North Hollywood to Pasadena Bus Rapid Transit (BRT) Corridor Planning and Environmental Study

ENERGY RESOURCES TECHNICAL REPORT

Prepared For:

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ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
BRT	Bus Rapid Transit
CAFE	Corporate Average Fuel Economy
CALGreen	California Green Building Standards
Caltrans	California Department of Transportation
CAP	Climate Action Plan
CARB	California Air Resources Board
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CMAQ	Congestion Mitigation and Air Quality
CNG	Compressed Natural Gas
CPUC	California Public Utilities Commission
CTP	California Transportation Plan
ECMP	Energy Conservation and Management Plan
EIR	Environmental Impact Report
EISA	Energy Independence and Security Act
GHG	Greenhouse Gas
ISTEA	Intermodal Surface Transportation Efficiency Act
LADWP	Los Angeles Department of Water and Power
LEED	Leadership in Energy and Environmental Design
MAP-21	Moving Ahead for Progress in the 21st Century Act
Metro	Los Angeles County Metropolitan Transportation Authority
MJ	Megajoules
MPG	Miles per Gallon
NHSTA	National Highway Traffic Safety Administration
PRC	Public Resources Code
RFS	Renewable Fuels Standard
RNG	Renewable Natural Gas
ROW	Right-of-Way
RPS	Renewables Portfolio Standard
RTP	Regional Transportation Plan
SAFE	Safer, Affordable, Fuel-Efficient
SB	Senate Bill

SCAG	Southern California Association of Government
SoCalGas	Southern California Gas Company
TEA-21	Transportation Equity Act for the 21st Century
TSP	Transit Signal Priority
U.S.	United States
VMT	Vehicle Miles Traveled
VRM	Vehicle Revenue Miles
ZEV	Zero-Emission Vehicle

1. Introduction

The Los Angeles County Metropolitan Transportation Authority (Metro) is proposing the North Hollywood to Pasadena Bus Rapid Transit (BRT) Corridor Project (Proposed Project or Project) which would provide a BRT service connecting several cities and communities between the San Fernando and San Gabriel Valleys. Specifically, the Proposed Project would consist of a BRT service that runs from the North Hollywood Metro B/G Line (Red/Orange) station in the City of Los Angeles through the Cities of Burbank, Glendale, the community of Eagle Rock in the City of Los Angeles, and Pasadena, ending at Pasadena City College. The Proposed Project with route options would operate along a combination of local roadways and freeway sections with various configurations of mixed-flow and dedicated bus lanes depending on location. A Draft Environmental Impact Report (EIR) is being prepared for the following purposes:

- To satisfy the requirements of the California Environmental Quality Act (CEQA) (Public Resources Code (PRC) Section 21000, et seq.) and the CEQA Guidelines (California Code of Regulations, Title 14, Chapter 3, Section 15000, et seq.).
- To inform public agency decision-makers and the public of the significant environmental effects of the Proposed Project, as well as possible ways to minimize those significant effects, and reasonable alternatives to the Proposed Project that would avoid or minimize those significant effects.
- To enable Metro to consider environmental consequences when deciding whether to approve the Proposed Project.

This Energy Resources Technical Report is comprised of the following sections:

1. Introduction
2. Project Description
3. Regulatory Framework
4. Existing Setting
5. Significance Thresholds and Methodology
6. Impact Analysis
7. Cumulative Analysis
8. References
9. List of Preparers

2. Project Description

This section is an abbreviated version of the Project Description contained in the Draft EIR. This abbreviated version provides information pertinent to the Technical Reports. Please reference the Project Description chapter in the Draft EIR for additional details about the Proposed Project location and surrounding uses, project history, project components, and construction methods. The Draft EIR also includes a more comprehensive narrative description providing additional detail on the project routing, station locations, and proposed roadway configurations. Unless otherwise noted, the project description is valid for the Proposed Project and all route variations, treatments, and configurations.

2.1 PROJECT ROUTE DESCRIPTION

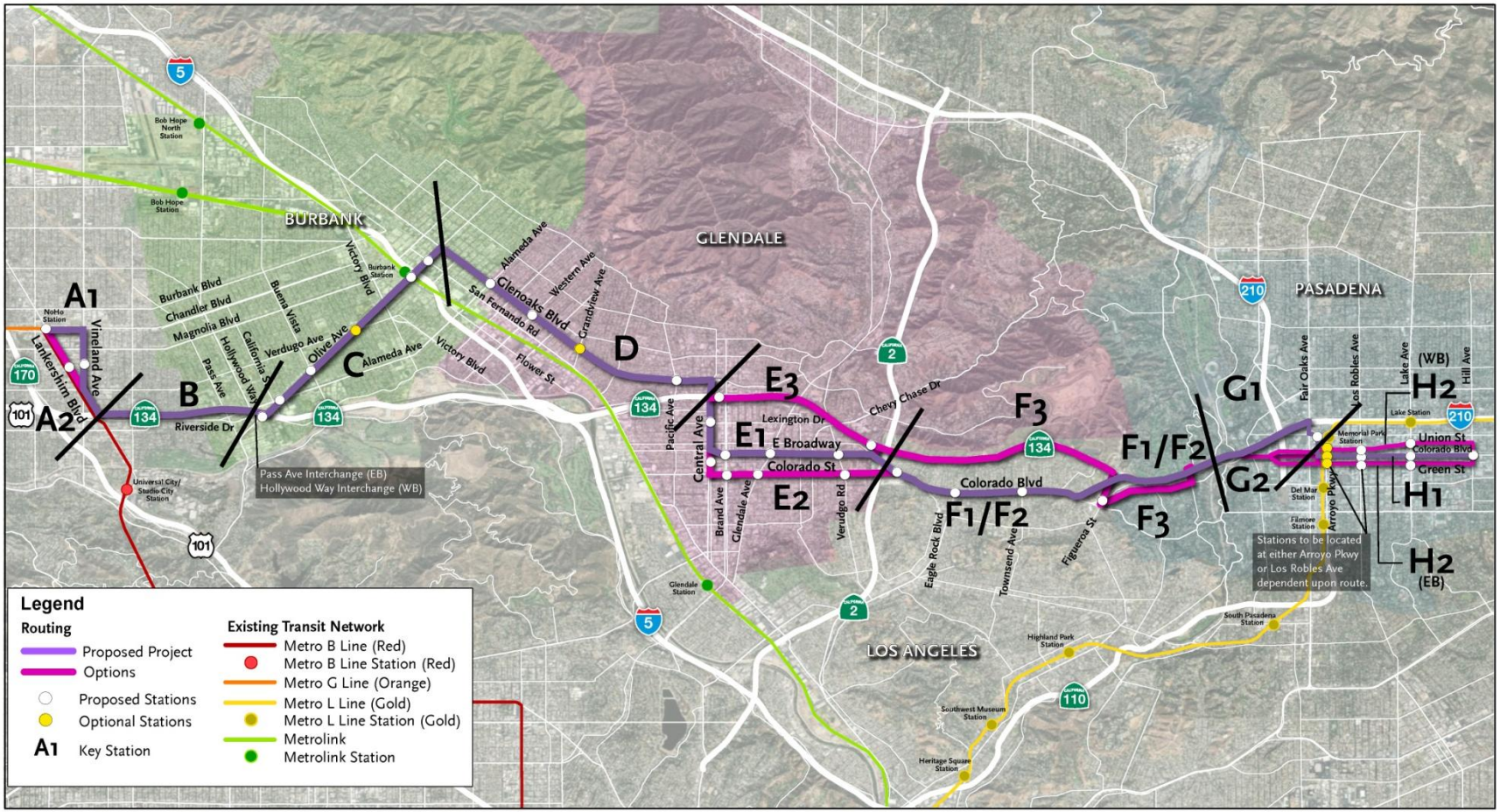
Metro is proposing the BRT service to connect several cities and communities between the San Fernando and San Gabriel Valleys. The Proposed Project extends approximately 18 miles from the North Hollywood Metro B/G Line (Red/Orange) Station on the west to Pasadena City College on the east. The BRT corridor generally parallels the Ventura Freeway (State Route 134) between the San Fernando and San Gabriel Valleys and traverses the communities of North Hollywood and Eagle Rock in the City of Los Angeles as well as the Cities of Burbank, Glendale, and Pasadena. Potential connections with existing high-capacity transit services include the Metro B Line (Red) and G Line (Orange) in North Hollywood, the Metrolink Antelope Valley and Ventura Lines in Burbank, and the Metro L Line (Gold) in Pasadena. The Study Area includes several dense residential areas as well as many cultural, entertainment, shopping and employment centers, including the North Hollywood Arts District, Burbank Media District, Downtown Burbank, Downtown Glendale, Eagle Rock, Old Pasadena and Pasadena City College (see **Figure 1**).

