,000	13,231,000	13,221,000	13,226,000	13,223,000
VHT	410,000	483,000	481,000	482,000	482,000
Average Vehicle Speed (mph)	29	27	27	27	27
AM Peak VMT	2,612,000	2,846,000	2,846,215	2,846,000	2,846,000
AM Peak VHT	115,000	138,000	138,000	138,000	138,000
AM Peak Average Speed (mph)	23	21	21	21	21
AM Peak Vehicle Trips	278,100	295,400	294,200	295,100	294,800
PM Peak VMT	3,255,000	3,545,000	3,541,000	3,541,400	3,539,200
PM Peak VHT	130,000	154,000	154,000	154,000	154,000
PM Peak Average Speed (mph)	25	23	23	23	23
PM Peak Vehicle Trips	367,100	388,300	386,900	387,900	387,600

318 day annualization

Alt1 - NoBuild Alt2 - NoBuild Alt3 - NoBuild

Annual VMT Reductions

-3,180,000 -1,590,000 -2,544,000

Station, Aerial Lighting & Elevators/Escalators - Los Angeles-South Coast County, Annual

Station, Aerial Lighting & Elevators/Escalators
Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unenclosed Parking with Elevator	13.80	1000sqft	0.32	13,800.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	33
Climate Zone	9			Operational Year	2026
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	CH4 Intensity (lb/MWhr)	0.033	N2O Intensity (lb/MWhr)	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - OPERATIONS ONLY

Land Use - Station assumed to be 300 feet long with two, 23-foot wide platforms

2.0 Emissions Summary

2.2 Overall Operational

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Energy	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	4.7479	4.7479	4.0000e-004	5.0000e-005	4.7724

5.0 Energy Detail

Historical Energy Use: N

5.2 Energy by Land Use - NaturalGas

Land Use	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
	kBTU/yr	tons/yr										MT/yr					
Unenclosed Parking with Elevator	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		0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.3 Energy by Land Use - Electricity

Land Use	Electricity Use	Total CO2	CH4	N2O	CO2e
	kWh/yr	MT/yr			
Unenclosed Parking with Elevator	26772	4.7479	4.0000e-004	5.0000e-005	4.7724
Total		4.7479	4.0000e-004	5.0000e-005	4.7724

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Station, At-Grade Lighting & Elevators/Escalators - Los Angeles-South Coast County, Annual

Station, At-Grade Lighting & Elevators/Escalators
Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unenclosed Parking Structure	13.80	1000sqft	0.32	13,800.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	33
Climate Zone	9			Operational Year	2026
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	CH4 Intensity (lb/MWhr)	0.033	N2O Intensity (lb/MWhr)	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - OPERATIONS ONLY

Land Use - Station assumed to be 300 feet long with two, 23-foot wide platforms

2.0 Emissions Summary

2.2 Overall Operational

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Energy	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	4.2829	4.2829	3.6000e-004	4.0000e-005	4.3050

5.0 Energy Detail

Historical Energy Use: N

5.2 Energy by Land Use - NaturalGas

Land Use	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
	kBTU/yr	tons/yr										MT/yr					
Unenclosed Parking Structure	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		0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.3 Energy by Land Use - Electricity

Land Use	Electricity Use	Total CO2	CH4	N2O	CO2e
	kWh/yr	MT/yr			
Unenclosed Parking Structure	24150	4.2829	3.6000e-004	4.0000e-005	4.3050
Total		4.2829	3.6000e-004	4.0000e-005	4.3050

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Station, Underground Lighting & Elevators/Escalators - Los Angeles-South Coast County, Annual

Station, Underground Lighting & Elevators/Escalators
Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Enclosed Parking with Elevator	13.80	1000sqft	0.32	13,800.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	33
Climate Zone	9			Operational Year	2026
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	CH4 Intensity (lb/MWhr)	0.033	N2O Intensity (lb/MWhr)	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - OPERATIONS ONLY

Land Use - Station assumed to be 300 feet long with two, 23-foot wide platforms

2.0 Emissions Summary

2.2 Overall Operational

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Energy	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	13.3137	13.3137	1.1200e-003	1.4000e-004	13.3824

5.0 Energy Detail

Historical Energy Use: N

5.2 Energy by Land Use - NaturalGas

Land Use	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
	kBTU/yr	tons/yr										MT/yr					
Enclosed Parking with Elevator	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		0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.3 Energy by Land Use - Electricity

Land Use	Electricity Use	Total CO2	CH4	N2O	CO2e
	kWh/yr	MT/yr			
Enclosed Parking with Elevator	75072	13.3137	1.1200e-003	1.4000e-004	13.3824
Total		13.3137	1.1200e-003	1.4000e-004	13.3824

Parking Lot - Los Angeles-South Coast County, Annual

Parking Lot
Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	500.00	Space	4.50	200,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	33
Climate Zone	9			Operational Year	2024
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	CH4 Intensity (lb/MWhr)	0.033	N2O Intensity (lb/MWhr)	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - OPERATIONS ONLY

