3.5 GREENHOUSE GAS EMISSIONS

This section of the Draft EIR provides an analysis of the potential impacts on greenhouse gas (GHG) emissions.

3.5-1 Regulatory Framework

Federal, state, regional and local regulations concerning GHG emissions are described in the following section.

3.5-1.1 Federal Regulations

Federal Clean Air Act

The Clean Air Act is the law that defines the United States Environmental Protection Agency (USEPA) responsibilities for protecting and improving the nation's air quality and the stratospheric ozone layer. In Massachusetts v. Environmental Protection Agency, 127 S.Ct. 1438 (2007), the Supreme Court found that carbon dioxide (CO_2) and other GHGs are pollutants under the Federal Clean Air Act, which the USEPA must regulate if it determines they pose an endangerment to public health or welfare. On December 7, 2009, the USEPA made two distinct findings: 1) that the current and projected concentrations of the six key GHGs [CO_2, methane (CH4), nitrous oxide (N2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride] in the atmosphere threaten the public health and welfare of current and future generations; and 2) that the combined emissions of these GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution which threatens public health and welfare.

Although these findings did not themselves impose any requirements, this action was a prerequisite to finalizing the USEPA's GHG emission standards for light-duty vehicles. In December 2021, the USEPA adopted revised national GHG emission standards for passenger cars and light trucks for Model Years 2023–2026.

Executive Order (EO) 14037, issued by President Biden on August 5, 2021, directs the USEPA and the National Highway Traffic Safety Administration (NHTSA) to develop standards for fuel economy and GHG emissions for medium- and heavy-duty vehicles by December 2022.

United States Department of Transportation Climate Action Plan

First published in 2012 and subsequently updated in 2014 and 2021, the latest iteration of the United States Department of Transportation (USDOT) Climate Action Plan (CAP) (2021) focuses on climate adaptation and resilience across agency programs and the management of Federal procurement, real property, public lands and water, and financial programs. The USDOT 2012 CAP focused on forecasted impacts of climate change on USDOT's facilities and critical mission activities (i.e., safety, state of good repair, and federally owned building environmental sustainability), and the 2014 CAP provided an update on USDOT climate adaptation accomplishments to date and outlined commitments in FY2013 and FY2014. The 2021 CAP contains the following actions and goals to address the resilience of the nation's transportation infrastructure to future effects of climate change and is presented in Table 3.5-1.

Table 3.5-1. United States Department of Transportation - Climate Action Plan 2021 Actions and Goals

Priority Action	Action Goal
Incorporate Resilience into USDOT Grant and Loan Programs	Ensure that projects supported by USDOT discretionary grant and loan programs incorporate effective climate change resiliency protective features, where possible.
Enhance Resilience Throughout Project Planning and Development	Ensure federally funded transportation projects are planned, designed, and constructed to be resilient to future climate change impacts.
Ensure Resiliency of USDOT Facilities and Operational Assets	Ensure that USDOT facilities and operational assets are resilient to the effects of climate, implementing priority adaptation actions at mission critical assets across the nation.
Ensure Climate-Ready Services and Supplies	USDOT will provide education and facilitation to support and encourage program management acquisition of innovative, novel services and supplies to advance the Department's ability to adapt to climate change.
Improve Climate Education and Research on Resilience	Increase climate change education among internal USDOT employees and ensure continued research in development to help fill gaps in climate change knowledge and use of new technologies.

Source: USDOT, 2021

Federal Transit Administration Climate Change Adaptation Initiative

The Federal Transit Administration (FTA) has implemented a Climate Change Adaptation Initiative program to investigate potential strategies for reducing climate impacts on transit infrastructure and enhancing climate resilience. The program conducted seven climate adaptation pilot studies to increase knowledge of how transit agencies can adapt to climate change, advance the state of the practice in adapting transit assets and operations to the impacts of climate change, and build strategic partnerships between transit agencies and climate adaptation experts. The approach of the pilot projects involved identification of climate hazards and potential climatic events, characterization of risks on transit projects and operations, development of initial adaptation strategies, and linking strategies to organizational structures. Metro was selected as one of the pilot study transit systems and a report was prepared to analyze climate adaptation opportunities, entitled *LACMTA Climate Change Adaptation Pilot Project Report*.

Federal Highway Administration Carbon Reduction Program

Established by the passage of the 2021 Bipartisan Infrastructure Law, the Federal Highway Administration's (FHWA) Carbon Reduction Program (CRP) provides funds for projects designed to reduce transportation emissions, defined as CO_2 emissions from on-road highway sources. The CRP requires each state to develop a carbon reduction strategy no later than two years after enactment and update the strategy at least every four years. The state-level carbon reduction strategy shall support efforts—and identify projects and strategies—to support the reduction of transportation-related GHG emissions and quantify the total carbon emissions from production, transport, and use of materials used in the construction of transportation facilities in the state. Under the CRP, the FHWA is tasked with reviewing the states' process for developing its carbon reduction strategy and certify that the strategy meets statutory requirements.

3.5-1.2 State Actions

Assembly Bill 32 (AB), Senate Bill (SB) 32, and the Climate Change Scoping Plan

In 2006, the Legislature passed the California Global Warming Solutions Act of 2006, AB 32, which created a comprehensive, multi-year program to reduce GHG emissions in California. AB 32 required California Air Resources Board (CARB) to develop a scoping plan that describes the approach California will take to reduce GHGs to achieve the goal of reducing emissions to 1990 levels by 2020. The Climate Change Scoping Plan was first approved by the CARB in 2008, recertified in 2011, and provided a mix of recommended strategies to reduce GHG emissions through direct regulations, market-based approaches, voluntary measures, policies, and other emission reduction programs cumulatively designed to meet the 2020 statewide target.

The First Update to the Climate Change Scoping Plan was approved by CARB on May 22, 2014, and built upon the framework established in the initial iteration, and also presented considerations for achieving the state objective of reducing GHG emissions to 80% below 1990 levels by 2050, originally set forth by EO S-3-05 and also Governor Brown's EO B-16-12 (which is specific to the transportation sector).

In 2016, the Legislature passed SB 32, which codifies a 2030 GHG emissions reduction target of 40% below 1990 levels, as originally established in EO B-30-15. In response to the evolving legislation addressing statewide GHG emissions reductions, CARB published California's 2017 Climate Change Scoping Plan in November 2017 to incorporate the 2030 target. The 2017 Climate Change Scoping Plan approach is multi-faceted and includes elements such as doubling building efficiency; 50% renewable power; more clean, renewable fuels; cleaner zero or near-zero emission cars, trucks, and buses; multimodal communities with opportunities for active transportation and transit; cleaner freight and goods movement; capping emissions from transportation, industry, natural gas, and electricity; and investing in communities to reduce emissions.

In December 2022, CARB approved the 2022 Scoping Plan for Achieving Carbon Neutrality (CARB, 2022a). The 2022 Scoping Plan Update assesses progress toward the statutory 2030 target, while laying out a technologically feasible, cost-effective, and equity-focused path to achieving carbon neutrality no later than 2045. The Final 2022 Scoping Plan Update sets a target of reducing statewide GHG emissions by 85% by 2045 to achieve its ambitious goals. Additionally, CARB forecasts that effective implementation of the 2022 Scoping Plan will reduce statewide demand for petroleum by 94% and cut air pollution by 71%by the 2045 horizon year. The 2022 Scoping Plan includes a commitment to build no new fossil gas-fired power plants and increases support for mass transit.

Assembly Bill 1493

AB 1493 amended the Clean Car Standards (Chapter 200, Statutes of 2002), which required CARB to develop and adopt GHG emission standards for automobiles. These standards are also known as the "Pavley I", regulations and required reductions in GHG emissions in new passenger vehicles from 2009 through 2016. The Clean Car Standards required CARB to develop and adopt standards for vehicle manufacturers to reduce GHG emissions coming from passenger vehicles and light duty trucks at a "maximum feasible and cost-effective reduction" by January 1, 2005. Pavley I took effect for model years starting in 2009 to 2016; and Pavley II, which is now referred to as Low Emission Vehicle III GHG, covers 2017 to 2025. Fleet average emission standards would reach 22% reduction by 2012 and 30% by 2016.

In January 2012, CARB adopted the Advanced Clean Cars program to extend AB 1493 through model years 2017 to 2025. This program promotes all types of clean fuel technologies such as plug-in hybrids,

battery electric vehicles, compressed natural gas vehicles, and hydrogen powered vehicles while reducing smog and saving consumers' money in fuel costs. Fuel savings may rise to 25% by 2025.

Senate Bill 375

SB 375 was enacted in 2008 to reduce GHG emissions from automobiles and light trucks through integrated transportation, land use, housing, and environmental planning. SB 375 has three major components: 1) using the regional transportation planning process to achieve reductions in GHG emissions consistent with AB 32's goals; 2) offering CEQA incentives to encourage projects that are consistent with a regional plan that achieves GHG emission reductions; and 3) coordinating the regional housing needs allocation process with the regional transportation process while maintaining local authority over land use decisions. Under the law, Metropolitan Planning Organizations (MPOs) are tasked with incorporating Sustainable Communities Strategies (SCS) as an element in Regional Transportation Plans (RTP). The SCS documents are intended to:

- Identify the general location of uses, residential densities, and building intensities within the region;
- Identify areas within the region sufficient to house all the population of the region, including all economic segments of the population, over the course of the planning period of the RTP taking into account net migration into the region, population growth, household formation and employment growth;
- Identify areas within the region sufficient to house an eight-year projection of the regional housing need for the region;
- Identify a transportation network to service the transportation needs of the region;
- Gather and consider the best practically available scientific information regarding resource areas and farmland in the region;
- Consider the state housing goals;
- Set forth a forecasted development pattern for the region, which, when integrated with the transportation network, and other transportation measures and policies, will reduce the GHG emissions from automobiles and light trucks to achieve, if there is a feasible way to do so, the GHG emission reduction targets approved by the state board; and,
- Allow the RTP to comply with the Clean Air Act.

State Cap-and-Trade Program

This program creates a market-based system with an overall emissions limit for affected sectors, including electric utilities, large industrial facilities and distributors of transportation, natural gas, and other fuels. Landmark checkpoint targets of the state Cap-and-Trade Program include reducing GHG emissions to 1990 levels by 2020, and ultimately achieving an 80% reduction from 1990 levels by 2050. Under the Cap-and-Trade Program, an overall limit on GHG emissions from capped sectors are established and facilities subject to the cap will be able to trade permits (allowances) to emit GHGs.

California's Renewables Portfolio Standard (SBs 1078/107/X 1-2/100)

SB 1078 and 107, California's Renewables Portfolio Standard (RPS), obligated investor-owned energy service providers and Community Choice Aggregations to procure an additional one percent of retail sales per year from eligible renewable sources until 20% was reached (by 2010). The California Public

Utilities Commission and California Energy Commission are jointly responsible for implementing the program.

SB X 1-2, called the California Renewable Energy Resources Act, obligates all California electricity providers to obtain at least 33% of their energy from renewable resources by 2020.

The passage of SB 100—The 100% Clean Energy Act of 2018 (2018)—updated the state's RPS to ensure that by 2030 at least 60% of statewide electricity is renewably sourced, set a goal of powering all retail electricity sold in the state, and supporting state agency electricity needs with renewable and zero-carbon resources by 2045. SB 100 also requires annual Joint Agency Reports to be prepared to track progress on expanding the availability of renewable resources and to assess the potential of emerging technologies in aiding the State's efforts to reduce GHG emissions from the energy sector. The first Joint Agency Report was published in 2021 and determined that approximately 63% of California's electricity retail sales in 2019 came from non-fossil fuel sources thanks to a combination of renewables, hydroelectric, and nuclear generation.