2.2 BRT ELEMENTS

BRT is intended to move large numbers of people quickly and efficiently to their destinations. BRT may be used to implement rapid transit service in heavily traveled corridors while also offering many of the same amenities as light rail but on rubber tires and at a lower cost. The Project would provide enhanced transit service and improve regional connectivity and mobility by implementing several key BRT elements. Primary components of the BRT are further addressed below and include:

- Dedicated bus lanes on city streets
- Transit signal priority (TSP)
- Enhanced stations with all-door boarding

Figure 1 – Proposed Project with Route Options



2.3 DEDICATED BUS LANES

The Proposed Project would generally include dedicated bus lanes where there is adequate existing street width, while operating in mixed traffic within the City of Pasadena. BRT service would operate in various configurations depending upon the characteristics of the roadways as shown below:

- **Center-Running Bus Lanes**: Typically includes two lanes (one for each direction of travel) located in the center of the roadway. Stations are usually provided on islands at intersections and are accessible from the crosswalk.
- **Median-Running Bus Lanes**: Typically includes two lanes (one for each direction of travel) located in the inside lane adjacent to a raised median in the center of the roadway. Stations are usually provided on islands at intersections and are accessible from the crosswalk.
- **Side-Running Bus Lanes**: Buses operate in the right-most travel lane separated from the curb by bicycle lanes, parking lanes, or both. Stations are typically provided along curb extensions where the sidewalk is widened to meet the bus lane. At intersections, right-turn bays may be provided to allow buses to operate without interference from turning vehicles and pedestrians.
- **Curb-Running Operations**: Buses operate in the right-most travel lane immediately adjacent to the curb. Stations are located along the sidewalk which may be widened to accommodate pedestrian movement along the block. Right-turning traffic merges with the bus lane approaching intersections and buses may be delayed due to interaction with right-turning vehicles and pedestrians.
- **Mixed-Flow Operations**: Where provision of dedicated bus lanes is impractical, the BRT service operates in lanes shared with other roadway vehicles, although potentially with transit signal priority. For example, where the service transitions from a center-running to side-running configuration, buses would operate in mixed-flow. Buses would also operate in mixed-flow along freeway facilities.

Table 1 provides the bus lane configurations for each route segment of the Proposed Project.

Table 1 – Route Segments

Key	Segment	From	To	Bus Lane Configuration
A1 (Proposed Project)	**Lankershim Blvd.**	**N. Chandler Blvd.**	**Chandler Blvd.**	**Mixed-Flow**
	Chandler Blvd.	**Lankershim Blvd.**	**Vineland Ave.**	**Side-Running**
	Vineland Ave.	**Chandler Blvd.**	**Lankershim Blvd.**	**Center-Running**
	Lankershim Blvd.	**Vineland Ave.**	**SR-134 Interchange**	**Center-Running** **Mixed-Flow**[1]
A2 (Route Option)	Lankershim Blvd.	N. Chandler Blvd.	SR-134 Interchange	Side-Running Curb-Running[2]
B (Proposed Project)	**SR-134 Freeway**	**Lankershim Blvd.**	**Pass Ave. (EB)** **Hollywood Wy. (WB)**	**Mixed-Flow**
C (Proposed Project)	**Pass Ave. – Riverside Dr. (EB)** **Hollywood Wy. –** **Alameda Ave. (WB)**	**SR-134 Freeway**	**Olive Ave.**	**Mixed-Flow**[3]
	Olive Ave.	**Hollywood Wy. (EB)** **Riverside Dr. (WB)**	**Glenoaks Blvd.**	**Curb-Running**
D (Proposed Project)	**Glenoaks Blvd.**	**Olive Ave.**	**Central Ave.**	**Curb-Running** **Median-Running**[4]
E1 (Proposed Project)	**Central Ave.**	**Glenoaks Blvd.**	**Broadway**	**Mixed-Flow** **Side-Running**[5]
	Broadway	**Central Ave.**	**Colorado Blvd.**	**Side-Running**
E2 (Route Option)	Central Ave.	Glenoaks Blvd.	Colorado St.	Mixed-Flow Side-Running[5]
	Colorado St. – Colorado Blvd.	Central Ave.	Broadway	Side-Running
E3 (Route Option)	Central Ave.	Glenoaks Blvd.	Goode Ave. (WB) Sanchez Dr. (EB)	Mixed-Flow
	Goode Ave. (WB) Sanchez Dr. (EB)	Central Ave.	Brand Blvd.	Mixed-Flow
	SR-134[6]	Brand Blvd.	Harvey Dr.	Mixed-Flow
F1 (Route Option)	Colorado Blvd.	Broadway	Linda Rosa Ave. (SR-134 Interchange)	**Side-Running**
				Side-Running Center Running[7]

Key	Segment	From	To	Bus Lane Configuration
F2 (Proposed Project)	**Colorado Blvd.**	**Broadway**	**Linda Rosa Ave. (SR-134 Interchange)**	**Side-Running**
F3 (Route Option)	SR-134	Harvey Dr.	Figueroa St.	Mixed-Flow
	Figueroa St.	SR-134	Colorado Blvd.	**Mixed-Flow**
	Colorado Blvd.	Figueroa St.	SR-134 via N. San Rafael Ave. Interchange	**Mixed-Flow**
G1 (Proposed Project)	**SR-134**	**Colorado Blvd.**	**Fair Oaks Ave. Interchange**	**Mixed-Flow**
	Fair Oaks Ave.	**SR-134**	**Walnut St.**	**Mixed-Flow**
	Walnut St.	**Fair Oaks Ave.**	**Raymond Ave.**	**Mixed-Flow**
	Raymond Ave.	**Walnut St.**	**Colorado Blvd. or Union St./Green St.**	**Mixed-Flow**
G2 (Route Option)	SR-134	Colorado Blvd.	Colorado Blvd. Interchange	Mixed-Flow
	Colorado Blvd. or Union St./Green St.	Colorado Blvd. Interchange	Raymond Ave.	Mixed-Flow
H1 (Proposed Project)	**Colorado Blvd.**	**Raymond Ave.**	**Hill Ave.**	**Mixed-Flow**
H2 (Route Option)	Union St. (WB) Green St. (EB)	Raymond Ave.	Hill Ave.	Mixed-Flow

Notes:
[1]South of Kling St.
[2]South of Huston St.
[3]Eastbound curb-running bus lane on Riverside Dr. east of Kenwood Ave.
[4]East of Providencia Ave.
[5]South of Sanchez Dr.
[6]Route continues via Broadway to Colorado/Broadway intersection (Proposed Project F2 or Route Option F1) or via SR-134 (Route Option F3)
[7]Transition between Ellenwood Dr. and El Rio Ave.

2.4 TRANSIT SIGNAL PRIORITY

TSP expedites buses through signalized intersections and improves transit travel times. Transit priority is available areawide within the City of Los Angeles and is expected to be available in all jurisdictions served by the time the Proposed Project is in service. Basic functions are described below:

- **Early Green**: When a bus is approaching a red signal, conflicting phases may be terminated early to obtain the green indication for the bus.
- **Extended Green**: When a bus is approaching the end of a green signal cycle, the green may be extended to allow bus passage before the green phase terminates.
- **Transit Phase**: A dedicated bus-only phase is activated before or after the green for parallel traffic to allow the bus to proceed through the intersection. For example, a queue jump may be implemented in which the bus departs from a dedicated bus lane or a station ahead of other traffic, so the bus can weave across lanes or make a turn.

2.5 ENHANCED STATIONS

It is anticipated that the stations servicing the Proposed Project may include the following elements:

- Canopy and wind screen
- Seating (benches)
- Illumination, security video and/or emergency call button
- Real-time bus arrival information
- Bike racks
- Monument sign and map displays

Metro is considering near-level boarding which may be achieved by a combination of a raised curb along the boarding zone and/or ramps to facilitate loading and unloading. It is anticipated that BRT buses will support all door boarding with on-board fare collection transponders in lieu of deployment of ticket vending machines at most stations.

The Proposed Project includes 21 proposed stations and two “optional” stations, and additional optional stations have been identified along the Route Options, as indicated in **Table 2**. Of the 21 proposed stations, four would be in the center of the street or adjacent to the median, and the remaining 17 stations would be situated on curbs on the outside of the street.

Table 2 – Proposed/Optional Stations

Jurisdiction	Proposed Project	Route Option
North Hollywood (City of Los Angeles)	North Hollywood Transit Center (Metro B/G Lines (Red/Orange) Station)	
	Vineland Ave./Hesby St.	Lankershim Blvd./Hesby St.
City of Burbank	Olive Ave./Riverside Dr.	
	Olive Ave./Alameda Ave.	
	Olive Ave./Buena Vista St.	
	Olive Ave./Verdugo Ave. (Optional Station)	
	Burbank-Downtown Metrolink Station	
	Olive Ave./San Fernando Blvd.	
City of Glendale	Glenoaks Blvd./Alameda Ave.	
	Glenoaks Blvd./Western Ave.	
	Glenoaks Blvd./Grandview Ave. (Optional Station)	
	Glenoaks Blvd./Pacific Ave.	
	Central Ave./Lexington Dr.	SR-134 at Brand Blvd.
		Central Ave./Americana Way
	Broadway/Brand Blvd.	Colorado St./Brand Blvd.
	Broadway/Glendale Ave.	Colorado St./Glendale Ave.
	Broadway/Verdugo Rd.	Colorado St./Verdugo Rd.
		SR-134 at Harvey Dr.
Eagle Rock (City of Los Angeles)	Colorado Blvd./Eagle Rock Plaza	
	Colorado Blvd./Eagle Rock Blvd.	
	Colorado Blvd./Townsend Ave.	Colorado Blvd./Figueroa St.
City of Pasadena	Metro L Line (Gold) Station [1] (Raymond Ave./Holly St.)	
	Colorado Blvd./Arroyo Pkwy. [2]	Union St./Arroyo Pkwy. (WB)[2] Green St./Arroyo Pkwy. (EB)[2]
	Colorado Blvd./Los Robles Ave. [1]	Union St./Los Robles Ave. (WB)[1] Green St./Los Robles Ave. (EB)[1]
	Colorado Blvd./Lake Ave.	Union St./Lake Ave. (WB) Green St./Lake Ave. (EB)
	Pasadena City College (Colorado Blvd./Hill Ave.)	Pasadena City College (Hill Ave./Colorado Blvd.)