2.0 Emissions Summary

2.2 Overall Operational

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
tons/yr											MT/yr					
Area	0.0163	6.0000e-005	6.3700e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0124	0.0124	3.0000e-005	0.0000	0.0132
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	12.4142	12.4142	1.0500e-003	1.3000e-004	12.4782
Total	0.0163	6.0000e-005	6.3700e-003	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	2.0000e-005	2.0000e-005	0.0000	12.4266	12.4266	1.0800e-003	1.3000e-004	12.4915

5.0 Energy Detail

Historical Energy Use: N

5.2 Energy by Land Use - NaturalGas

Land Use	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
kBTU/yr											tons/yr						
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		0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.3 Energy by Land Use - Electricity

Land Use	Electricity Use	Total CO2	CH4	N2O	CO2e
kWh/yr	MT/yr				
Parking Lot	70000	12.4142	1.0500e-003	1.3000e-004	12.4782
Total		12.4142	1.0500e-003	1.3000e-004	12.4782

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Date: 7/13/2021 12:44 PM

Parking Lot - Los Angeles-South Coast County, Annual

6.0 Area Detail

6.2 Area by SubCategory

	ROC	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	2.7800e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0129					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	5.9000e-004	6.0000e-005	6.3700e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0124	0.0124	3.0000e-005	0.0000	0.0132	
Total	0.0163	6.0000e-005	6.3700e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0124	0.0124	3.0000e-005	0.0000	0.0132	

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MSF - facility only - Los Angeles-South Coast County, Annual

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Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-Rail	177.00	1000sqft	4.06	177,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	33
Climate Zone	9			Operational Year	2026
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	CH4 Intensity (lb/MWhr)	0.033	N2O Intensity (lb/MWhr)	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CONSTRUCTION & OPERATION

Land Use - land-use info based on ACE site drawings

2.0 Emissions Summary

2.2 Overall Operational

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
tons/yr											MT/yr					
Area	0.7218	2.2000e-005	2.2500e-003	0.0000		1.0000e-005	1.0000e-005	1.0000e-005	1.0000e-005	1.0000e-005	0.0000	4.3900e-003	4.3900e-003	1.0000e-005	0.0000	4.6800e-003
Energy	8.20E-04	7.4600e-003	6.2700e-003	4.0000e-005		5.7000e-004	5.7000e-004	5.7000e-004	5.7000e-004	5.7000e-004	0.0000	128.3474	128.3474	0.0103	1.3800e-003	129.0159
Mobile	0.1772	0.2057	1.9147	4.3900e-003	0.4960	3.1300e-003	0.4991	0.1323	2.9100e-003	0.1352	0.0000	406.0855	406.0855	0.0267	0.0169	411.8011
Waste					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	13.7736	0.0000	13.7736	1.9860	0.0000	15.6728
Water						0.0000	0.0000	0.0000	0.0000	0.0000	12.9856	94.5191	107.5047	1.3417	0.0325	150.7208
Total	7.23E-01	7.4600e-003	6.2700e-003	4.0000e-005	0	0.00057	0.00057	0	0.00057	0.00057	12.9856	222.8665	235.8521	1.352	0.03388	279.7367

Notes:

- MSF operations would not require landscaping;
- Vehicle trips are already accounted for in regional traffic modeling;
- Warehouse waste generation parameters are inappropriate for MSF, actual waste generation would be immaterial;
- Warehouse water demand likely excessive for MSF, but included nonetheless

5.0 Energy Detail

Historical Energy Use: N

5.2 Energy by Land Use - NaturalGas

Land Use	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
kBTU/yr		tons/yr											MT/yr				
Unrefrigerated Warehouse-Rail	152220	8.2000e-004	7.4600e-003	6.2700e-003	4.0000e-005		5.7000e-004	5.7000e-004		5.7000e-004	5.7000e-004	0.0000	8.1230	8.1230	1.6000e-004	1.5000e-004	8.1713
Total		8.2000e-004	7.4600e-003	6.2700e-003	4.0000e-005		5.7000e-004	5.7000e-004		5.7000e-004	5.7000e-004	0.0000	8.1230	8.1230	1.6000e-004	1.5000e-004	8.1713

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5.3 Energy by Land Use - Electricity

Land Use	Electricity Use kWh/yr	Total CO2	CH4	N2O	CO2e
		MT/yr			
Unrefrigerated Warehouse-Rail	677910	120.2243	0.0102	1.2300e-003	120.8445
Total		120.2243	0.0102	1.2300e-003	120.8445

6.0 Area Detail

6.2 Area by SubCategory

SubCategory	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e	
tons/yr											MT/yr						
Architectural Coating	0.0820					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.6396					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.1000e-004	2.0000e-005	2.2500e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	4.3900e-003	4.3900e-003	1.0000e-005	0.0000	4.6800e-003	
Total	0.7218	2.0000e-005	2.2500e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	4.3900e-003	4.3900e-003	1.0000e-005	0.0000	4.6800e-003	

7.0 Water Detail

7.2 Water by Land Use

Land Use	Indoor/Outdoor Use Mgal	Total CO2	CH4	N2O	CO2e
		MT/yr			
Unrefrigerated Warehouse-Rail	40.9312 / 0	107.5047	1.3417	0.0325	150.7208
Total		107.5047	1.3417	0.0325	150.7208