California Green Building Standards Code (CALGreen)

In January 2010, the California Building Standards Commission adopted the statewide mandatory CALGreen, Part 11 of Title 24, California Code of Regulations. CALGreen applies to the planning, design, operation, construction, use, and occupancy of every newly constructed building or structure. CALGreen contains a separate set of requirements for residential and non-residential buildings. The Code was updated in 2016 to require additional energy savings, and will subsequently be updated every three years. The most recently adopted iteration of CALGreen was in 2022, which went into effect January 1, 2023.

Senate Bill 743

SB 743 encourages land use and transportation planning decisions and investments that reduce vehicle miles traveled that contribute to GHG emissions, as required by AB 32. SB 743 requires the State Office of Planning and Research (OPR) to develop revisions to the CEQA Guidelines, establishing criteria for determining the significance of transportation impacts of projects within transit priority areas that promote the reduction of GHG emissions, the development of multimodal transportation networks, and a diversity of land uses. It also allows OPR to develop alternative metrics outside of transit priority areas.

California Climate Change Executive Orders

The California Governor's Office has issued a series of EO's related to addressing impacts of climate change, beginning in 2004. The following table, Table 3.5-2, summarizes the most relevant State EO's to GHG emissions in the transportation sector and transit infrastructure.

Table 3.5-2. California Climate Change Executive Orders Summary

Executive Order	Date	Summary
S-03-05	June 2005	Established state GHG emission targets of 1990 levels by 2020 (the same as AB 32, enacted later and discussed above) and 80% below 1990 levels by 2050. It calls for the Secretary of California Environmental Protection Agency (Cal/EPA) to be responsible for the coordination of state agencies and progress reporting.
S-01-07	January 2007	Established a Low Carbon Fuel Standard and directed the Secretary of the Cal/EPA to develop and propose protocols for measuring the lifecycle carbon intensity of transportation fuels.
S-13-08	November 2008	Directed state agencies to complete analysis of the effects of sea level rise in California, prepared in the California Sea Level Rise Assessment Report through coordination with the National Academy of Sciences.
S-14-08	November 2008	Established renewable energy generation share target for retail sellers of electricity of 33% renewably sourced by 2020.
B-16-12	March 2012	Directed state agencies to encourage the commercialization of zero emission vehicles (ZEVs), set goal of one million ZEVs in use statewide by 2020.
B-30-15	April 2015	Established a mid-term goal for 2030 of reducing GHG emissions by 40% below 1990 levels and required CARB to update its current AB 32 Scoping Plan to identify the measures to meet the 2030 target.
B-55-18	September 2018	Established a goal to achieve statewide carbon neutrality by 2045.
N-19-19	September 2019	Called for actions from multiple state agencies—including the California State Transportation Agency (CalSTA)—to pursue strategic endeavors to reduce GHG emissions and mitigate impacts of climate change; empowered CalSTA to leverage discretionary state transportation funds to help meet the stat's climate goals.
N-79-20	September 2020	Established a target to make all vehicles in the state emission free: cars and passenger trucks by 2035, medium and heavy-duty trucks by 2045.

California State Transportation Agency Climate Action Plan for Transportation Infrastructure

In response to EO's N-19-19 and N-79-20, CalSTA published the Climate Action Plan for Transportation Infrastructure (CAPTI) in 2021 to outline strategies and actions that will advance more sustainable, equitable, and healthy modes of transportation—such as walking, biking, transit, and rail—as well as accelerate the transition to ZEV technologies. The CAPTI is a product of an Interagency Working Group comprised of staff from the California Department of Transportation, the California Transportation Commission, the Cal/EPA, CARB, and several other state agencies collaborating to organize the guiding principles of the CAPTI Investment Framework; aimed at reducing GHG emissions from the transportation sector and mitigating the effects of climate change. The CAPTI framework is built on the following guiding principles to achieve its goals within the transportation sector by 2050:

- Building toward an integrated, statewide rail and transit network.
- Investing in networks of safe and accessible infrastructure supporting active transportation.

- Including investments in light, medium, and heavy-duty ZEV infrastructure as part of larger transportation projects.
- Strengthening CalSTA's commitment to social and racial equity by reducing public health and economic harms and maximizing community benefits to disproportionately impacted disadvantaged communities.
- Promoting projects that do not significantly increase passenger vehicle travel.
- Promoting compact infill development while protecting residents and businesses from displacement, by funding transportation projects that support housing for low-income residents near job centers, provide walkable communities, and address affordability to reduce the housing-transportation cost burden and passenger vehicle trips.
- Developing a zero-emission freight transportation system that avoids and mitigates environmental justice impacts, reduces criteria and toxic air pollutants, improves freight's economic competitiveness and efficiency, and integrates multimodal design and planning into infrastructure development on freight corridors.

3.5-1.3 Regional Regulations

Southern California Association of Governments (SCAG)

SCAG is the MPO for the six-county region that includes Los Angeles, Orange, Riverside, Ventura, San Bernardino, and Imperial counties. Connect SoCal, the 2020-2045 RTP/SCS, includes a strong commitment to reduce emissions from transportation sources to comply with SB 375. SB 375 requires CARB to develop regional CO_2 emission reduction targets (exclusive of Pavley emissions that are counted separately), compared to 2005 emissions, for cars and light trucks for each MPO. The 2020–2045 RTP/SCS charts a course for closely integrating land use and transportation planning including in areas labeled as High Quality Transit Areas. High Quality Transit Areas reflect areas with rail transit service or bus service where lines have peak headways of less than 15 minutes. The 2020-2045 RTP/SCS was prepared through a collaborative, continuous, and comprehensive process by SCAG and it serves as an update to the 2016–2040 RTP/SCS. Major themes in the 2020–2045 RTP/SCS that are relevant to the Proposed Project include integrating strategies for land use and transportation, striving for sustainability, protecting and preserving the existing transportation infrastructure, increasing capacity through improved system management, and giving people more transportation choice.

South Coast Air Quality Management District (SCAQMD)

SCAQMD adopted a Policy on Global Warming and Stratospheric Ozone Depletion on April 6, 1990. The policy commits the SCAQMD to consider global impacts in rulemaking and in drafting revisions to the Air Quality Management Plan (AQMP). In March 1992, the SCAQMD Governing Board reaffirmed this policy and adopted amendments to the policy.

SCAQMD released a draft guidance regarding interim CEQA GHG significance thresholds. In its October 2008 document, the SCAQMD proposed the use of a percent emission reduction target (e.g., 30%) to determine significance for commercial/residential projects that emit greater than 3,000 metric ton (MT) per year. On December 5, 2008, the SCAQMD Governing Board adopted the staff proposal for an interim GHG significance threshold for stationary source/industrial projects where the SCAQMD is the lead agency. However, SCAQMD has not officially adopted a GHG significance threshold for land use development or transportation projects; a GHG CEQA Significance Threshold Working Group was

formed in 2008 to further evaluate potential GHG significance thresholds, but has not convened since 2010.

Metro

Since 2007, Metro has implemented a robust sustainability program. In June 2008, the Metro Board approved the first Metro Sustainability Implementation Plan, which defined how sustainability would be operationalized throughout Metro. In 2012, the Metro Board adopted the Metro Countywide Sustainability Planning Policy, which provided leadership for the implementation of a regional transit system that increased mobility, fostered walkable and livable communities, and minimized GHG emissions and environmental impacts.

In 2019, the Metro Board adopted a new Climate Action and Adaptation Plan (CAAP), which establishes the target of reducing systemwide GHG emissions—relative to 2017 levels—by 79% by 2030 and 100% by 2050. Metro's CAAP categorizes operational emissions sources into three sectors or scopes.

- Scope 1: Sources of direct GHG emissions from equipment and facilities owned and/or operated by Metro.
- Scope 2: Indirect GHG emissions from electricity purchases.
- Scope 3: Includes all other Metro activities from sources owned or controlled by another company or entity, including: business travel, embodied emission in material goods purchased and service contracted by Metro, emissions from landfilled solid waste, and emissions from Metro employee commute patterns.

The CAAP includes 13 mitigation measures to reduce GHG emissions, most of which are aimed at reducing Scope 1 and Scope 2 emissions. These include electrifying the vehicle fleet and implementing additional zero-emission vehicle technologies, increasing renewable energy sourcing and storage, and improving utility consumption efficiency and other facility enhancements.

Metro's Countywide Sustainability Planning Policy anticipated periodic updates. In 2020, rather than simply update the policy, the Metro Board adopted a new 10-year sustainability strategic plan, the Moving Beyond Sustainability Strategic Plan (MBSSP). The MBSSP updates and consolidates the principles established in Metro's prior sustainability planning documents, including Vision 2028, Long Range Transportation Plan, Equity Platform Framework, and the 2019 CAAP. The MBSSP includes objectives related to energy resource management, water quality and conservation, emissions and pollution control, materials and construction/operations, climate adaptation and resiliency, and equity in economic and workforce development. Specific quantitative targets related to GHG emissions include the 2019 CAAP goals of reducing total agency-wide emissions to 79% below the 2017 baseline level and displacing a total of 903,000 $MTCO_2e$ annually, through the expansion of zero-emissions transit modes, investment in renewable energy technologies, and prudent transit-oriented land use planning initiatives. In the absence of the Metro network, GHG emissions within Los Angeles County would have been approximately 3.7% higher in 2017.

Metro has also adopted a Green Construction Policy committing to less polluting construction equipment and vehicles and implementing best practices to reduce harmful diesel emissions on all Metro construction projects performed on Metro properties and Metro ROW. Best practices include Tier 4 emission standards for off-road diesel-powered- construction equipment greater than 50 horsepower and restricting idling to a maximum of five minutes. The Green Construction Policy was updated in 2018 to require that contractors use renewable diesel for all engines (Metro, 2020).

3.5-1.4 Local Climate Adaptation Planning

At the local level, the project alignments being analyzed would transect portions of the cities of Lawndale, Redondo Beach, and Torrance. All three of these cities are included within the South Bay Cities Council of Governments (SBCCOG), which developed a Sustainable South Bay Strategy (SBSS) (2009), to guide land use and transportation planning decisions within the South Bay Cities subregion. The Transportation Vision component of the SBSS identified several strategies toward advancing local GHG emissions reductions: encouraging the use of electric vehicles for local trips; evaluating opportunities to implement "complete" mixed-mode streets with Class 2 combination lanes for neighborhood electric vehicles and bicycles as well as dedicated bus lanes; community education about car-sharing services; and—most critically—the expansion of rapid transit services to the South Bay Cities. The SBSS did not establish any specific targets or objectives for the subregion and focused on more general concepts.

More recently, SBCCOG published the Sub-Regional CAP (2018) and the Sub-Regional Climate Adaptation Plan (2019) as part of its continued efforts towards reducing GHG emissions and managing land use and transportation decision-making in the context of mitigating the effects of climate change. The Sub-Regional CAP (2018) evaluated the effectiveness of SBSS strategies throughout the South Bay region using conceptual neighborhoods, involving the expansion of electric vehicle use and shared mobility, land use and parking orientation, and encouraging active transportation through implementation of complete streets and bike lanes in the 15 South Bay Cities. The Sub-Regional Climate Adaptation Plan included a vulnerability assessment and examined how future effects of climate change could affect water management, energy management, biodiversity, coastal resource management, transportation, and climate mitigation. Neither the Sub-Regional CAP nor the Sub-Regional Climate Adaptation Plan outline any specific goals or targets related to GHG emissions reductions.