[1]With Fair Oaks Ave. interchange routing
[2]With Colorado Blvd. interchange routing

2.6 DESCRIPTION OF CONSTRUCTION

Construction of the Proposed Project will likely include a combination of the following elements dependent upon the chosen BRT configuration for the segment: restriping, curb-and-gutter/sidewalk reconstruction, right-of-way (ROW) clearing, pavement improvements, station/loading platform construction, landscaping, and lighting and traffic signal modifications. Generally, construction of dedicated bus lanes consists of pavement improvements including restriping, whereas ground-disturbing activities occur with station construction and other support structures. Existing utilities will be protected or relocated. Due to the shallow profile of construction, substantial utility conflicts are not anticipated, and relocation efforts should be brief. Construction equipment anticipated to be used for the Proposed Project consists of asphalt milling machines, asphalt paving machines, large and small excavators/backhoes, loaders, bulldozers, dump trucks, compactors/rollers, and concrete trucks. Additional smaller equipment may also be used such as walk-behind compactors, compact excavators and tractors, and small hydraulic equipment.

The construction of the Proposed Project is expected to last approximately 24 to 30 months. Construction activities will shift along the corridor so that overall construction activities should be of relatively short duration within each segment. Most construction activities would occur during daytime hours. For specialized construction tasks, it may be necessary to work during nighttime hours to minimize traffic disruptions. Traffic control and pedestrian control during construction would follow local jurisdiction guidelines and the Work Area Traffic Control Handbook. Typical roadway construction traffic control methods will be followed including the use of signage and barricades.

It is anticipated that publicly owned ROW or land in proximity to the Proposed Project's alignment will be available for staging areas. Because the Proposed Project is anticipated to be constructed in a linear segment-by-segment method, there will not be a need for large construction staging areas in proximity to the alignment.

2.7 DESCRIPTION OF OPERATIONS

The Proposed Project will provide BRT service from 4:00 a.m. to 1:00 a.m. or 21 hours per day Sunday through Thursday, and longer service hours (4:00 a.m. to 3:00 a.m.) will be provided on Fridays and Saturdays. The proposed service span is consistent with the Metro B Line (Red). The BRT will operate with 10-minute frequency throughout the day on weekdays tapering to 15 to 20 minutes frequency during the evenings, and with 15-minute frequency during the day on weekends tapering to 30 minutes in the evenings. The BRT service will be provided on 40-foot zero-emission electric buses with the capacity to serve up to 75 passengers, including 35-50 seated passengers and 30-40 standees, and a maximum of 16 buses are anticipated to be in service along the route during peak operations. The buses will be stored at an existing Metro facility.

3. Regulatory Framework

This section provides an overview of applicable regulations and plans currently in place related to energy resource management at the federal, state, regional, and local level.

3.1 FEDERAL REGULATIONS

3.1.1 Energy Policy and Conservation Act of 1975

In 1975, Congress enacted the Federal Energy Policy and Conservation Act, which established the first fuel economy standards for on-road motor vehicles in the United States (U.S.). Pursuant to the Act, the National Highway Traffic Safety Administration (NHTSA) is responsible for establishing additional vehicle standards. In 2012, new fuel economy standards for passenger cars and light trucks were approved for model years 2017 through 2021 (77 Federal Register 62624–63200). Fuel economy is determined based on each manufacturer's average fuel economy for the fleet of vehicles available for sale in the U.S.

3.1.2 Alternative Motor Fuels Act of 1988

The Alternative Motor Fuels Act amended a portion of the Energy Policy and Conservation Act to encourage the use of alternative fuels, including electricity. This Act directed the Secretary of Energy to ensure that the maximum practicable number of federal passenger automobiles and light duty trucks be alcohol-powered vehicles, dual energy vehicles, natural gas-powered vehicles or natural gas dual energy vehicles. This Act also directed the Secretary of Energy to conduct a study regarding such vehicles' performance, fuel economy, safety, and maintenance costs and report to Congress the results of a feasibility study concerning the disposal of such alternative-fueled federal vehicles.

3.1.3 Intermodal Surface Transportation Efficiency Act (ISTEA)

The ISTEA was the first federal legislation regarding transportation planning and policy. This Act presented an intermodal approach to highway and transit funding with collaborative planning requirements, giving additional powers to state and local transportation decision-makers and metropolitan planning organizations. This Act also provided funds for non-motorized commuter trails, defined a number of High Priority Corridors to be part of the National Highway System, and called for the designation of up to five high-speed rail corridors.

The Congestion Mitigation and Air Quality (CMAQ) Improvement Program was created under ISTEA. The program was reauthorized under the Transportation Equity Act for the 21st Century (TEA-21) in 1998 and again as part of the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2005. The purpose of the CMAQ Improvement Program is to fund transportation projects or programs and related efforts that contribute to air quality improvements and provide congestion relief.

3.1.4 Energy Policy Act of 1992

The Energy Policy Act of 1992 was passed to reduce U.S. dependence on foreign petroleum and improve air quality. The Energy Policy Act includes several provisions intended to build an inventory of alternative fuel vehicles in large, centrally fueled fleets in metropolitan areas. The Energy Policy Act requires certain Federal, state, and local government and private fleets to purchase a percentage of light duty alternative fuel vehicles each year. Financial incentives were also included in the Energy Policy Act, such as federal tax deductions for businesses and individuals to cover the incremental cost of alternative fuel vehicles. States are also required by the Energy Policy Act to consider a variety of incentive programs to help promote the expansion of alternative fuel vehicle fleets.

3.1.5 Transportation Equity Act for the 21st Century

The Transportation Equity Act for the 21st Century (TEA-21) was enacted in 1998 as the successor legislation to ISTEA and builds on its established initiatives. This Act reauthorized the CMAQ Improvement Program and authorized federal highway, highway safety, transit and other surface transportation programs over the next six years. It combined the continuation an-d improvement of current programs with new initiatives to meet the challenges of improving traffic safety, protecting and enhancing communities and the natural environment as transportation is provided, and advancing economic growth and competitiveness domestically and internationally through efficient and flexible transportation.

3.1.6 Energy Policy Act of 2005

The Energy Policy Act of 2005 includes provisions for renewed and expanded tax credits for electricity generated by qualified energy sources (i.e., landfill gas), provides bond financing, tax incentives, grants, and loan guarantees for clean renewable energy and rural community electrification, and establishes a Federal purchase requirement for renewable energy called the Renewable Fuels Standard (RFS).

3.1.7 Energy Independence and Security Act of 2007

On December 19, 2007, the Energy Independence and Security Act (EISA) was signed into law. This federal legislation requires ever-increasing levels of renewable fuels (the RFS) to replace petroleum. The Environmental Protection Agency (EPA) is responsible for developing and implementing regulations to ensure that transportation fuel sold in the U.S. contains a minimum volume of renewable fuel. The RFS program regulations were developed in collaboration with refiners, renewable fuel producers, and many other stakeholders.

The RFS program was created under the Energy Policy Act of 2005 and established the first renewable fuel volume mandate in the U.S. As required under the Act, the original RFS program required 7.5 billion gallons of renewable fuel to be blended into gasoline by 2012. Under the EISA, the RFS program was expanded in several key ways that lay the foundation for achieving significant reductions in greenhouse gas (GHG) emissions from the use of renewable fuels,

reducing imported petroleum, and encouraging the development and expansion of the renewable fuels sector in the U.S.

The EISA includes several key provisions that will increase energy efficiency and the availability of renewable energy, which will reduce GHG emissions as a result. The EISA facilitates the reduction of GHG emissions by requiring the following:

- Increasing the supply of alternative fuel sources by setting a mandatory RFS that requires fuel producers to use at least 36 billion gallons of biofuel in 2022;
- Prescribing or revising standards affecting regional efficiency for heating and cooling products, procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances;
- Achieving approximately 25 percent greater efficiency for light bulbs by phasing out old incandescent light bulbs between 2012 and 2014; requiring approximately 200 percent greater efficiency for light bulbs, or similar energy savings, by 2020; and
- While superseded by 2019 EPA and NHTSA actions, the Act included, a) establishing a minimum average fuel economy of 35 miles per gallon (mpg) for the combined fleet of cars and light trucks by 2020, and b) directing the NHTSA to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for trucks.

Additional provisions of EISA address energy savings in government and public institutions, promote research for alternative energy, additional research in carbon capture, international energy programs, and the creation of green jobs.

3.1.8 Light Duty Vehicles Standards

On May 19, 2009, President Obama announced a national policy for fuel efficiency and emissions standards in the U.S. auto industry. The adopted federal standard applied to passenger cars and light-duty trucks for model years 2012 through 2016. The rule surpassed the prior Corporate Average Fuel Economy (CAFE) standards and required an average fuel economy standard of 35.5 mpg and 250 grams of CO_2 per mile by model year 2016, based on EPA calculation methods. These standards were formally adopted on April 1, 2010. In August 2012, standards were adopted for model year 2017 through 2025 passenger cars and light-duty trucks. By 2020, new vehicles are projected to achieve 41.7 mpg—if GHG reductions are achieved exclusively through fuel economy improvements—and 213 grams of CO_2 per mile (Phase 2 standards). By 2025, new vehicles are projected to achieve 54.5 mpg and 163 grams of CO_2 per mile, a reduction of approximately 50 percent relative to 2010.