City of Lawndale

The City of Lawndale General Plan (1996) contains goals, policies, and programs that focus on the reduction of GHG emissions described in the following section. The AQMP, a subsection of the Resource Management chapter of the General Plan, was developed to comply with the requirements of the AQMP for the South Coast Air Basin (SCAB), to support emissions reductions and coordinate local efforts that impact air quality both locally and in the region. More recently, the City of Lawndale adopted its own City of Lawndale CAP (2017), as part of an endeavor by the SBCCOG to develop CAPs for all 15 municipalities within the South Bay Cities region in collaboration with Metro, SCAG, and other planning agencies. The goals, policies, and programs contained within the AQMP and the City of Lawndale CAP that are relevant to GHG emissions from the transportation and transit sector are shown in Table 3.5-3.

Table 3.5-3. City of Lawndale – Relevant GHG Emissions Goals, Policies, and Programs

Goal/Policy/Program	Description
City of Lawndale Air Quality Management Plan	
Goal 1	The City shall promote good air quality and mobility in an environment of continued population growth, while providing for a healthy economic base. The City will work towards reducing vehicle miles traveled (VMT) through an improved job/housing balance and a more efficient urban land use plan.
Policy 1b	Attain growth management performance goals and/or VMT reduction consistent with the SCAG's Growth Management Plan.
Goal 2	Reduce reliance on single-occupant vehicles and reduce the number of non-work and commuting trips.
Goal 4	Increase energy efficiency through land use and transportation planning, the use of renewable resources and less-polluting fuel, and the implementation of conservation measures.
Policy 4d	Ensure that new facilities use appliances that comply with current South Coast Air Quality Management District emission standards.
Implementation Program 1 – Efficient Land Use	
Program 1.2	The City shall incorporate procedures to attain VMT reduction targets through jobs/housing balance at the subregional level.
Program 1.3	Implement a growth management plan to reduce vehicle miles travelled through jobs/housing balance and mixed development land uses. The City will implement the growth management plan to attain subregional performance goals (defined by SCAG) through development of the General Plan, adoption of measures and ordinances by January 1992, and through issuance of development permits.
City of Lawndale Climate Action Plan	
Goal LUT: A	Accelerate the market for electric vehicles by installing charging stations in city-owned parking lots, at on-street parking locations, and at city-owned facilities.
Goal LUT: B	Encourage ridesharing by facilitating private and public mobility services through the removal of barriers to private sector bike and car-sharing.
Goal LUT: C	Encourage transit usage through the implementation of a Bus Rapid Transit System and expand the sub-regional public transit network and enhance transit frequency through collaboration with SBCCOG and neighboring cities, as well as the prioritization of funding around transit stations to promote active transportation.
Measure LUT: F3	Increase transit accessibility through general plan updates, zoning code modifications, and ordinances.

Source: City of Lawndale, 1996; 2017

City of Redondo Beach

The City of Redondo Beach CAP (2017) and General Plan's Transportation and Circulation Element (Revised in 2021) are the documents designed to address GHG emissions control strategies within Redondo Beach. Goals designed to regulate GHG emissions that are most relevant to the Proposed Project are shown in Table 3.5-4.

Table 3.5-4. City of Redondo Beach – Relevant GHG Emissions Goals

Goal/Measure	Description
City of Redondo Beach Climate Action Plan	
Goal LUT: A	Accelerate the market for electric vehicles by installing charging stations in city-owned parking lots, at on-street parking locations, and at city-owned facilities.
Goal LUT: B	Encourage ridesharing by facilitating private and public mobility services through the removal of barriers to private sector bike and car-sharing.
Goal LUT: C	Encourage transit usage through the implementation of a Bus Rapid Transit System and expand the sub-regional public transit network and enhance transit frequency through collaboration with SBCCOG and neighboring cities.
Measure LUT: C2	Expand transit network through collaboration with Metro to expand bus or rail transit network, improve transit connectivity, improve transit amenities, and promoting active transportation.
Measure LUT: G3	Increase transit accessibility through general plan updates, zoning code modifications, and travel demand ordinance augmentation; Conduct a public transit gap study; Establish commuter shuttles linking business districts with transit.
City of Redondo Beach General Plan, Transportation and Circulation Element	
Goal G2	Reduce Year 2030 trip generation by 25% compared to 2007 levels.
Goal G4	Residents and visitors should be able to safely and conveniently walk, bike, or take transit in Redondo Beach as they prefer.
Goal G7	To comply with State legislation, Redondo Beach will implement plans and programs to reduce greenhouse gas emissions.
Goal G16	Pursue Transit Priorities by: extending Metro's C (Green) Line; creating multimodal transit hubs; enhancing transit wayfinding and signage at transit stops; providing transit information to Redondo Beach residents directly.

Source: City of Redondo Beach, 2017; 2021

City of Torrance

The City of Torrance General Plan (2010) contains objectives and policies that focus on the reduction of GHG emissions described in the following section. The City of Torrance General Plan Community Resources Element and the City of Torrance CAP (2017) are the two documents designed to regulate GHG emissions within Torrance. The CAP also references the Cool City Program and the United States Mayor's Climate Protection Agreement, which the City of Torrance has adopted. Objectives, policies, and programs designed to regulate GHG emissions are shown in Table 3.5-5.

Table 3.5-5. City of Torrance – Relevant GHG Emissions Objectives, Policies, and Programs

Objective/Policy	Description
City of Torrance General Plan, Community Resources Element	
Objective CR.13	To contribute to the improvement of local and regional ambient air quality to benefit the health of all.
Policy CR 13.2	Work with neighboring cities to implement local and regional projects that improve mobility on freeways and railways, reduce emissions, and improve air quality.
Policy CR 13.8	Promote energy-efficient building construction and operation practices that reduce emissions and improve air quality.
Objective CR. 14	To reduce the City's overall carbon footprint and counteract the effects of global warming through a reduction in the emissions of greenhouse gases within Torrance.
Policy CR 14.1	Support the California Air Resources Board in its ongoing plans to implement AB32, and fully follow any new AB32-related regulations.
Policy CR 14.2	Develop and implement greenhouse gas emissions reduction measures, including discrete, early-action greenhouse gas-reducing measures that are technologically feasible and cost-effective.
City of Torrance Climate Action Plan	
LUT: C1.3	Collaborate with neighboring cities/SBCCOG for a regional transit system.
LUT: C2.1	Work with Transit Agency to expand bus or rail transit network.
LUT: C2.2	Work with Transit Agency to improve transit connectivity
LUT: C2.4	Work with Transit Agency to improve transit amenities.
LUT: C2.5	Work with Transit Agency to better accommodate bicycles.
LUT: C2.6	Prioritize funding around transit to encourage walking and biking
LUT: C2.7	Implement first/last mile improvements at stations/destinations
LUT: C2.8	Introduce a fixed-route transit service in the jurisdiction.
LUT: D2.11	Construct or improve pedestrian infrastructure around transit.
Cool Cities Program	
The City of Torrance adopted the Sierra Club's Cool Cities Program in 2007, committing the City to reduce their carbon footprint. In doing so, the City Council adopted the US Mayor's Climate Protection Agreement, which is the first step in becoming a Cool City. The Mayor's Agreement focuses on local action to meet the goal of reducing carbon dioxide pollution to a level at least 7% below 1990 levels by 2012.	

Source: City of Torrance, 2010; 2017

3.5-2 Methodology

The term GHG refers to a group of chemical compounds that are generally believed to affect global climate conditions. The greenhouse effect is a concept in atmospheric science that describes the process by which certain atmospheric gases, referred to as GHGs, absorb energy from sunlight within the Earth's atmosphere and prevent it from being released back into space. This mechanism is responsible for maintaining a warm, habitable environment on the planet's surface based on the equilibrium concentrations of the gases. GHGs such as CO_2, CH_4 and N_2O keep the average surface temperature of the Earth close to 60 degrees Fahrenheit.

For each regulated GHG, a global warming potential (GWP) has been calculated to reflect the atmospheric residence time and how strongly it absorbs radiative infrared energy relative to CO_2 on a per-kilogram basis. GWP is a metric that indicates the relative climate forcing of a kilogram of emissions when averaged over the period of interest. The 20- and 100-year horizons are used for the GWPs in Table 3.5-6. To account for this higher potential, emissions of other GHGs are frequently expressed in the equivalent mass of CO_2, denoted as CO_2e. The GHG emissions inventory in California and GHG emissions analyses for CEQA purposes utilize GWP values developed in the International Panel on Climate Change Fourth Assessment Report.

Table 3.5-6. Global Warming Potential for Selected Greenhouse Gases

Pollutant	Lifetime (Years)	AR4 Global Warming Potential (20-Year)	AR4 Global Warming Potential (100-Year)
Carbon Dioxide (CO_2)	variable	1	1
Nitrous Oxide (N_2O)	114	289	298
Methane (CH_4)	12	72	25

Source: Intergovernmental Panel on Climate Change, 2007

Longterm and irrevocable shifts in weather—including changes in temperature, precipitation, and seasonal patterns—are referred to as climate change. According to the Intergovernmental Panel on Climate Change, anticipated effects of climate change caused by GHG emissions include sea-level rise, climate related hazards, extinction of species, species migration, reduced food production, exacerbated health problems, slower economic growth, and displacement of people. Possible effects of climate change along the California Coast include:

- Sea-level rise that threatens coastal wetlands, infrastructure, and property;
- Increased storm activity, together with sea-level rise, could increase beach erosion and cliff undercutting;
- Warmer temperatures and more frequent storms due to El Niño that bring more rain instead of snow to the Sierra Nevada Mountains, reducing supply of water for summer needs; and
- Decreased summer runoff and warming ocean temperatures that affect salinity, water circulation, and nutrients in the Pacific Ocean, possibly leading to complex changes in marine life.

Implementation of the Proposed Project or its Options would affect the regional GHG emissions inventory temporarily during construction activities and continually during future operation following completion of the light rail transit line. Emissions were estimated separately for the temporary construction activities and the long-term operational conditions associated with the Proposed Project. The GHG emissions assessment addressed both direct and indirect sources that would be involved in construction and operation of the Proposed Project. A combination of air quality modeling tools was utilized to characterize emissions from construction of the Proposed Project and Options, as well as

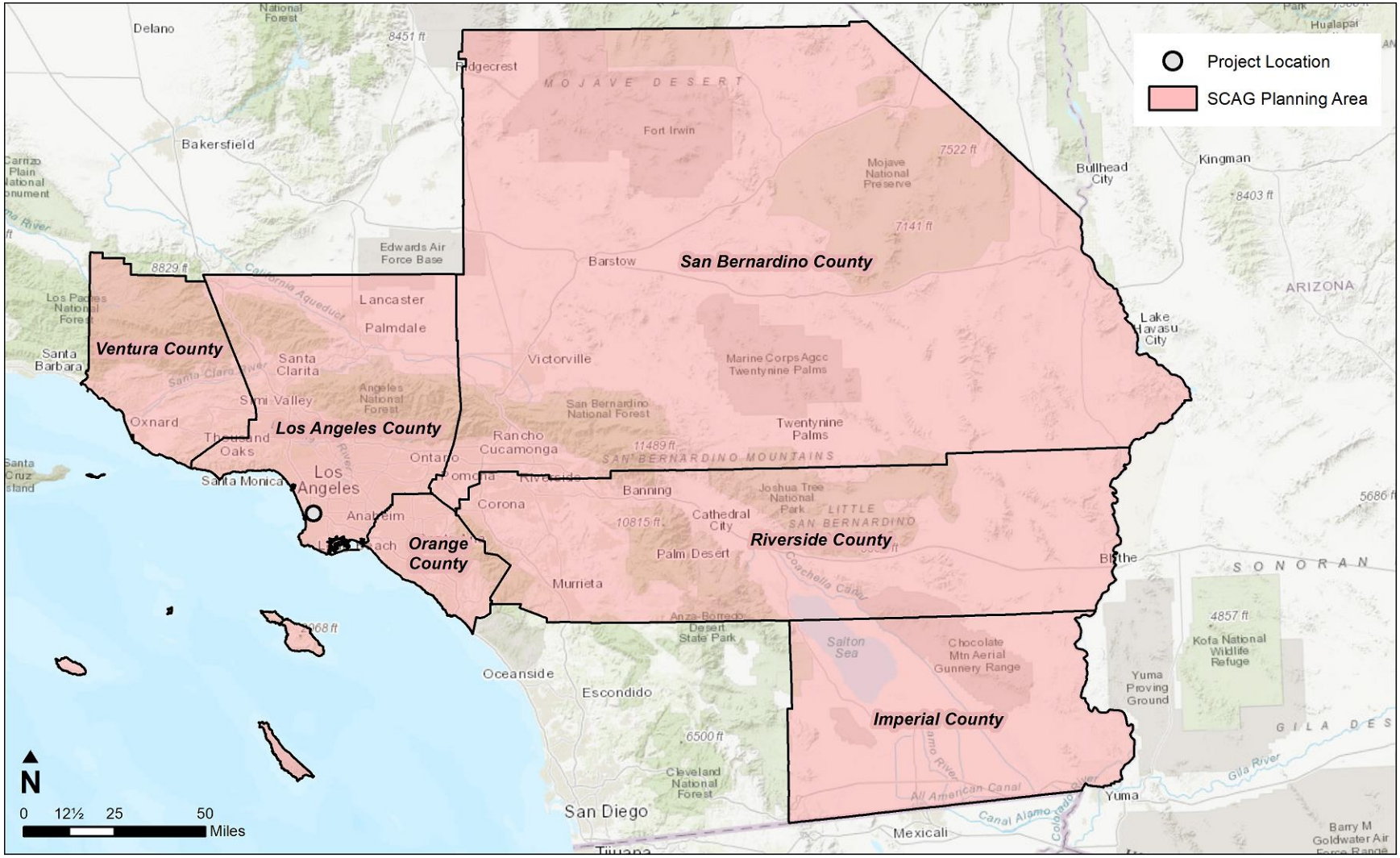
future operations with and without implementation of the Proposed Project. GHG emissions are assessed on annual timescales.

The methodology considered guidance published by the American Public Transportation Association (APTA) in a report titled, R*ecommended Practice for Quantifying Greenhouse Gas Emissions from Transit* (Revised 2018). The report provides guidance and recommendations to transit agencies for quantifying GHG emissions, including both emissions generated by transit and the potential reduction of emissions through displaced vehicle travel. It lays out a standard methodology for transit agencies to report their GHG emissions in a transparent, consistent, and cost-effective manner. The document was designed to ensure that agencies can provide an accurate public record of emissions, was intended to help agencies comply with future state and federal legal requirements, and potentially gain credit for their early actions to reduce emissions. Guidance from the report was adapted to suit the analysis of the Proposed Project and Options using the emissions quantification tools developed by the CARB and the SCAQMD.

3.5-2.1 Resource Study Area

The RSA for the analysis of potential environmental impacts related to GHG emissions is the six-county geographic region under the SCAG jurisdiction, as depicted on Figure 3.5-1, which include Los Angeles, Imperial, Orange, Riverside, San Bernardino, and Ventura Counties. The CARB sets SB 375 GHG emissions reduction targets at the MPO level for the SCAG region that are addressed through the preparation of the SCS portion of the RTP/SCS documentation. Thus, the effects of the Proposed Project and Options on regional GHG emissions are evaluated primarily at the MPO level.

Figure 3.5-1. Resource Study Area



Source: TAHA, 2022

3.5-2.2 Construction GHG Emissions

Construction activities for the Proposed Project and Options will generally involve structure demolition and clearing of the Metro-owned railroad right-of-way (Metro ROW), utility relocations, grading and embankments earthwork, trenching and retaining wall installation, bridges and elevated structure construction, stations construction, trackwork installation, and systems construction and testing. Construction will also require the relocation of existing freight tracks along segments of the corridor and new at-grade light rail crossings.

During each phase of construction, GHG emissions would be temporarily generated through off-road construction equipment exhaust and on-road vehicle exhaust associated with heavy-duty haul trucks, material delivery trucks, and construction crew vehicles. GHG emissions for off-road equipment were quantified using emission factors from CARB's OFFROAD2017-ORION emissions inventory, and GHG emissions for on-road vehicle activities were quantified using emission factors from the CARB EMission FACtor (EMFAC) mobile source emissions inventory model. Consistent with SCAQMD methodology guidance, construction activity GHG emissions are amortized over a 30-year operational lifetime.

Proposed Project Construction

Table 3.5-7 summarizes the Proposed Project construction schedule, including the amount of material hauling that would occur during each phase in cubic yards (CY) and the daily construction crew size. Metro plans for contractors to use trucks with trailers (30-CY capacity total) to minimize heavy-duty truck trips involved in material hauling. Comprehensive off-road equipment lists were developed by Metro for each phase to estimate total GHG emissions that would be generated by Proposed Project construction. Construction would be anticipated to take approximately five.

Table 3.5-7. **Proposed Project Construction Schedule**

Construction Phase	Approx. Duration (Months)	Estimated Daily Crew (Vehicles)	Material Hauling (Cubic Yards)
Early Utility Relocation	18	40	12,400
Project Start-Up	6	40	121,000
Final Utility Relocations	15	40	3,100
Freight Track Bridges	10	25	1,000
Freight Retaining Walls	12	40	112,100
LRT Retaining Walls	8	40	72,400
Freight At-Grade Crossings	4	25	4,200
LRT Guideway Bridges	26	25	66,500
Freight Trackwork (BNSF)	4	40	72,400
Stations and Access	18	40	11,000
LRT Trackwork	15	40	80,000
Systems Construction	12	20	-
Testing/Commissioning	9	15	-

Source: STV, 2022

Trench Option Construction

Trench Option construction will require additional activities and last longer than the Proposed Project—as summarized below in Table 3.5-8—with completion expected approximately seven years. The Trench

Option terminates at 190th Steet and would be congruent with the Proposed Project from 190th Street to the future Torrance Transit Center (TC) Station (approximately 1.7 miles).

Table 3.5-8. Trench Option Construction Schedule

Construction Phase	Approx. Duration (Months)	Estimated Daily Crew (Vehicles)	Material Hauling (Cubic Yards)
Early Utility Relocation	18	40	13,600
Project Start-Up	6	40	49,800
Final Utility Relocations	15	40	3,400
Freight Track Bridges	8	40	14,000
Freight Retaining Walls	18	40	105,500
LRT Retaining Walls	8	40	155,800
LRT Guideway Bridges	32	30	22,900
Freight At-Grade Crossings	4	40	4,200
LRT Guideway Trench	36	60	277,700
Freight Trackwork (BNSF)	25	40	71,100
Stations and Access	20	40	15,100
LRT Trackwork	15	20	80,000
Systems Construction	12	20	-
Testing/Commissioning	9	15	-

Source: STV, 2022

Relative to the Proposed Project, construction of the Trench Option would not involve the two at-grade light rail crossings for the light rail transit alignment, but would require additional trenching activities and material export to accommodate the subterranean segment of the light rail transit corridor, as well as additional fill import for embankments at locations of grade separation. Additionally, the overall duration of Trench Option construction is expected to be approximately two years longer than the Proposed Project. Metro plans for contractors to use trucks with 30-CY capacity to minimize heavy-duty truck trips involved in material hauling. Comprehensive off-road equipment lists were developed by Metro for each construction phase and used to produce estimates of total GHG emissions that would be generated by construction of the Trench Option.

Hawthorne Option Construction

Construction of the Hawthorne Option is anticipated to completed in approximately five years. The southern portion of the Hawthorne Option alignment would be congruent with the Proposed Project from 190th Street to the future Torrance TC Station (approximately 1.7 miles). Table 3.5-9 summarizes the Hawthorne Option construction schedule, including the amount of material hauling that would occur during each phase in CY and the daily construction crew size.

Table 3.5-9. Hawthorne Option Construction Schedule

Construction Phase	Approx. Duration (Weeks)	Estimated Daily Crew (Vehicles)	Material Hauling (Cubic Yards)
Early Utility Relocation	18	40	8,000
Project Start-Up	6	40	87,100
Final Utility Relocations	15	40	2,000
LRT Guideway Bridges	35	60	278,700
Freight Retaining Walls	6	40	68,400
LRT Retaining Walls	8	40	2,000
Freight Trackwork (BNSF)	8	25	29,700
Stations and Access	22	40	7,800
LRT Trackwork	14	20	81,000
Systems Construction	12	20	-
Testing/Commissioning	9	15	-

Source: STV, 2022

Relative to the Proposed Project, construction of the Hawthorne Option would not involve any at-grade light rail crossings and would require additional material export to accommodate the foundations of the bridges and elevated track alignment, as well as additional fill import for embankments at locations of grade separation. However, the overall duration of Hawthorne Option construction is expected to be similar to the Proposed Project. Metro plans for contractors to use trucks with 30-CY capacity to minimize heavy-duty truck trips involved in material hauling. Comprehensive off-road equipment inventories were developed by Metro for each construction phase to produce estimates of total GHG emissions that would be generated by construction of the Hawthorne Option.

3.5-2.3 Operational GHG Emissions

Implementation of the Proposed Project would extend an existing electrically propelled Metro light rail transit line and would not require additional maintenance facilities that would introduce new direct sources of GHG emissions into the RSAs. Operations would predominantly involve changes to indirect sources of regional GHG emissions, including electricity generation to power the light rail transit corridor and stations, as well as transportation fuel savings associated with passenger vehicle trip displacement corresponding to increased transit ridership. Table 3.5-10 presents a summary of the annual projected vehicle revenue miles (VRM) for the Proposed Project and Options as well as the forecasted on-road vehicle miles traveled (VMT) displacement.

Table 3.5-10. Summary of Operational Parameters Relevant to GHG Emissions (2042)

Parameter	Proposed Project	Trench Option	Hawthorne Option
Annual Vehicle Revenue Miles	757,841	757,841	757,841
Annual On-Road VMT Displacement	17,083,851	17,083,851	17,207,383

Source: Metro, 2022

Indirect Power Supply Emissions

While the light rail transit propulsion would not represent a direct source of GHG emissions, the delivery of electricity to Proposed Project facilities would indirectly produce GHG emissions at the power source.

According to energy data collected between 2015–2019, Metro estimated that rail propulsion requires approximately 9.2 kilowatt-hours (kWh) per VRM (kWh/VRM), accounting for both the heavy and light rail lines. The annual electricity demand for Proposed Project light rail transit propulsion operations was estimated by multiplying the Metro per-mile rail electricity consumption factor by the annual operating miles of the light rail transit corridor extension for the Proposed Project and Options, which would be 757,841 light rail transit vehicle miles for all three scenarios. Light rail transit facilities would be connected to the electrical grid, with power in the Cities of Lawndale, Redondo Beach, and Torrance delivered by Southern California Edison (SCE).