On September 27, 2019, the EPA and the NHTSA published the “Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program” (84 Federal Register 51310 [September 27, 2019]). The Part One Rule revokes California’s authority to set its own GHG emissions standards and set zero-emission vehicle (ZEV) mandates in California. Both the GHG emission standards and the ZEV sales standards reduce GHG emissions and fossil fuel energy

consumption; as a result of the loss of ZEV sales requirements, there may be fewer ZEVs sold and thus additional gasoline-fueled vehicles sold in future years. California expects Part Two of these regulations to be adopted in 2020, and it is anticipated that the federal government may adopt revised GHG emission standards and fuel efficiency standards. In November 2019, California and 23 other states, environmental groups, and the cities of Los Angeles and New York, filed a petition with the U.S. Court of Appeals for the District of Columbia Circuit, for the EPA to reconsider the published rule. The Court has not yet ruled on the lawsuit.

3.1.9 Moving Ahead for Progress in the 21st Century Act (MAP-21)

Signed by President Obama in July 2012, MAP-21 represented the first multi-year transportation authorization enacted since 2005, funding surface transportation programs with more than $105 billion for fiscal years 2013 and 2014. Among the provisions within MAP-21 that relate to energy is the scope of the state and metropolitan planning processes, which aim to “protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and state and local planned growth and economic development patterns.” MAP-21 also authorized $70 million for a public transportation research program that focuses on energy efficiency and system capacity, among other items. With the exception of the provisions of MAP-21, there is no federal legislation related specifically to the subject of energy efficiency in public transportation project development and operation.

3.2 STATE REGULATIONS

3.2.1 Warren-Alquist Act

The California Legislature passed the Warren-Alquist Act in 1974. The Warren-Alquist Act created the California Energy Commission (CEC), which is the state's primary energy policy and planning agency. The legislation directed the CEC to formulate and adopt the nation’s first energy conservation standards for both buildings constructed and appliances sold in California; removed the responsibility of electricity demand forecasting from the utilities, which had a financial interest in high-demand projections, and transferred it to a more impartial CEC; and directed CEC to embark on an ambitious research and development program, with a particular focus on fostering what were characterized as non-conventional energy sources.

The CEC has five major responsibilities: (1) forecasting future energy needs and keeping historical energy data, (2) licensing thermal power plants 50 megawatts or larger, (3) promoting energy efficiency through appliance and building standards, (4) developing energy technologies and supporting renewable energy, and (5) planning for and directing the state’s response to energy emergencies. Senate Bill (SB) 1389 (Chapter 568, Statutes of 2002) requires the CEC to prepare a biennial integrated energy policy report assessing major energy trends and issues facing the state’s electricity, natural gas, and transportation fuel sectors. The report also provides policy recommendations to conserve resources, protect the environment, and ensure reliable, secure and diverse energy supplies.

California has adopted statewide legislation to address issues related to various aspects of energy consumption and efficiency. Several regulatory entities administer energy policy throughout the state. The California Public Utilities Commission (CPUC) is a state agency created by a constitutional amendment to regulate privately owned utilities providing the telecommunications, electric, natural gas, water, railroad, rail transit, and passenger transportation services. The CPUC is responsible for assuring that California utility customers have safe, reliable utility services at reasonable rates, while protecting utility customers from fraud. The CPUC regulates the planning and approval for the physical construction of electric generation, transmission, or distribution facilities and local distribution pipelines of natural gas.

3.2.2 Renewable Energy and Portfolios Standards

The state has adopted regulations to increase the proportion of electricity from renewable sources.

3.2.2.1 Senate Bill 1389

The CEC is responsible for forecasting future energy needs for the state and developing renewable energy resources and alternative renewable energy technologies for buildings, industry, and transportation. SB 1389 requires the CEC to prepare a biennial integrated energy policy report assessing major energy trends and issues facing the state's electricity, natural gas, and transportation fuel sectors. The report is also intended to provide policy recommendations to conserve resources, protect the environment, and ensure reliable, secure, and diverse energy supplies. The *2015 Integrated Energy Policy Report*, the most recent report required under Senate Bill 1389, was released to the public in February 2016.

3.2.2.2 Senate Bill 1078 and Senate Bill 107

SB 1078 (2002) and SB 107 (2006) created the Renewable Energy Standard, which required electric utility companies to increase procurements from eligible renewable energy resources by at least one percent of their retail sales annually until reaching 20 percent by 2010.

In November 2008, Governor Schwarzenegger signed Executive Order S-14-08, which expands the state's Renewables Portfolio Standard to 33 percent renewable power by 2020. On April 12, 2011, Governor Jerry Brown signed SB X1-2 to increase California's Renewables Portfolio Standard to 33 percent by 2020. SB 350 (Chapter 547, Statues of 2015) further increased the Renewables Portfolio Standard to 50 percent by 2030. The legislation also included interim targets of 40 percent by 2024 and 45 percent by 2027.

On September 10, 2018, Governor Jerry Brown signed SB 100, which further increased California's Renewables Portfolio Standard to achieve 50 percent renewable resources by December 31, 2026, and a 60 percent target by December 31, 2030, while requiring retail sellers and local publicly owned electric utilities to procure eligible renewable electricity for 44 percent of retail sales by December 31, 2024, 52 percent by December 31, 2027, and 60 percent by December 31, 2030, and that the California Air Resources Board (CARB) should

plan for 100 percent eligible renewable energy resources and zero-carbon resources by December 31, 2045.

3.2.2.3 Assembly Bill 118

In 2007, Assembly Bill (AB) 118 created the Alternative and Renewable Fuel and Vehicle Technology Program, to be administered by the CEC. This Program authorizes the CEC to award grants, revolving loans, loan guarantees and other appropriate measures to qualified entities to develop and deploy innovative fuel and vehicle technologies that will help achieve California's petroleum reduction, air quality and climate change goals, without adopting or advocating any one preferred fuel or technology. In addition to funding alternative fuel and vehicle projects, this Program also funds workforce training to prepare the workforce required to design, construct, install, operate, produce, service and maintain new fuel vehicles. The statue was amended in 2008 and 2013, which authorized the CEC to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's climate change policies.

3.2.2.4 Senate Bill 350

The Clean Energy and Pollution Reduction Act of 2015, SB 350 (Chapter 547, Statutes of 2015) was approved by Governor Edmund G. Brown, Jr. on October 7, 2015. SB 350 does the following: (1) increases the standards of California's Renewables Portfolio Standard (RPS) program by requiring that the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources be increased to 50 percent by December 31, 2030; (2) requires the State Energy Resources Conservation and Development Commission to establish annual targets for statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas final end uses of retail customers by January 1, 2030; (3) provides for the evolution of the Independent System Operator into a regional organization; and (4) requires the state to reimburse local agencies and school districts for certain costs mandated by the state through procedures established by statutory provisions. Among other objectives, the legislature intends to double the energy efficiency savings in electricity and natural gas final end uses of retail customers through energy efficiency and conservation (SB 350, Clean Energy and Pollution Reduction Act 2015).

3.2.3 California Building Standard Code

3.2.3.1 Title 24 Standards

The CEC first adopted Energy Efficiency Standards for Residential and Nonresidential Buildings (California Code of Regulations, Title 24, Part 6) in 1978 in response to a legislative mandate to reduce energy consumption in the state. Although not originally intended to reduce GHG emissions, increased energy efficiency and reduced consumption of electricity, natural gas, and other fuels would result in fewer GHG emissions from residential and nonresidential buildings subject to the standard. The standards are updated periodically (typically every three years) to allow for the consideration and inclusion of new energy efficiency technologies and methods.

The Energy Efficiency Standards for Residential and Nonresidential Buildings focuses on several key areas to improve the energy efficiency of renovations and additions to existing buildings as well as newly constructed buildings.. The major efficiency improvements to the residential Standards involve improvements for attics, walls, water heating, and lighting, whereas the major efficiency improvements to the nonresidential Standards include alignment with the American Society of Heating, Refrigerating and Air-Conditioning Engineers 90.1-2013 national standards. Furthermore, the standards require that enforcement agencies determine compliance with the California Code of Regulations, Title 24, Part 6 before issuing building permits for any construction.

3.2.3.2 California Green Building Standards Code

Part 11 of the Title 24 Building Energy Efficiency Standards is referred to as the California Green Building Standards (CALGreen) Code. The purpose of the CALGreen Code is to "improve public health, safety and general welfare by enhancing the design and construction of buildings through the use of building concepts having a reduced negative impact or positive environmental impact and encouraging sustainable construction practices in the following categories: (1) Planning and design; (2) Energy efficiency; (3) Water efficiency and conservation; (4) Material conservation and resource efficiency; and (5) Environmental air quality." The CALGreen Code is not intended to substitute for or be identified as meeting the certification requirements of any green building program that is not established and adopted by the California Building Standards Commission. The CALGreen Code establishes mandatory measures for new residential and non-residential buildings. Such mandatory measures include energy efficiency, water conservation, material conservation, planning and design and overall environmental quality.

3.2.4 State Transportation Planning

3.2.4.1 California Transportation Plan

The California Transportation Plan (CTP) is a statewide, long-range transportation plan to meet future mobility needs developed by the California Department of Transportation (Caltrans). The Plan defines performance-based goals, policies, and strategies to comply with MAP-21 and to achieve an integrated, multimodal transportation system. The Plan is prepared in response to federal and state requirements and is updated every five years. The Plan addresses how the state will achieve maximum feasible emissions reductions, taking into consideration the use of alternative fuels, new vehicle technology and tailpipe emissions reductions. California Department of Transportation (Caltrans) must consult and coordinate with related state agencies, air quality management districts, public transit operators and regional transportation planning agencies. Caltrans must also provide an opportunity for general public input and submit a final draft of the CTP to the legislature and governor. The most recent CTP was published in 2016 (CTP 2040).

3.2.4.2 Senate Bill 375

SB 375 addresses energy resources associated with the transportation sector through regional transportation and sustainability plans. SB 375 required the CARB to adopt regional GHG emissions reduction targets for the automobile and light-truck sector for the milestone years 2020 and 2035, and tasked regional metropolitan planning organizations (MPOs) with the preparation of sustainable communities strategies (SCS) within their regional transportation plans (RTP). The Southern California Association of Governments (SCAG) *Connect SoCal 2020–2045 Regional Transportation Plan/Sustainable Communities Strategy* (RTP/SCS) includes a commitment to reduce emissions from transportation sources to comply with SB 375. The 2016-2040 RTP/SCS states that the region will meet or exceed the SB 375 per capita targets, lowering regional per capita GHG emissions by 8 percent by 2020, 18 percent by 2035, and 22 percent by 2040. The GHG emissions reductions from automobile and light-truck sectors would result from decreased transportation fuels consumption.

3.2.4.3 Senate Bill 743

SB 743 encourages land use and transportation planning decisions and investments to reduce VMT that contribute to GHG emissions, as required by AB 32. SB 743 requires the Office of Planning Research to develop revisions to the CEQA Guidelines and establish criteria to determine the significance of transportation impacts of projects within transit priority areas.

3.2.5 State CEQA Guidelines

CEQA Guidelines Appendix F provides a goal of conserving energy in the state of California. Under CEQA (PRC Section 21100(b)(3)), EIRs must include a discussion of the potential significant energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy. The appendix indicates the following methods to achieve this goal: (1) decreasing overall per capita energy consumption, (2) decreasing reliance on natural gas and oil, and (3) increasing reliance on renewable energy sources. In addition to building code compliance, other relevant considerations may include, among others, the project size, location, orientation, equipment use and any renewable energy features that are incorporated into the project (CEQA Guidelines Section 15126.2(b)).

3.3 LOCAL REGULATIONS

3.3.1 Southern California Association of Governments

SCAG is the MPO for the regional planning jurisdiction encompassing Los Angeles, Ventura, San Bernardino, Riverside, Orange, and Imperial Counties. SCAG is required by federal law to prepare and update a long-range RTP (23 U.S. Code [U.S.C.] § 134 et seq.) The RTP must include, among other things: the identification of transportation facilities such as major roadways, transit, intermodal facilities and connectors that function as an integrated metropolitan system over at least a 20 year forecast period; a financial plan demonstrating how the RTP can be implemented with “reasonably available” resources and additional financial

approaches and strategies to improve existing facilities and relieve vehicular congestion and maximize the safety and mobility of people and goods and environmental mitigation activities (23 U.S.C. § 134 (i)(2)). California SB 375, codified in 2008 in Government Code §65080 (b)(2)(B), also requires that the RTP include a SCS that outlines growth strategies for land use and transportation and helps reduce the state's GHG emissions from cars and light duty trucks.

SCAG adopted the *Connect SoCal 2020–2045 RTP/SCS* (*Connect SoCal*) in May 2020, which is the most recent and applicable RTP for the Proposed Project. The document is based on the "Core Vision" rooted in the 2008 and 2012 RTP/SCS plans, that provides a path forward through the intersection of enhancing Sustainable Development, System Preservation and Resilience, Demand and System Management, Transit Backbone, Complete Streets, and Goods Movement. The SCS outlined in the *Connect SoCal* plan incorporates several strategies that SCAG will endeavor to create a safer and more accessible urban environment, including the focus of growth near destinations and mobility options, leveraging technology innovations, supporting implementation of sustainability policies, and promoting a green region. The strategies for land use are integrated with transportation strategies to achieve regional goals. The Proposed Project is identified in *Connect SoCal* as the "BRT Connector – Orange/Red Line to Gold Line."

3.3.2 Los Angeles Countywide Sustainability Plan

The Los Angeles Countywide Sustainability Plan is a regional sustainability plan for unincorporated areas of Los Angeles County. The Countywide Sustainability Plan includes various goals to improve countywide sustainability features and can serve as a template for cities within LA County to formulate their own municipality-level sustainability plans. The Plan includes the following goals:

- Goal 1: Resilient and healthy community environments where residents thrive in place.
- Goal 2: Buildings and infrastructure that support human health and resilience.
- Goal 3: Equitable and sustainable land use and development without displacement.
- Goal 4: A prosperous LA County that provides opportunities for all residents and businesses and supports the transition to a green economy.
- Goal 5: Thriving ecosystems, habitats, and biodiversity.
- Goal 6: Accessible parks, beaches, recreational waters, public lands, and public spaces that create opportunities for respite, recreation, ecological discovery, and cultural activities.
- Goal 7: A fossil fuel-free LA County.
- Goal 8: A convenient, safe, clean, and affordable transportation system that enhances mobility while reducing car dependency.
- Goal 9: Sustainable production and consumption of resources.
- Goal 10: A sustainable and just food system that enhances access to affordable, local, and healthy food.

- Goal 11: Inclusive, transparent, and accountable governance that facilitates participation in sustainability efforts, especially by disempowered communities.
- Goal 12: A commitment to realize OurCounty sustainable goals through creative, equitable, and coordinated funding partnerships.

3.3.3 Metro Energy Management

In recent years, Metro has implemented several policies and plans to enhance energy efficiency throughout its system. In 2011, Metro published its Energy Conservation and Management Plan (ECMP) to serve as a strategic blueprint for proactively guiding energy use in a sustainable, cost-effective, and efficient manner. The ECMP complements Metro's 2007 Energy and Sustainability Policy, focusing on electricity for rail vehicle propulsion, electricity for rail and bus facility purposes, natural gas for rail and bus facility purposes, and the application of renewable energy. The ECMP addresses current and projected energy needs based on 2010 utility data and existing agency plans to meet increasing ridership through system expansion and new facility construction incorporating Measure R initiatives. Metro's efforts to improve energy efficiency and expand renewable energy use are directly correlated with systemwide GHG emissions reductions; the 2012 Metro Climate Action and Adaptation Plan relied upon the ECMP sustainability analyses to set a path forward for reducing Metro's GHG emissions.

Adopted in 2012, the Metro Countywide Sustainability Planning Policy & Implementation Plan outlines Metro's robust approach to improving energy efficiency, reducing GHG emissions, and providing a healthier and more accessible network of transportation and transit infrastructure. The plan includes core principles and priorities, shown in **Table 3**, that guide Metro's transportation planning efforts to influence sustainability outcomes as a regional mobility provider, a project manager, and a steward of public funds. Metro identified three key social, economic, and environmental priorities for each fundamental principle to be advanced through the transportation planning process.

Table 3 – Metro Sustainability Principles and Priorities

Principles/Priorities	Description
PRINCIPLE: CONNECT PEOPLE AND PLACES	
Social Priority: Access	Better Integrate land-use and transportation planning to reduce trip lengths and increase travel choices.
Economic Priority: Prosperity	Reduce transportation costs for residents and provide the mobility necessary to increase economic competitiveness.
Environmental Priority: Green Modes	Promote clean mobility options to reduce criteria pollutants, greenhouse gas emissions, and dependence on foreign oil.
PRINCIPLE: CREATE COMMUNITY VALUE	
Social Priority: Healthy Neighborhoods	Heathy Neighborhoods: Improve public health through traffic safety, reduced exposure to pollutants, and design an infrastructure for active transportation.

Principles/Priorities	Description
Economic Priority: Community Development	Design and build transportation facilities that promote infill development, build community identity, and support social and economic activity.
Environmental Priority: Urban Greening	Enhance and restore natural systems to mitigate the impacts of transportation projects on communities and wildlife, and ecosystems.
PRINCIPLE: CONSERVE RESOURCES	
Social Priority: Context Sensitivity	Build upon the unique strengths of Los Angeles County's communities through strategies that match local and regional context and support investment in existing communities.
Economic Priority: System Productivity	Increase the efficiency and ensure the long-term viability of the multimodal transportation system.
Environmental Priority: Environmental Stewardship	Plan and support transportation improvements that minimize material and resource use through conservation, re-use, re-cycling, and re-purposing.

SOURCE: Metro, *Metro Countywide Sustainability Planning Policy and Implementation Plan*, 2012.

Ultimately, the principles and priorities will be increasingly integrated in planning activities to align and optimize transportation strategies implemented through various planning programs toward a common vision of sustainability; to evaluate proposals for funding programs; to inspire project design, creativity, and innovation; and to guide and communicate sustainability performance.