As of 2020, SCE's delivered power mix was comprised approximately 31% renewable energy and was characterized by a GHG intensity factor of approximately 598 pounds of CO_2e emitted per megawatt-hour of electricity delivered (598 $lbCO_2e$/MWh). By 2030, all utility service providers in California are required to generate 60%of their electric retail sales from renewable (zero-emission) sources, and that contribution is required to be 100% by 2045. SCE has prepared forecasts of the projected carbon intensity of their delivered power to customers into the future and estimated that in 2042 the GHG intensity factor would be approximately 263 $lbCO_2e$/MWh (California Air Pollution Control Officers Association [CAPCOA], 2022). Annual GHG emissions associated with electricity consumption for the Proposed Project and Options were estimated by multiplying the total annual electricity demand in MWh by the forecasted 2042 SCE delivered power mix carbon intensity factor.

Indirect Regional Travel Emissions

In addition to indirect GHG emissions associated with electricity provision to light rail transit facilities, implementation of the Proposed Project would indirectly affect regional GHG emissions through the displacement of on-road vehicle trips and VMT. The extension of the light rail transit corridor would expand public transit accessibility in the Proposed Project area and would provide an alternative transportation mode to passenger vehicle use for various types of trips throughout the community. Displacing on-road vehicle trips is one of the primary tenets of GHG emissions reduction strategies for the SCAG region. Regional transportation modeling was prepared to estimate daily VMT on the roadway network under existing conditions and with and without project implementation in 2042.

The operational GHG emissions assessment utilized CARB mobile source emissions inventory factors produced by EMFAC2021 for Los Angeles County (in units of grams of CO_2, CH_4, and N_2O emitted per on-road vehicle mile) to estimate the annual GHG emissions from on-road vehicle travel in each of the analytical scenarios. Annual GHG emissions from vehicle travel on the regional roadway network were estimated by multiplying the daily VMT by a factor of 347 (CARB, 2008b), then by the EMFAC2021 emissions factors, and summed in units of metric tons of CO2e ($MTCO_2e$) using the corresponding 100-year GWP values presented in Table 3.5-6.

3.5-2.4 Significance Thresholds

As discussed in the following subsections, the thresholds of significance used to assess the GHG emissions impacts of the Proposed Project, Trench Option, and Hawthorne Option are based on Appendix G of the CEQA Guidelines and are informed by guidance provided by the OPR and the SCAQMD. There would be a significant impact if the Proposed Project would:

a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

b. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The CEQA Guidelines Section 15064.4 states that, when making a determination with respect to the significance of a project's GHG emissions, a lead agency shall have discretion to determine whether to: 1) Use a model or methodology to quantify GHG emissions resulting from a project, and which model or methodology to use; and/or 2) Rely on a qualitative analysis or performance-based standards. Section 15064.4 also states that a lead agency should consider the following factors when assessing the significance of the impact of GHG emissions on the environment: 1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting; 2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; and 3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

Neither CARB, OPR, SCAQMD, nor Metro have officially promulgated specific thresholds for analyzing GHG emissions under CEQA for transit projects. CARB and OPR acknowledge that transforming public transit systems and reducing VMT is an effective climate adaptation strategy due to the intersectionality of transportation and climate adaptation planning (OPR, 2008; OPR, 2018; CARB, 2019; CARB, 2022a). The ratification of SB 375 and the subsequent regional GHG emissions targets established in the SCS process are consistent with CARB's position that VMT is a proxy for transportation-related GHG emissions, and the 2017 and 2022 Scoping Plan Updates identified that slower growth in VMT from more efficient land use and development patterns would promote achievement of the state's climate goals (CARB 2019; CARB 2022a).

3.5-2.5 CEQA Streamlining Guidance for Transit and Active Transportation Projects

In response to SB 743, OPR endeavored to evaluate opportunities to streamline CEQA impacts assessments related to transportation and GHG emissions. As a transit project, the Proposed Project and Options would contribute to statewide efforts to reduce on-road VMT and the associated GHG emissions in pursuit of achieving the AB 32 emission reduction targets. OPR has developed technical guidance on issues that broadly affect CEQA practice and land use planning. These advisories provide general advice and recommendations, which agencies, the public, and other entities may use at their discretion in developing assessments of potential environmental impacts under CEQA. Spurred by the passage and adoption of SB 743—adopted in 2013—the CEQA Guidelines were updated in 2018 to incorporate VMT as the preferred metric for analyzing transportation impacts under CEQA. OPR has published two draft *Technical Advisories* (*Evaluating Transportation Impact in CEQA* and *CEQA Review of Sustainable Transportation Projects*) that discuss the parallels of benefits associated with expanding transit infrastructure and reducing VMT and GHG emissions (OPR, 2018; OPR, 2021).

Generally, rail transit projects are understood to improve regional connectivity and air quality through induced changes to mobility patterns spurred by the provision of an alternative mode of transportation that replaces and reduces vehicle trips. The OPR guidance recommends streamlining CEQA analyses of potential impacts to transportation and transportation-related emissions for transit and active transportation projects that are widely recognized to reduce on-road VMT and associated vehicle emissions. The guidance acknowledged the intersectionality of enhancing accessibility to transit through the implementation of multimodal transportation hubs and the resulting reduction in VMT attributed to the passenger vehicle trips displaced by increased transit ridership with environmental benefits related to GHG emissions, and air pollutant emissions more generally. OPR recommends the streamlining of GHG emissions impacts analyses for transit and active transportation projects because these projects reduce GHG emissions, increase multimodal transportation networks, and facilitate mixed-use development, which are crucial land use planning initiatives for climate adaptation (OPR, 2018b). As

such, project GHG emissions are assessed in the context of the existing GHG emissions inventory, the Metro systemwide GHG emissions displacement, and climate adaptation plans and policies."

> *"Transit and active transportation projects generally reduce VMT and therefore are presumed to cause a less-than-significant impact on transportation. This presumption may apply to all passenger rail projects, and bicycle and pedestrian infrastructure projects. Streamlining transit and active transportation projects aligns with each of the three statutory goals contained in SB 743 by reducing GHG emissions, increasing multimodal transportation networks, and facilitating mixed use development."*

The OPR guidance was based on programmatic review of public transit and active transportation projects that consistently demonstrate reductions in emissions from on-road vehicles through implementation of transit systems. The OPR advises that the streamlining of impact analyses under CEQA is reasonable for transit and active transportation projects that displace vehicle trips and reduce on-road VMT. Consistent with the OPR recommendations discussed above, State CEQA Guidelines Section 15064.3(b)(2) likewise provides that transportation projects that reduce, or have no impact on, VMT should be presumed to have a less than significant impact. However, to satisfy the recommendations provided in Section 15064.4 of the CEQA Guidelines, the impacts assessment for the Proposed Project quantified the GHG emissions associated with construction and future operations and evaluated them in the context of the relevant regulatory framework.

3.5-2.6 Project Features

As described in Chapter 2, Project Description, a number of features have been incorporated into the project to ensure compliance with the laws, guidelines, and best practices of regulatory agencies. While project features were not developed specifically for GHG emissions, PF-AQ-1, Metro Green Construction Policy, PF-AQ-3, Metro 2020 Moving Beyond Sustainability Strategic Plan, and PF-AQ-4 Metro Design Standards, as described in Section 3.4, Air Quality, are relevant to GHG emissions in the RSAs.

3.5-3 Affected Environment / Existing Conditions

3.5-3.1 California GHG Emissions

CARB maintains a statewide GHG emissions inventory that currently documents the period from 2000 to 2020. The statewide annual emissions are shown in Table 3.5-11. In 2020, total statewide GHG emissions from sectors as categorized in the Scoping Plan were approximately 369.1 million metric tons of CO_2e ($MMTCO_2e$) and made up 80% of California's GHG emissions (CARB, 2022b), which was approximately 112 $MMTCO_2e$ lower than 2007 levels, representing a reduction of 23%. Between 2011 and 2020, annual emissions decreased by approximately 68.3 $MMTCO_2e$. Of note, between October 23, 2015, and February 18, 2016, an exceptional natural gas leak event occurred at the Aliso Canyon natural gas storage facility that resulted in unexpected GHG emissions of considerable magnitude. The exceptional incident released approximately 109,000 metric tons of CH_4, which equated to approximately 1.96 $MMTCO_2e$ of unanticipated emissions in 2015 and an additional 0.52 $MMTCO_2e$ in 2016. According to CARB, these emissions will be mitigated in the future through projects funded by the Southern California Gas Company based on legal settlement and are presented alongside but tracked separately from routine inventory emissions. Furthermore, the substantial decrease in 2020

transportation sector emissions is predominately attributed to changes in behavioral patterns spurred by the COVID-19 pandemic (i.e., people driving less in general).

Table 3.5-11. California GHG Emissions Inventory

Sector	CO_2e Emissions (Million Metric Tons)									
	2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Transportation	159.5	156.9	157.0	157.7	161.5	165.2	166.6	165.3	162.4	135.8
Electricity Gen. (In-State)	42.6	54.5	53.5	53.0	52.0	44.1	40.2	40.4	38.5	40.9
Electricity Gen. (Imports)	46.6	44.4	40.0	36.8	33.9	26.4	23.9	24.6	21.7	18.6
Industrial	85.8	80.7	83.0	85.2	83.2	81.6	81.7	81.9	80.4	73.3
Commercial	15.6	14.0	13.7	13.3	13.4	13.7	13.6	14.0	14.6	13.5
Residential	30.5	25.2	25.4	22.3	22.9	23.4	24.0	23.4	25.9	25.3
Agriculture and Forestry	34.2	35.2	33.9	33.9	32.6	32.2	31.7	32.2	31.4	31.6
Emissions Total	**437.4**	**434.6**	**431.5**	**428.2**	**426.6**	**414.5**	**410.5**	**411.0**	**404.4**	**369.1**

Source: CARB, 2022b

According to the 2020-2045 RTP/SCS, the most recent GHG emissions data by sector for the SCAG region is from 2012. Similar to the 2013 United States and California GHG emission profiles, transportation, industrial, and electricity are the three largest contributors to GHG emissions. Total SCAG emissions in 2020 were estimated to be 216 $MMTCO_2e$. Transportation emissions are most prevalent to all other sectors in California and specifically in the SCAG region. Transportation emissions accounted for approximately 38% of total emissions in the SCAG region, compared to 26% of total emissions in the United States in 2008. Fossil fuel CO_2 emissions for 2011 were calculated across the Los Angeles megacity, which include Los Angeles, Orange, Riverside, Santa Barbara, and Ventura Counties. The total fossil fuel CO_2 emissions were calculated to be approximately 48 megatons of CO_2 per year, with transportation emissions accounting for approximately 50% of these emissions. Los Angeles County contributed approximately 55% of the total fossil fuel CO_2 emissions.

3.5-3.2 GHG Emissions from the Metro Transit System

Metro has prepared detailed emissions inventories covering 2012 through 2019 that were compiled to support its Moving Beyond Sustainability (2020f) strategic plan. The largest source of emissions for the agency is vehicle fuel. Accordingly, Metro's bus service is the largest source of emissions by mode. New fleet technologies powered by renewable energy can dramatically reduce Metro's emissions over the long term, but the agency is further reducing emissions in other areas. Since 2012, emissions resulting from building energy use have decreased by 23% while emissions from water consumption have been cut in half. Currently, the best sustainability indicator of an effective public transit system is GHG displacement that occurs primarily through mode shift and/or taking cars off the road.