Since 2009, Metro has prepared an annual Energy & Resource Report to provide an annual evaluation of the sustainability performance of the multimodal system, measured across ten specific performance metrics and through updates on program impact. The 2019 Energy & Resource Report is the most recently published version and it serves as a performance update to the 2018 Energy & Resource Report, which contains a comprehensive assessment of Metro system operations. Between 2017 and 2018, Metro reduced its systemwide energy use per vehicle revenue mile (VRM) by approximately 6.5 percent. Metro has committed to incorporating renewable natural gas (RNG) into its bus fleet, and intends to achieve zero carbon emissions by 2050 through strategies including transitioning its fleet to 100 percent zero-emission buses by 2030 and ensuring 100 percent renewable energy use by 2035. Metro published an updated iteration of its Climate Action and Adaptation Plan in 2019 that summarizes current and projected GHG emissions from Metro operations, describes how climate change could affect Metro's system and operations, and identifies steps to reduce emissions and increase resilience to climate change.

In 2020, Metro published *Moving Beyond Sustainability*, a 10-year strategic plan that is the most comprehensive to date and sets goals, targets, strategies, and actions that align with and emanate from other key Metro guidance documents. The plan is organized into topical strategic focus areas including water quality and conservation, solid waste, materials, construction and operations, energy resource management, emissions and pollution control, resilience and climate adaptation, and economic and workforce development. By recognizing the

intersectionality of these various focus areas, Metro designed a robust, holistic plan to guide the expansion and enhancement of its transit services into the future.

Targets of the plan specifically related to energy resources include:

- Reduce potable water use by 22 percent from the 2020 Business-as-Usual scenario.
- Reduce annual operational solid waste disposal 24 percent from business as usual scenario.
- Achieve Leadership in Energy and Environmental Design (LEED) Silver certification for all new facilities over 10,000 square feet, and achieve Envision certification where LEED is not applicable.
- Design and build 100 percent of capital projects to CALGreen Tier 2 standards.
- Reduce energy consumption by 17 percent at facilities from the 2030 Business as Usual Scenario.
- Increase onsite renewable energy generation to 7.5 megawatts (MW).

3.3.4 City of Los Angeles

The City of Los Angeles has implemented numerous regulations, plans, programs, and policies aimed at reducing citywide energy demands and enhancing energy efficiency. The energy conservation efforts are interrelated with strategies to improve sustainability and regional air quality, as well as transportation and traffic congestion. The following discussions provide a brief overview of the most relevant regulatory initiatives.

3.3.4.1 GreenLA Climate Action Plan

The City has issued guidance promoting sustainable development to reduce GHG emissions Citywide in the form of a Climate Action Plan. The objective of GreenLA is to reduce GHG emissions 35 percent below 1990 levels by 2030. The measures would reduce emissions directly from municipal facilities and operations and create a framework to address citywide GHG emissions. GreenLA lists various focus areas in which to implement GHG reduction strategies. Focus areas include energy, water, transportation, land use, waste, port, airport, and ensuring that changes to the local climate are incorporated into planning and building decisions.

The City published an implementation document titled ClimateLA. ClimateLA presents the existing GHG inventory for the City, describes enforceable GHG reduction requirements, provides mechanisms to monitor and evaluate progress, and includes mechanisms that allow the plan to be revised in order to meet targets. By 2030, the plan aims to reduce GHG emissions by 35 percent from 1990 levels, which were estimated to be approximately 54.1 million metric tons.

Therefore, the City will need to lower annual GHG emissions to approximately 35.1 million metric tons per year by 2030. To achieve these reductions the City has developed strategies that focus on energy, water use, transportation, land use, waste, open space and greening, and economic factors. To reduce emissions from energy usage, ClimateLA proposes the following goals: increase the amount of renewable energy provided by Los Angeles Department of Water

and Power (LADWP); present a comprehensive set of green building policies to guide and support private sector development; reduce energy consumed by City facilities and utilize solar heating where applicable; and help citizens to use less energy. With regard to waste, ClimateLA sets the goal of reducing or recycling 70 percent of trash by 2015. With regard to open space and greening, ClimateLA includes the following goals: create 35 new parks; revitalize the Los Angeles River to create open space opportunities; plant one million trees throughout the City; identify opportunities to "daylight" streams; identify promising locations for stormwater infiltration to recharge groundwater aquifers; and collaborate with schools to create more parks in neighborhoods.

3.3.4.2 Sustainable City pLAn 2015

In addition to GreenLA, Mayor Eric Garcetti released Los Angeles's first-ever Sustainable City pLAn on April 8, 2015 (City 2015). The pLAn is a roadmap to achieving short-term results and sets a path to strengthen and transform the City in future decades. Recognizing the risks posed by climate change, Mayor Garcetti set time-bound outcomes on climate action, most notably to reduce GHG emissions by 45 percent by 2025, 60 percent by 2035, and 80 percent by 2050, all against a 1990 baseline. Los Angeles' emissions are 20 percent below the 1990 baseline as of 2013, putting Los Angeles nearly halfway to the 2025 pLAn reduction target of 45 percent. In addition, the 20 percent reduction exceeds the 15 percent statewide goal listed in the First Update to the AB 32 Scoping Plan.

3.3.4.3 Mobility Plan 2035

State law requires that municipal General Plans must contain seven mandatory elements: land use, transportation, housing, conservation, open space, noise, and safety; the City of Los Angeles has 12 elements within its General Plan to better address the specific local planning challenges it faces. Adopted by the City Council in September 2016, Mobility Plan 2035 represents the transportation element of the Los Angeles General Plan dedicated to improving multimodal connectivity throughout the City. Key policy initiatives of Mobility Plan 2035 most relevant to energy resources and public transit are shown in **Table 4**.

3.3.4.4 L.A.'s Green New Deal – Sustainable City pLAn 2019

In April 2019, Mayor Eric Garcetti released L.A.'s Green New Deal (Sustainable City pLAn 2019). Rather than an adopted plan, the Green New Deal is a mayoral initiative that consists of a program of actions designed to create sustainability-based performance targets through 2050 that advance economic, environmental, and equity objectives. L.A.'s Green New Deal (Sustainable City pLAn 2019) is the first four-year update to the City's first Sustainable City pLAn that was released in 2015. It augments, expands, and elaborates in even more detail L.A.'s vision for a sustainable future and it addresses climate change with accelerated targets and new aggressive goals.

Table 4 – Mobility Plan 2035 Initiatives

Policy	Description
2.3 Pedestrian Infrastructure	Recognize walking as a component of every trip and ensure high-quality pedestrian access in all site planning and public right-of-way modifications to provide a safe and comfortable walking environment.
2.5 Transit Network	Improve the performance and reliability of existing and future bus service.
2.9 Multiple Networks	Consider the role of each enhanced network when designing a street that includes multiple modes.
2.11 Transit Right-of-Way Design	Set high standards in determining transit rights-of-way that considers user experience and supports active transportation infrastructure.
2.12 Walkability and Bikeway Accommodations	Design for pedestrian and bicycle travel when rehabilitating or installing a new bridge, tunnel, or exclusive transit right-of-way.
3.2 People with Disabilities	Accommodate the needs of people with disabilities when modifying or installing infrastructure in the public right-of-way.
3.3 Land Use Access and Mix	Promote equitable land use decisions that result in fewer vehicle trips by providing greater proximity and access to jobs, destinations, and other neighborhood services.
3.4 Transit Services	Provide all residents, workers, and visitors with affordable, efficient, convenient, and attractive transit services.
3.5 Multi-Modal Features	Support “first-mile, last-mile solutions” such as multi-modal transportation services, organizations, and activities in the areas around transit stations and major bus stops (transit stops) to maximize multi-modal connectivity.
3.7 Regional Transit Connections	Improve transit access and service to major regional destinations, job centers, and inter-modal facilities.
3.8 Bicycle Parking	Provide bicyclists with convenient, secure, and well-maintained bicycle parking facilities.
3.9 Increased Network Access	Discourage the vacation of public rights of way.
4.11 Cohesive Regional Mobility	Communicate and partner with SCAG, Metro, and adjacent cities and local transit operators to plan and operate a cohesive regional mobility system.
5.1 Sustainable Transportation	Encourage the development of a sustainable transportation system that promotes environmental and public health.
5.2 Vehicle Miles Traveled (VMT)	Support ways to reduce VMT per capita.
5.4 Clean Fuels and Vehicles	Continue to encourage the adoption of low and zero emission fuel sources, new mobility technologies, and supporting infrastructure.

SOURCE: City of Los Angeles, *Mobility Plan 2035*, 2016.

While not a plan adopted solely to reduce GHG emissions, within L.A.'s Green New Deal (Sustainable City pLAn 2019), climate mitigation is one of eight explicit benefits that help define its strategies and goals. These include reducing GHG emissions through near-term outcomes:

- Reduce potable water use per capita by 22.5 percent by 2025; 25 percent by 2035; and maintain or reduce 2035 per capita water use through 2050.
- Reduce building energy use per square foot (sf) for all building types by 22 percent by 2025; 34 percent by 2035; and 44 percent by 2050 (from a baseline of 68 million British thermal units/square feet in 2015).
- All new buildings will be net zero carbon by 2030 and 100 percent of buildings will be net zero carbon by 2050.
- Ensure 57 percent of new housing units are built within 1,500 feet of transit by 2025; and 75 percent by 2035.
- Increase the percentage of all trips made by walking, biking, micro-mobility/matched rides or transit to at least 35 percent by 2025, 50 percent by 2035, and maintain at least 50 percent by 2050.
- Reduce VMT per capita by at least 13 percent by 2025; 39 percent by 2035; and 45 percent by 2050.
- Increase the percentage of electric and zero emission vehicles in the City to 25 percent by 2025; 80 percent by 2035; and 100 percent by 2050.