As shown below in Table 3.5-12, the Metro transit system displaced 918,076 $MTCO_2e$ in 2019 through mode shift to transit and land use orientation, which resulted in a net reduction of 591,123 $MTCO_2e$ throughout Los Angeles County when accounting for Metro emissions. Total GHG emission generation across Metro operations was approximately 326,953 $MTCO_2e$ in 2019, which represented a reduction of approximately 16% from 2015. Of the total emissions in 2019, rail propulsion comprised approximately 20%, estimated to be 64,529 $MTCO_2e$. Metro rail operations in 2019 involved a total of over 23 million VRM and averaged approximately 6.17 $lbCO_2e$ per mile. As the electric service utility companies within Los Angeles County—SCE and the Los Angeles Department of Water and Power—expand the proportion

of energy supplied by renewable resources in the future to meet regulatory requirements established by Senate Bill 100, the average per-mile GHG emission rate of Metro Rail operations will decrease.

Furthermore, as a founding member of the APTA Sustainability Commitment, Metro reports annually on a framework of performance metrics that enable transit agencies to measure and report sustainability performance over time. Metro uses systemwide VRM as its primary normalization factor to facilitate easier tracking of progress and changes during years of service growth and to account for the influence of external factors that affect system operations, such as the COVID-19 pandemic. APTA is currently in the process of reviewing and revising the APTA Sustainability Commitment and associated methodology; however, data for total emissions and displacement from Metro operations in 2020–2021 is available in its 2022 APTA Sustainability Performance Report (2022a) that was prepared using the current methodological guidance. Despite reduced Metro operations resulting from the COVID-19 pandemic, the net systemwide effect on regional GHG emissions was a displacement—or reduction—of approximately 510,950 $MTCO_2e$ in 2020 and 214,429 $MTCO_2e$ in 2021 using the APTA methodology.

As the APTA methodology for estimating GHG displacement is based on transit ridership, Metro's GHG displacement for 2021 declined by 51.5% compared to 2020. This approach resulted in an overall 57.8% reduction in the net GHG emissions for 2021 compared to the prior year. However, Metro continues to displace more GHG emissions than it releases into the atmosphere, with 2021 emissions generation being approximately 40% of the emissions displacement using the APTA methodology.

Metro is making strides in electrifying its bus fleet through the Zero Emissions Bus Master Plan (2020) and the Electric Vehicle Implementation Plan (2021), reaching a key milestone in July 2020 by rolling out the first batch of electric buses on the Metro G (Orange) Line and achieving a 100% electric fleet on the line by the start of 2021. Metro has committed to electrifying the entire bus fleet by 2030, which will substantially reduce GHG emissions associated with its bus operations that currently represent the largest source of emissions, accounting for approximately 50% of systemwide emissions in 2019.

Table 3.5-12. Metro GHG Emissions Inventory and Displacement

Source/Sector	Annual CO_2e Emissions (Metric Tons)						
	2015	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Operational & Non-Modal Emissions							
Rail Propulsion	51,736	54,177	69,399	71,848	64,529	-	-
Bus (Operated)	251,439	245,360	234,662	207,925	160,804	-	-
CNG Compression	7,950	7,802	12,066	10,781	10,583	-	-
Bus (Contracted)	16,158	16,274	13,381	9,895	5,965	-	-
Vanpool	18,254	17,655	15,703	14,967	14,884	-	-
Non-Revenue Vehicles	9,915	9,969	9,730	9,102	10,272	-	-
Facility Electricity	22,110	22,941	30,965	24,051	21,955	-	-
Facility Natural Gas	4,906	5,881	5,519	5,255	6,849	-	-
Water Consumption	895	717	757	750	665	-	-
Refrigerants	7,911	10,065	9,844	2,261	8,771	-	-
Employee Commuting[1]	-	-	13,846	15,076	21,675	-	-
Emissions Total	**391,275**	**390,840**	**415,872**	**371,911**	**326,953**	**231,279**	**144,244**
Emissions Displacement							
Mode Shift to Transit	(465,101)	(448,301)	(207,374)	(200,669)	(186,515)	-	-
Land Use Orientation[1]	-	-	(813,110)	(786,820)	(731,561)	-	-
Displacement Total	**(465,101)**	**(448,301)**	**(1,020,485)**	**(987,490)**	**(918,076)**	**(742,229)**	**(359,673)**
Net Annual Emissions							
Net Metro System	(73,827)	(57,461)	(604,613)	(615,579)	(591,123)	(510,950)	(215,429)

Source: Metro, 2020e; Metro, 2022a

[1]Employee commuting and land use orientation emissions were not tracked and quantified prior to 2017.

3.5-3.3 Effects of the COVID 19-Pandemic

Since 2020, the COVID-19 pandemic has impacted society through modifications in activity organization, changes to employment and travel, and the use of information and communication technologies. The most material effects of the pandemic on GHG emissions are related to patterns of regional mobility. According to a study by the University of California, Davis (UC Davis, 2022), in Fall of 2019, approximately 87% of workers within the SCAG region physically commuted to work at least one time each month, while approximately 13% exclusively worked remotely. During 2020 and 2021, the proportion of exclusively remote workers increased to 36% (Fall 2020) and 22.5% (Summer 2021), respectively. By the Summer of 2022, the percent of workers that physically commuted at least once per month rebounded to 88%, similar to pre-pandemic levels. However, the average monthly frequency of physical commutes among all workers in 2022 (12.8 days per month) remained considerably below the pre-pandemic level of 15.6 days per month. By Summer of 2021, the average number of monthly commuting trips was still 29% lower compared to the months before the pandemic.

Transit ridership also decreased substantially during the years 2020 and 2021 in tandem with a decrease in on-road vehicle trips. Commuting trips by rail within the SCAG region were 21% lower in the Summer of 2021 than during pre-pandemic conditions, and non-commuting trips decreased by 18%. As time goes on, further investigations into the long-term repercussions of the COVID-19 pandemic will be better

understood. Eventually, it is anticipated that regional growth projections and regional transportation activities will recover to levels predicted prior to the COVID-19 pandemic. However, studies on the effects of the pandemic on regional transportation patterns and forecasted growth between existing conditions and the opening year of the Proposed Project and Options in the mid-2030s, or the horizon year of 2042 are not presently available. This impact analysis uses the best available data, including those described in preceding sections.

3.5-4 Environmental Impacts

3.5-4.1 Would the Project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

3.5-4.1.1 *Construction Impacts*

Less Than Significant Impact. Construction of the Proposed Project would take place over approximately five years between 2027–2033 and would generate GHG emissions through off-road equipment exhaust and on-road haul truck trips, concrete and material delivery trips, and construction crew vehicle trips that would persist only as long as construction activities are ongoing. As mentioned previously, all construction activities would be required to comply with PF-AQ-1 Metro Green Construction Policy, PF-AQ-3 Moving Beyond Sustainability Strategic Plan, and PF-AQ-4 Metro Rail Design Guidelines, which would minimize emissions through ensuring that equipment and vehicles are operated at optimal manufacturer specifications and are not allowed to idle for more than five minutes when not in use. Emission factors from CARB's OFFROAD2017-ORION emissions inventory model and the EMFAC on-road mobile source emissions model were used to estimate GHG emissions that would be produced during each phase of Proposed Project construction, as summarized below in Table 3.5-13.

Table 3.5-13. Proposed Project Construction GHG Emissions (2027–2033)

Construction Phase	Off-Road Equipment	On-Road Vehicles	Phase Total
Short-Term Construction GHG Emissions ($MTCO_2e$)			
Early Utility Relocation	1,430.5	436.2	1,866.7
Project Start-Up	68.8	801.5	870.2
Final Utility Relocations	636.1	320.4	956.5
Freight Track Bridges	185.6	313.3	498.9
Freight Retaining Walls	534.5	845.9	1,380.4
LRT Retaining Walls	792.7	562.2	1,354.9
Freight At-Grade Crossings	146.1	73.1	219.2
LRT Guideway Bridges	1,997.1	831.8	2,828.8
Freight Trackwork (BNSF)	85.9	499.1	584.9
Stations and Access	483.6	305.7	789.3
LRT Trackwork	359.4	877.0	1,236.4
Systems Construction	271.7	108.5	380.2
Testing/Commissioning	108.2	22.7	130.8
Total Construction			**13,097.4**
Annual Average (Five-Year Construction)			*2,182.9*
Amortized Emissions (30-Year Lifetime)			***436.6***

Source: STV, 2022; TAHA, 2022

Construction of the Proposed Project would generate approximately 13,097.4 $MTCO_2e$ over the approximately five-year duration, which equates to an average of approximately 2,182.9 $MTCO_2e$ annually during that timeframe. SCAQMD staff guidance states that for CEQA assessments, construction-related GHG emissions that occur over a relatively short-term period should be amortized over a 30-year operational project lifetime due to the inherently cumulative nature of GHG emissions and the persistence of GHGs in the atmosphere (SCAQMD, 2008). The amortized GHG emissions rate during construction of the Proposed Project would be approximately 437 $MTCO_2e$ annually throughout the operational lifetime, and these emissions are considered in conjunction with future permanent environmental effects related to GHG emissions. Impacts resulting from GHG emissions during construction of the Proposed Project would be **less than significant**.

TRENCH OPTION

Less Than Significant Impact. Construction of the Trench Option would take place over approximately seven years, two years longer than the Proposed Project, between 2027–2035 and would generate temporary GHG emissions through off-road equipment exhaust and on-road haul truck trips, concrete and material delivery trips, and construction crew vehicle trips. As mentioned previously, all construction activities would incorporate PF-AQ-1, PF-AQ-3 and PF-AQ-4, which would control emissions through ensuring that equipment and vehicles are operated at optimal manufacturer specifications and are not allowed to idle for more than five minutes when not in use. Emission factors from CARB's OFFROAD2017-ORION emissions inventory model and the EMFAC on-road mobile source emissions model were used to estimate GHG emissions that would be produced during each phase of Trench Option construction, as summarized below in Table 3.5-14.

Table 3.5-14. Trench Option Construction GHG Emissions (2027–2035)

Construction Phase	Off-Road Equipment	On-Road Vehicles	Phase Total
Short-Term Construction GHG Emissions ($MTCO_2e$)			
Early Utility Relocation	1,430.5	443.4	1,873.9
Project Start-Up	68.8	349.4	418.2
Final Utility Relocations	636.1	318.5	954.6
Freight Track Bridges	202.5	328.5	531.0
Freight Retaining Walls	801.7	864.4	1,666.1
LRT Retaining Walls	792.7	1,034.6	1,827.3
LRT Guideway Bridges	2,611.5	655.1	3,266.6
Freight At-Grade Crossings	146.1	69.3	215.4
LRT Guideway Trench	2,587.0	1,836.5	4,423.4
Freight Trackwork (BNSF)	557.6	736.1	1,293.7
Stations and Access	591.0	375.6	966.6
LRT Trackwork	359.4	847.9	1,207.3
Systems Construction	271.7	109.8	381.6
Testing/Commissioning	108.2	21.6	129.8
Total Construction			**19,155.5**
Annual Average (Seven-Year Construction)			*2,736.5*
Amortized Emissions (30-Year Lifetime)			***638.5***

Source: STV 2022; TAHA, 2022

Construction of the Trench Option would generate approximately 19,156 $MTCO_2e$ over the seven-year duration, which equates to an average of approximately 2,736.5 $MTCO_2e$ annually during that timeframe. Relative to the Proposed Project, construction of the Trench Option would generate an additional 6,058 $MTCO_2e$ of GHG emissions due to increased haul truck activities and the extended schedule. SCAQMD guidance states that for CEQA assessments, construction-related GHG emissions should be amortized over a 30-year operational project lifetime due to the inherently cumulative nature of GHG emissions and the persistence of GHGs in the atmosphere. The amortized GHG emissions rate during construction of the Trench Option would be approximately 639 $MTCO_2e$ annually throughout the operational lifetime, and these emissions are considered in conjunction with future operational emissions. Impacts resulting from GHG emissions during construction of the Trench Option would be **less than significant**.

HAWTHORNE OPTION

Less Than Significant Impact. Similar to the Proposed Project, construction of the Hawthorne Option would take place over approximately five years between 2029[1]–2035 and would generate temporary GHG emissions through off-road equipment exhaust and on-road haul truck trips, concrete and material delivery trips, and construction crew vehicle trips. As mentioned previously, all construction activities would incorporate PF-AQ-1, PF-AQ-3 and PF-AQ-4, which would minimize emissions through ensuring that equipment and vehicles are operated at optimal manufacturer specifications and are not allowed to idle for more than five minutes when not in use. CARB's OFFROAD2017-ORION emissions inventory model and the EMFAC on-road mobile source emissions model was used to estimate GHG emissions that would be produced during each phase of Hawthorne Option construction, as summarized below in Table 3.5-15.

Table 3.5-15. Hawthorne Option Construction GHG Emissions

Construction Phase	Off-Road Equipment	On-Road Vehicles	Phase Total
Short-Term Construction GHG Emissions ($MTCO_2e$)			
Early Utility Relocation	1,430.5	404.1	1,834.7
Project Start-Up	68.8	605.1	673.9
Final Utility Relocations	636.2	304.4	940.5
LRT Guideway Bridges	2,919.5	2,161.0	5,080.5
Freight Retaining Walls	267.3	966.3	1,233.6
LRT Retaining Walls	792.9	122.3	915.3
Freight Trackwork (BNSF)	171.5	284.1	455.6
Stations and Access	617.9	335.3	953.1
LRT Trackwork	359.4	838.3	1,197.7
Systems Construction	271.7	109.7	381.4
Testing/Commissioning	108.2	21.1	129.3
Total Construction			**13,795.6**
Annual Average (Five-Year Construction)			*2,299.3*
Amortized Emissions (30-Year Lifetime)			***459.9***

Source: STV 2022; TAHA, 2022

Construction of the Hawthorne Option would generate approximately 13,796 $MTCO_2e$ over the six-year duration, which equates to an average of approximately 2,300 $MTCO_2e$ annually during that timeframe. Relative to the Proposed Project, construction of the Hawthorne Option would generate approximately 700 $MTCO_2e$ more of GHG emissions due to reduced haul truck activities. SCAQMD guidance states that for CEQA assessments, construction-related GHG emissions should be amortized over a 30-year operational project lifetime due to the inherently cumulative nature of GHG emissions and the

[1] Coordination with Caltrans would need to take place prior to the initiation of construction as part of the Hawthorne Option, resulting in a later start date than the Proposed Project or Trench Option

persistence of GHGs in the atmosphere (SCAQMD, 2008). The amortized GHG emissions rate during construction of the Hawthorne Option would be approximately 460 $MTCO_2e$ annually throughout the operational lifetime, and these emissions are considered in conjunction with future operational emissions. Impacts resulting from GHG emissions during construction of the Hawthorne Option would **be less than significant**.

3.5-4.1.2 *Operational Impacts*

Less Than Significant Impact. As discussed, implementation of the Proposed Project would generate direct GHG emissions during temporary construction activities from off-road equipment and on-road vehicle exhaust and long-term indirect GHG emissions would be generated through energy use (i.e., light rail transit propulsion, lighting, and accessory equipment at station platforms). GHG emissions from on-road motor vehicles would also be substantially affected through induced mode shift emissions displacement. The 2022 Climate Change Scoping Plan Update identifies that the transportation sector has three major means of reducing GHG emissions: transportation electrification, building decarbonization, and reducing VMT. CARB acknowledges that employing VMT as the metric of CEQA transportation impacts statewide will help GHG reductions planned under SB 375 be achieved. Furthermore, CARB determined it would not be possible to achieve the state's 2030 and 2045 emissions goals without reducing VMT growth, and that the state was not on track to achieve 2017 VMT reduction goals (CARB, 2019a; CABR 2022a). Table 3.5-16 summarizes annual average GHG emissions that would be generated in the operational year of 2042. After accounting for amortized construction emissions, Proposed Project operations would result in a net reduction of approximately 2,369.4 $MTCO_2e$ annually in 2042 primarily due to displaced on-road vehicle trips.

Table 3.5-16. Proposed Project and Options GHG Emissions (2042)

Operational Source	Proposed Project	Trench Option	Hawthorne Option
Amortized Construction ($MTCO_2e$/year)	**436.6**	**638.5**	**459.9**
Light Rail Corridor Electricity (MWh/year)	6,946.5	6,946.5	6,946.5
Stations & Parking Lot Electricity (MWh/year)	882.0	882.0	882.0
Indirect Electricity Emissions ($MTCO_2e$/year)	**915.5**	**915.5**	**915.5**
Vehicle Trip Displacement (VMT/day)	49,233	49,233	49,589
Emissions Displacement ($MTCO_2e$/year)	**(3,721.4)**	**(3,721.4)**	**(3,748.4)**
Total Annual Emissions ($MTCO_2e$/year)	**(2,369.4)**	**(2,167.4)**	**(2,373.0)**

Source: TAHA, 2022

As presented in Table 3.5-16, implementation of the Proposed Project would decrease regional on-road VMT by 49,233 daily miles through transportation mode shift, and net GHG emissions in 2042 would be a reduction of 2,369.4 $MTCO_2e$ annually. Long-term operation of the Proposed Project would advance state, regional, and local initiatives to reduce GHG emissions by providing alternative modes of transportation and creating an efficient, well-connected public transit network to serve surrounding communities. Implementation of the Proposed Project would enhance the Metro network GHG emissions displacement through mode shift by 3,721.4 $MTCO_2e$, which represents an additional two percent reduction relative to 2019 Metro operations summarized in

Table 3.5-12 (186,515 $MTCO_2e$ displaced). The Proposed Project is consistent with CARB plans and policies to reduce GHG emissions from passenger vehicles by providing alternative transportation modes for both local and regional trips. Implementation of the Proposed Project and other planned transportation and transit improvements in the region are critical to achieving the SB 375 regional per capita targets for light duty vehicles. Therefore, implementation of the Proposed Project would result in a **less than significant impact** related to the generation of GHG emissions, and mitigation would not be required.

TRENCH OPTION

Less Than Significant Impact. The analysis of GHG emissions associated with the Trench Option is similar to the discussion presented above for the Proposed Project. Implementation of the Trench Option would generate direct GHG emissions during temporary construction activities from off-road equipment and on-road vehicle exhaust and long-term indirect GHG emissions would be generated through energy use (i.e., light rail transit propulsion, lighting, and accessory equipment at station platforms). GHG emissions from on-road motor vehicles would also be substantially affected through induced mode shift emissions displacement. The 2022 Scoping Plan identifies that the transportation sector has three major means of reducing GHG emissions: transportation electrification, building decarbonization, and reducing VMT. CARB acknowledges that employing VMT as the metric of CEQA transportation impacts statewide will help GHG reductions planned under SB 375 be achieved. Furthermore, CARB determined it would not be possible to achieve the state's 2045 emissions goals without reducing VMT growth. Table 3.5-16 summarizes annual average GHG emissions that would be generated during long-term Trench Option operations in the design year of 2042. After accounting for amortized construction emissions, Trench Option operations would result in a net reduction of approximately 2,167.4 $MTCO_2e$ annually in 2042 due to displaced on-road vehicle trips.

As presented in Table 3.5-16, implementation of the Trench Option would decrease regional on-road VMT by 49,233 daily miles through transportation mode shift, and net GHG emissions would be a reduction of 2,167.4 $MTCO_2e$ annually. Long-term operation of the Trench Option would advance State, regional, and local initiatives to reduce GHG emissions by providing alternative modes of transportation and creating an efficient, well-connected public transit network to serve communities. Implementation of the Trench Option would enhance the GHG emissions displacement through mode shift by 3,721.4 $MTCO_2e$, which represents an additional two percent reduction relative to 2019 Metro operations summarized in

Table 3.5-12 (186,515 $MTCO_2e$ displaced). The Trench Option would be consistent with CARB plans and policies to reduce GHG emissions from passenger vehicles by providing alternative transportation modes for both local and regional trips. Therefore, implementation of the Trench Option would result in a **less than significant impact** related to the generation of GHG emissions, and mitigation would not be required.

HAWTHORNE OPTION

Less Than Significant Impact. The analysis of GHG emissions associated with the Hawthorne Option is similar to the discussion presented above for the Proposed Project. Implementation of the Hawthorne Option would generate direct GHG emissions during temporary construction activities from off-road equipment and on-road vehicle exhaust and long-term indirect GHG emissions would be generated through energy use (i.e., light rail transit propulsion, lighting, and accessory equipment at station platforms). GHG emissions from on-road motor vehicles would also be substantially affected through induced mode shift emissions displacement. The 2022 Climate Change Scoping Plan Update identifies

that the transportation sector has three major means of reducing GHG emissions: transportation electrification, building decarbonization, and reducing VMT. CARB acknowledges that employing VMT as the metric of CEQA transportation impacts statewide will help GHG reductions planned under SB 375 be achieved. Furthermore, CARB determined it would not be possible to achieve the state's 2045 emissions goals without reducing VMT growth. Table 3.5-16 summarizes annual average GHG emissions that would be generated during long-term Hawthorne Option operations in the design year of 2042. After accounting for amortized construction emissions, Hawthorne Option operations would result in a net reduction of approximately 2,373 $MTCO_2e$ annually in 2042 due to displaced on-road vehicle trips.

As presented in Table 3.5-16, above, implementation of the Hawthorne Option would decrease regional on-road VMT by 49,589 daily miles through transportation mode shift, and net GHG emissions would be a reduction of 2,373 $MTCO_2e$ annually. Long-term operation of the Hawthorne Option would contribute to advancing state, regional, and local initiatives to reduce GHG emissions by providing alternative modes of transportation and creating an efficient, well-connected public transit network to serve communities. Implementation of the Hawthorne Option would enhance the GHG emissions displacement through mode shift by 3,748.4 $MTCO_2e$, which represents an additional two percent reduction relative to 2019 Metro operations summarized in

Table 3.5-12 (186,515 $MTCO_2e$ displaced). The Hawthorne Option would be consistent with CARB plans and policies to reduce GHG emissions from passenger vehicles by providing alternative transportation modes for both local and regional trips. Therefore, implementation of the Hawthorne Option would result in a **less than significant impact** related to the generation of GHG emissions, and mitigation would not be required.

3.5-4.2 Would the Project Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

3.5-4.2.1 *Construction Impacts*

Less Than Significant Impact. At the state level, the primary transportation-related plans and regulations that address GHG emissions include SB 375, SB 32, and the 2022 Scoping Plan Update, which is the latest iteration of the Climate Change Scoping Plan to implement AB 32. The primary regional GHG emissions reduction plan is contained within the SCS portion of the SCAG Connect SoCal 2020–2045 RTP/SCS. Metro will prioritize and ensure consistency with its own 2019 CAAP and 2020 MBSSP for all projects being implemented. At the local level, the Proposed Project alignment would traverse portions of the Cities of Lawndale, Redondo Beach, and Torrance and would also comply with each city's GHG reduction plan to the extent feasible.