The Green New Deal builds upon the City's Sustainable City pLAn, in which the City met or exceeded 90 percent of the pLAn's long-term goals on time or early, resulting in a reduction of GHG emissions by 11 percent in a single year and creating more than 35,000 green jobs.

3.3.5 City of Burbank

The City of Burbank adopted its General Plan 2035 in 2013, which contains numerous items related to management of energy resources. **Table 5** presents the most relevant elements of the Burbank General Plan 2035 that are directly or indirectly associated with public transit and energy resource management.

Table 5 – Burbank General Plan 2035 Goals and Policies

Goal/Policy	Description
AIR QUALITY & CLIMATE CHANGE ELEMENT	
Goal 1 Reduction of Air Pollution	Promote planning and programs that reduce air pollutants to improve the health and sustainability of the city and county. Implement policies that reduce fossil fuel combustion (by reducing VMT and promoting conservation and use of renewable energy) to lessen adverse impacts on both air quality and climate change.
Policy 1.9	Encourage the use of zero-emission vehicles, low-emission vehicles, bicycles, and other non-motorized vehicles.
Policy 1.11	Offer incentives for all City employees to use means other than single-occupant vehicles for their daily work commute.

Goal/Policy	Description
Goal 3 Reduction of Greenhouse Gas Emissions	Burbank seeks a sustainable, energy-efficient future and complies with statewide GHG reduction goals.
Policy 3.2	Establish goals and strategies to reduce communitywide GHG emissions by at least 30% from current levels by 2035.
Policy 3.4	Reduce GHG emissions from new development by promoting water conservation and recycling; promoting development that is compact, mixed-use, pedestrian friendly, and transit-oriented; promoting energy-efficient building design and site planning; and improving the jobs/housing ratio.
LAND USE ELEMENT	
Goal 4 Public Spaces and Complete Streets	Complete streets enhance the image and character of the community and create inviting public spaces.
Policy 4.1	Develop complete streets that create functional places meeting the needs of pedestrians, bicyclists, wheelchair users, equestrians, and motorists.
Policy 4.5	Require that pedestrian-oriented areas include amenities such as sidewalks of adequate width, benches, street trees and landscaping, decorative paving, public art, kiosks, and restrooms.
MOBILITY ELEMENT	
Goal 1 Balance	Develop a transportation system that ensures economic vitality while preserving neighborhood character.
Policy 1.1	Consider economic growth, transportation demands, and neighborhood character in developing a comprehensive transportation system that meets Burbank's needs.
Policy 1.2	Recognize that Burbank is a built-out city and wholesale changes to street rights-of-way are infeasible.
Policy 1.4	Ensure that future land uses can be adequately served by the planned transportation system.
Goal 2 Sustainability	Burbank's transportation system will adapt to changing mobility and accessibility needs without sacrificing today's community values.
Policy 2.1	Improve Burbank's alternative transportation access to local and regional destinations through land use decisions that support multimodal transportation.
Policy 2.3	Prioritize investments in transportation projects and programs that support viable alternatives to automobile use.
Policy 2.5	Consult with local, regional, and state agencies to improve air quality and limit GHG emissions from transportation and goods movement.
Goal 3 Complete Streets	Burbank's complete streets will meet all mobility needs and improve community health.
Policy 3.2	Complete city streets by providing facilities for all transportation modes.
Policy 3.3	Provide attractive, safe street designs that improve transit, bicycle, pedestrian, and equestrian connections between homes and other destinations.
Policy 3.5	Design street improvements so they preserve opportunities to maintain or expand bicycle, pedestrian, and transit systems.

Goal/Policy	Description
Goal 4 Transit	Burbank's convenient, efficient public transit network provides a viable alternative to the automobile.
Policy 4.1	Ensure that local transit service is reliable, safe, and provides high-quality service to major employment centers, shopping districts, regional transit centers, and residential areas.
Policy 4.4	Advocate for improved regional bus transit, bus rapid transit, light rail, or heavy rail services linking Burbank's employment and residential centers to the rest of the region.
Policy 4.5	Improve transit connections with nearby communities and connections to Downtown Los Angeles, West San Fernando Valley, Hollywood, and the Westside.
Policy 4.7	Integrate transit nodes and connection points with adjacent land uses and public pedestrian spaces to make them more convenient for transit users.
Policy 4.8	Promote multimodal transit centers and stops to encourage seamless connections between local and regional transit systems, pedestrian and bicycle networks, and commercial and employment centers.
OPEN SPACE & CONSERVATION ELEMENT	
Goal 10 Energy Resources	Burbank conserves energy, uses alternative energy sources, and promotes sustainable energy projects that reduce pollution and fossil fuel consumption.
Policy 10.4	Encourage residents and businesses to reduce vehicle use or to purchase alternatively fueled vehicles.
Policy 10.5	Promote technologies that reduce use of non-renewable energy resources.

SOURCE: City of Burbank, *General Plan 2035*, 2013.

3.3.6 City of Glendale

The City of Glendale General Plan contains several elements that address energy resources management, conservation, and efficiency that are relevant to Proposed Project implementation. The Glendale Circulation Plan contains Goals and Objectives that set direction for the city's policies, principles, standards, and programs related to community mobility. Goals represent long-term, slowly evolving statements of community initiatives, and Objectives are mid-term measurable advancements to guide the city to its ultimate goals. **Table 6** provides a summary of the components pertinent to public transit accessibility and the energy benefits of reducing on-road passenger vehicle travel and transportation fuels consumption.

In addition to the Circulation Plan, Glendale published a Greener Glendale Plan – The City of Glendale's Sustainability Plan that also addresses energy resource management and efficiency related to public transit and transportation fuels consumption. The Transportation component contains several objectives and strategies aimed at expanding and encouraging public transit access and use, which are summarized in **Table 7**.

Table 6 – Glendale Circulation Plan Goals and Objectives

Goal/Objective	Description
Goal 2	Minimization of congestion, air pollution, and noise associated with motor vehicles.
Objective 2.1	Increase/support public and high occupancy vehicle transportation system improvements through mitigation of traffic impacts from new development.
Goal 3	Reasonable access to services and goods in Glendale by a variety of transportation modes.
Objective 3.1	Encourage growth in areas and in patterns which are or can be well served by public transportation.
Objective 3.4	Ensure transportation connections to regional systems by a variety of nodes.

SOURCE: City of Glendale, *Circulation Plan*, 2012.

Table 7 – Greener Glendale Plan Transportation Objectives

Goal/Objective	Description
Objective T1	Facilitate the provision of alternative transportation infrastructure.
Policy T1-A	Incentivize community provision and funding of public transit and bicycle, pedestrian, and multi-modal infrastructure, such as in renovations and new development projects.
Policy T1-D	Explore opportunities to reduce vehicle travel lanes/widths in order to provide spaces for other modes of transportation (a.k.a., “road diets”).
Policy T1-G	Connect Glendale to the regional light rail network and high speed rail, should it be developed.
Objective T2	Promote and encourage alternative forms of transportation.
Policy T2-A	Encourage businesses, schools, hospitals, etc. to provide telecommuting options, incentives for utilizing alternative transportation, and other programs promoting the use of car-share, bicycles, and public transit to their employees/students.

SOURCE: City of Glendale, *Greener Glendale Plan*, 2012.

3.3.7 City of Pasadena

The City of Pasadena updated the Mobility Element of its General Plan in 2015, which contains Mobility Objectives that are incorporated into local planning endeavors to promote a city where people can circulate without cars. The Mobility Objectives and subheading policies relevant to transit system implementation and energy resource management are summarized in **Table 8**.

Table 8 – Pasadena Mobility Plan Objectives

Objective/Policy	Description
Objective 1	Enhance livability.
Policy 1.2	Promote greater linkages between land uses and transit, as well as non-vehicular modes of transportation to reduce vehicular trip related emissions.
Policy 1.9	Support local and regional air quality, sustainability, and GHG emission reduction goals through management of the City’s transportation network.
Policy 1.16	Support mobility performance measures which support the City’s sustainability goals.

Objective/Policy	Description
Policy 1.25	Assess ways to improve availability of transit for underserved populations.
Policy 1.31	Emphasize transportation projects and programs that will contribute to a reduction in vehicle miles traveled per capita, while maintaining economic vitality and sustainability.
Objective 2	Encourage walking, biking, transit, and other alternatives to motor vehicles.
Policy 2.1	Continue to support the construction of the Gold Line Foothill Extension transit service and the expansion and use of regional and local bus transit service.
Policy 2.3	Provide convenient, safe and accessible transit stops.

SOURCE: City of Glendale, *Greener Glendale Plan*, 2012.

In 2018, the City of Pasadena prepared a climate action plan (CAP) with the goal to reduce community-wide GHG emissions 27 percent below 2009 levels by 2020, 49 percent below 2009 levels by 2030, 59 percent below 2009 levels by 2035, and 83 percent below 2009 levels by 2050. City initiatives to reduce GHG emissions are directly and indirectly correlated with energy resource management, improving energy efficiency, and reducing transportation fuels consumption. The Pasadena CAP contains strategies and measures to achieve the established targets; the elements pertinent to developing transit systems and transportation energy are presented in **Table 9**.