Construction of the Proposed Project would temporarily generate GHG emissions associated with off-road equipment and on-road vehicle activities, and following completion of the light rail transit corridor sources involved in construction activities would no longer produce emissions associated with the Proposed Project. The cumulative nature of GHG emissions implicitly precludes the potential for short-term emissions generated during construction to interfere with long-term GHG emission reduction targets established by state, regional, and local planning documentation. In accordance with SCAQMD guidance, the GHG emissions that would be generated during construction were amortized over a 30-year operational lifetime and considered in conjunction with the long-term operational effects of the Proposed Project. The discussion of operational impacts below addresses GHG emissions that would be produced during Proposed Project construction. Therefore, the Proposed Project is consistent with the SCAG SCS, and would result in **less than significant impacts** related to regional GHG reductions.

TRENCH OPTION

Less Than Significant Impact. Similar to the Proposed Project, GHG emissions that would be generated during construction of the Trench Option are evaluated in conjunction with the long-term operational effects. Although construction of the Trench Option would temporarily generate approximately 19,156 $MTCO_2e$ of GHG emissions from off-road equipment and on-road vehicle trips, the permanent effect of Trench Option operations would be a net GHG emissions reduction, as summarized in Table 3.5-16. Therefore, construction of the Trench Option would result in **less than significant impacts** related to GHG plan consistency and would produce environmental benefits related to vehicle emissions.

HAWTHORNE OPTION

Less Than Significant Impact. Similar to the Proposed Project, GHG emissions that would be generated during construction of the Hawthorne Option are evaluated in conjunction with the long-term operational effects. Although construction of the Hawthorne Option would temporarily generate approximately 13,796 $MTCO_2e$ of GHG emissions from off-road equipment and on-road vehicle trips, the permanent effect of Hawthorne Option operations would be a net GHG emissions reduction, as summarized in Table 3.5-16. Therefore, construction of the Hawthorne Option would result in **less than significant impacts** related to GHG plan consistency and would produce environmental benefits related to vehicle emissions.

3.5-4.2.2 *Operational Impacts*

Less Than Significant Impact. A significant GHG impact may occur if implementation of the Proposed Project could conflict with applicable GHG reductions plans, policies or regulations. At the state level, the primary transportation-related plans and regulations that address GHG emissions include SB 375, SB 32, and the 2022 Scoping Plan Update, which is the latest iteration of the Climate Change Scoping Plan to implement AB 32. The primary regional GHG emissions reduction plan is contained within the SCS portion of the SCAG Connect SoCal 2020–2045 RTP/SCS. By default, Metro will prioritize and ensure consistency with its own 2019 CAAP and 2020 MBSSP for all projects being implemented. At the local level, the Proposed Project alignment would traverse portions of the Cities of Lawndale, Redondo Beach, and Torrance and would also comply with each city's GHG reduction plan to the extent feasible.

CARB's 2022 Scoping Plan Update (CARB, 2022a) provides a blueprint for the state to reduce GHG emissions in order to meet the goals set under SB 32 of achieving a 40% reduction in GHG emissions from 1990 levels by 2030 and achieving carbon neutrality by 2045. Implementing the 2022 Scoping Plan also puts California on a trajectory to exceed the 80% reduction from 1990 levels by 2050 in accordance with EO S-3-05. CARB acknowledges that while most of the GHG reductions from the transportation sector will come from technologies and low carbon fuels, VMT reductions are necessary to achieve the 2030 emissions target and must be party of any transportation strategy considered, and the state is currently not on track to reduce VMT by the metrics outlined in the previous 2017 plan. The 2022 Scoping Plan Update identifies that slower growth in VMT from more efficient land use development and passenger vehicle trip displacement would promote achievement of the State's climate goals. The CARB 2020 Mobile Source Strategy (2021) and the 2022 Scoping Plan Update) identified that a 15% reduction in statewide light-duty automobile VMT relative to business-as-usual is required to achieve the 2050 GHG emissions goals.

Implementation of the Proposed Project would directly contribute to the statewide efforts to reduce light-duty automobile VMT, inducing a daily displacement of approximately 49,223 light-duty vehicle miles. Furthermore, the enhanced transit connectivity provided by the Proposed Project would result in

intersectional benefits related to promoting active transportation, which CARB has identified as a key element of the 2022 Scoping Plan Update strategy. Based on this analysis, the Proposed Project would not conflict with CARB's Scoping Plan and would result in environmental benefits related to advancing statewide VMT and GHG emissions reduction efforts.

The primary regional-level planning document addressing GHG emissions reductions is SCAG's Connect SoCal 2020–2045 RTP/SCS, which presents strategies and tools that are consistent with local jurisdictions' land use policies and incorporate BMPs for achieving the state-mandated reductions in GHG emissions. Connect SoCal identifies improved accessibility and mobility as one of its goals, with light-duty VMT reductions being the crux of the SCS document's purpose. The Proposed Project would provide an expansion of light rail transit service that would directly increase transit capacity, which would support the SCS' goal of improved accessibility and mobility relative to the future (2042) baseline condition. Implementation of the Proposed Project would not conflict with the goals of SB 375 and the SCAG RTP/SCS in that it would provide extended transit service along the Metro C (Green) Line corridor, promoting active transportation and inducing mode shift to displace light-duty passenger vehicle trips.

Overall, SCAG analysis determined that effectively implementing Connect SoCal would achieve a 10.8-percent reduction in daily per-capita VMT, and implementation of the Proposed Project would contribute to that forecasted decrease. The Proposed Project would also introduce two new light rail transit stations within Los Angeles County, which would provide increased opportunities for transit-oriented development and High-Quality Transit Areas. These are key land use orientation strategies identified within Connect SoCal that are imperative to ensuring that regional GHG emissions reductions are met. By enhancing connectivity to the regional transit network, the Proposed Project would result in environmental benefits and would accommodate further strategies to reduce emissions at the community level. Therefore, the Proposed Project is consistent with the SCAG SCS, and would result in **less than significant impacts** related to regional GHG reductions.

TRENCH OPTION

Less Than Significant Impact. The analysis of Trench Option consistency with GHG emissions reduction plans is congruent with the discussion presented for the Proposed Project at the state, regional, and local levels. As summarized in Table 3.5-16 implementation of the Trench Option would result in a daily light-duty VMT displacement of 49,233 vehicle miles and would reduce annual GHG emissions within Los Angeles County by approximately 2,167.4 $MTCO_2e$ in the operational year of 2042. The Trench Option would enhance regional transit connectivity, promote active transportation and transit-oriented development, and would induce decreases in per-capita VMT consistent with CARB Climate Change Scoping Plan and SCAG SCS policies. Therefore, the Trench Option would result in **less than significant impacts** related to GHG plan consistency and would produce environmental benefits related to vehicle emissions.

HAWTHORNE OPTION

Less Than Significant Impact. The analysis of Hawthorne Option consistency with GHG emissions reduction plans is congruent with the discussion presented for the Proposed Project at the state, regional, and local levels. As summarized in Table 3.5-16, implementation of the Hawthorne Option would result in a daily light-duty VMT displacement of 49,589 vehicle miles and would reduce annual GHG emissions within Los Angeles County by approximately 2,373 $MTCO_2e$ in the operational year of 2042. The Hawthorne Option would enhance regional transit connectivity, promote active transportation and transit-oriented development, and would induce decreases in per-capita VMT consistent with CARB Climate Change Scoping Plan and SCAG SCS policies. Therefore, the Hawthorne

Option would result in **less than significant impacts** related to GHG plan consistency and would produce environmental benefits related to vehicle emissions.

3.5-5 Mitigation Measures

No mitigation measures are required, as there are no significant impacts related to GHG emissions.

3.5-6 Project Impacts Remaining After Mitigation

As described in Section 3.5-5, no mitigation measures are required to reduce construction and operation impacts to a level below significance.

3.5-7 Cumulative Impacts

The methodology for cumulative analysis and a description of relevant projects and projections are included in Section 3.0, Introduction. The geographic scope of the cumulative analysis for greenhouse gas emissions are the RSAs described in Section 3.5-2.1, defined as the six-county geographic region under the SCAG jurisdiction, as shown on Figure 3.5-1.

3.5-7.1 Proposed Project

From a cumulative standpoint, reasonably foreseeable actions within the RSA include all transportation projects that are programmed in the Connect SoCal 2020–2045 RTP/SCS. CARB issued a determination that the Connect SoCal SCS successfully demonstrated that the region would attain its established SB 375 per capita GHG emissions targets in the 2035 horizon year of the analysis on October 30, 2020. This determination relies on projects that are programmed into the RTP/SCS being implemented, one of which is the Proposed Project as identified under Federal Transportation Improvement Program (FTIP) ID LA0G632. Additionally, as discussed in Sections 3.5.4-1, although implementation of the Proposed Project would generate direct GHG emissions during temporary construction activities from off-road equipment and on-road vehicle exhaust and long-term indirect GHG emissions would be generated through energy use (i.e., light rail transit propulsion, lighting and accessory equipment at station platforms), GHG emissions from on-road motor vehicles would be substantially affected through induced mode shift emissions displacement. The Proposed Project is anticipated to reduce GHG emissions when compared to future 2042 baseline conditions. Further, as discussed in Section 3.5.4-2, the Proposed Project would not conflict with GHG emissions reductions plans and policies. Therefore, the incremental contribution of the Proposed Project to cumulatively significant GHG emission impacts would not be cumulatively considerable. The Proposed Project would ultimately provide environmental and community benefits related to GHG emissions reductions and active transportation.

3.5-7.2 Trench Option

The analysis of cumulative impacts associated with implementation of the Trench Option is similar to the discussion presented above for the Proposed Project. The Trench Option is included in the 2020–2045 Connect SoCal RTP/SCS under FTIP ID LA0G632, and would contribute to statewide, regional, and local efforts to reduce light-duty VMT in accordance with SB 375 and the Climate Change Scoping Plan. As discussed in Section 3.5.4-1, although implementation of the Trench Option Project would generate direct GHG emissions during temporary construction activities from off-road equipment and on-road vehicle exhaust and long-term indirect GHG emissions would be generated through energy use (i.e., light rail transit propulsion, lighting and accessory equipment at station platforms), GHG emissions from on-road motor vehicles would be substantially affected through induced mode shift emissions displacement. The Trench Option is anticipated to reduce GHG emissions when compared to future 2042 baseline conditions. Further, as discussed in Section 3.5.4-2, the Proposed Project would not

conflict with GHG emissions reductions plans and policies. The incremental contribution of the Trench Option to cumulatively significant GHG emissions impacts would not be cumulatively considerable. Ultimately, the Trench Option would provide environmental and community benefits related to GHG emissions reductions and active transportation.

3.5-7.3 Hawthorne Option

The analysis of cumulative impacts associated with implementation of the Hawthorne Option is similar to the discussion presented above for the Proposed Project. The Hawthorne Option is included in the 2020–2045 Connect SoCal RTP/SCS under FTIP ID LA0G632, and would contribute to statewide, regional, and local efforts to reduce light-duty VMT in accordance with SB 375 and the Climate Change Scoping Plan. As discussed in Section 3.5.4-1, although implementation of the Hawthorne Option would generate direct GHG emissions during temporary construction activities from off-road equipment and on-road vehicle exhaust and long-term indirect GHG emissions would be generated through energy use (i.e., light rail transit propulsion, lighting and accessory equipment at station platforms), GHG emissions from on-road motor vehicles would be substantially affected through induced mode shift emissions displacement. The Hawthorne Option is anticipated to reduce GHG emissions when compared to future 2042 baseline conditions. Further, as discussed in Section 3.5.4-2, the Proposed Project would not conflict with GHG emissions reductions plans and policies. The incremental contribution of the Hawthorne Option to cumulatively significant GHG impacts would not be cumulatively considerable. Ultimately the Hawthorne Option would provide environmental and community benefits related to GHG emissions reductions and active transportation.