Table 9 – City of Pasadena CAP Reduction Strategies and Measures

Strategies/Measures	Strategy/Measure Description
Strategy 1	Sustainable Mobility and Land Use
Measure T-1	Walking and Bicycling
T-1.1	Continue to expand Pasadena's bicycle and pedestrian network
T-1.2	Continue to improve bicycle and pedestrian safety
T-1.3	Continue to encourage bicycle and pedestrian travel
Measure T-2	Public Transit
T-2.1	Continue to enhance safe, reliable, and seamless transit services
Measure T-3	Transportation Demand Management
T-3.1	Decrease annual commuter miles traveled by single-occupancy vehicles
T-3.2	Improve the existing transportation system to smooth traffic flow, reduce idling, minimize bottlenecks, and encourage efficient driving techniques
Measure T-4	Alternative Fuel Vehicles
T-4.1	Expand the availability and use of alternative fuel vehicles and fueling infrastructure
Measure T-5	Transit-Oriented Development
T-5.1	Facilitate high-density, mixed-use, transit-oriented and infill development
Measure T-6	Construction Vehicles
T-6.1	Reduce GHG emissions from heavy-duty construction equipment and vehicles
Measure T-7	Lawn and Garden Equipment
T-7.1	Reduce GHG emissions from lawn and garden equipment

Strategies/Measures	Strategy/Measure Description
Measure WC-3	Storm Water
WC-3.1	Improve storm water systems to slow, sink, and treat run-off, recharge groundwater, and improve water quality
Strategy 4	Solid Water Reduction
Measure WR-1	Solid Waste
WR-1.1	Continue to reduce solid waste and landfill GHG emissions

SOURCE: City of Pasadena, *CAP*, 2018.

4. Existing Setting

4.1 ENERGY RESOURCES OVERVIEW

Various forms of energy resources are used to fuel on-road vehicles, provide lighting and heat for residential and non-residential buildings, treat, supply, and distribute potable water, among many other end uses. Direct and indirect energy resources involved in the Proposed Project's transit system implementation include electricity, natural gas, and transportation fuels (i.e., gasoline and diesel fuel). This section provides a brief discussion of the types of energy resources that would be consumed by construction and operation of the Proposed Project and how they are produced and distributed to the respective end uses.

4.1.1 Electricity

The production of electricity requires the consumption or conversion of other natural resources, whether it be water (hydroelectric power), wind, oil, gas, coal, or solar energy. The delivery of electricity as a utility involves several system components for distribution and use. Electricity is distributed through a network of transmission and distribution lines referred to as a power grid. Energy capacity, or electrical power, is generally measured in watts (W), while energy use is measured in watt-hours (Wh), which is the integral electricity consumption over a time period of one hour. On a utility scale, the capacity of electricity generation and amount of consumption is generally described in MW and megawatt-hours (MWh), respectively. Within the Proposed Project area, electricity providers include:

- Los Angeles Department of Water and Power (LADWP)
- Burbank Water and Power
- Glendale Water and Power
- Pasadena Water and Power

4.1.2 Natural Gas

Natural gas is a combustible mixture of simple hydrocarbon compounds (primarily methane) that is a fossil energy source formed deep beneath the earth's surface. Surveys are performed to identify potential productive natural gas deposits, and wells are drilled either vertically or horizontally to extract the gas from its origin. Natural gas consumed in California is obtained from its naturally occurring subterranean reservoirs and delivered through high-pressure transmission pipelines. Natural gas provides almost one-third of the total energy requirements in California and is generally measured in units of standard cubic feet or British thermal units. The Southern California Gas Company (SoCalGas) is the natural gas provider for the Project Area.

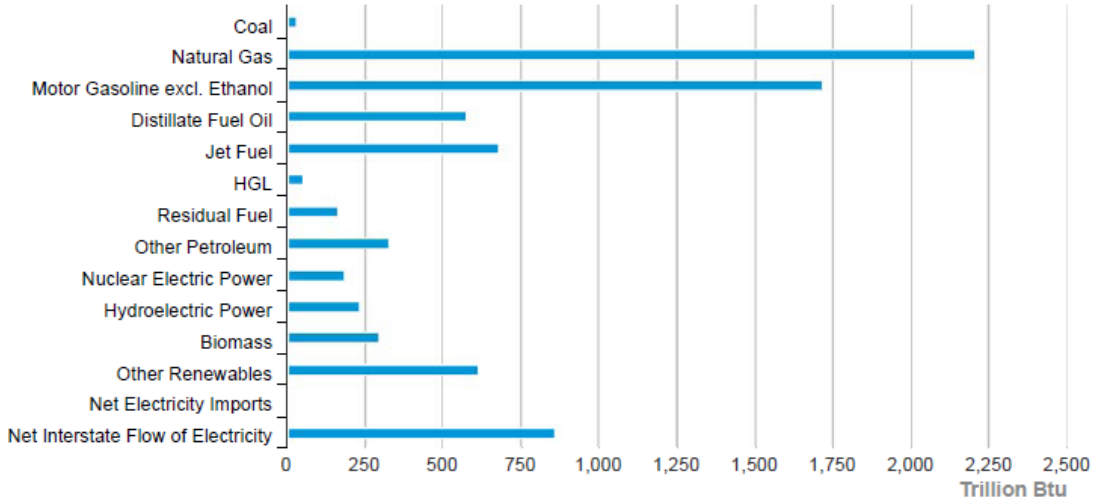
4.1.3 Transportation Fuels

The spark-ignited internal combustion engines of on-road motor vehicles and off-road equipment use fossil fuel energy for propulsion. Gasoline and diesel fuel are formulations of fossil fuels refined for use in various applications. Gasoline is the primary fuel source for most passenger automobiles, and diesel fuel is the primary fuel source for most off-road equipment and medium and heavy-duty trucks. The assessment of energy resources includes a quantitative evaluation of the transportation fuels that would be consumed during construction and operation of the Proposed Project.

4.2 STATE SETTING

This subsection provides a brief overview of the statewide energy resources for electricity, natural gas, and transportation fuels. Electricity, natural gas, and renewable energy production, consumption, research, and conservation within the state are managed by the CEC in coordination with the CPUC and the California Department of Conservation. California's consumption by source for the year 2018 is shown in **Figure 2**. Natural gas and gasoline are the most consumed resources and account for 27.6 percent and 21.5 percent of all energy consumption, respectively, followed by jet fuel at 8.6 percent, and distillate fuel oil at 7.2 percent. Other renewables (solar, wind, etc.) accounts for approximately 7.7 percent of all energy consumption in the State.

Figure 2 – California Energy Consumption by Source 2018



SOURCE: EIA 2020.

4.2.1 Electricity

According to the U.S Energy Information Administration (EIA) State Energy Profile, California is among the top states in the nation in net electricity generation from renewable resources. The state leads the nation in net electricity generation from solar, geothermal, and biomass. California is also a leading producer of electricity from conventional hydroelectric power and wind, ranking fourth in the nation in both. California has considerable solar potential, especially

in the state's southeastern deserts and several of the world's largest solar thermal plants are located in California's Mojave Desert. Substantial geothermal resources are also found in California's coastal mountain ranges and in the volcanic areas of northern California, as well as along the state's border with Nevada and near the Salton Sea.

Electricity in California is produced in a variety of ways and consumed in many more. In 2018, renewable resources—including hydroelectric and non-commercial solar installations—supplied almost half (44 percent) of California's in-state electricity generation, which was approximately 195,027 GWh of electrical power. Hydropower accounted for approximately 13 percent of generation in 2018 and fluctuates based on precipitation patterns. Non-hydroelectric renewable technologies, such as solar, wind, geothermal, and biomass, provided about 30 percent of net generation from utility-scale (greater than one MW) facilities. Natural gas-fired power plants provided more than 46 percent of in-state electricity, and nuclear power accounted for approximately 9.4 percent. Solar and wind now account for approximately 23 percent of in-state electricity generation. In 2018 California also relied on 90,648 GWh of net electricity imports, less than 15 percent of which was sourced from coal-fired power plants.

4.2.2 Natural Gas

California's natural gas output equals about one-tenth of state demand. Almost two-thirds of California households use natural gas for home heating, and almost half of the state's utility-scale electricity generation is fueled by natural gas. Several interstate natural gas pipelines enter the state from Arizona, Nevada, and Oregon and bring natural gas into California from the Southwest, the Rocky Mountain region, and western Canada. Almost all the natural gas delivered to California is used in the state or is placed in storage. California has 14 natural gas storage reservoirs in 12 storage fields, together those fields have a natural gas storage capacity of about 600 billion cubic feet.

4.2.3 Transportation Fuels

According to the CEC, transportation fuels account for nearly 40 percent of statewide total energy demand and approximately 39 percent of the state's GHG emissions. In 2018, California consumed 15.5 billion gallons of gasoline and 3.7 billion gallons of diesel fuel. Petroleum-based fuels currently account for more than 90 percent of California's transportation fuel use. To address the magnitude of transportation fuel consumption, California has implemented several polices, rules, and regulations to improve vehicle efficiency, increase the development and use of alternative fuels, reduce air pollutants and GHG emissions from the transportation sector, and reduce on-road vehicle miles traveled. The California initiatives have begun to gradually reduce statewide dependence on fossil fuels, and the CEC predicts that demand for gasoline will continue to decline as the expansion of public transit infrastructure and use of alternative fuels becomes more prevalent.

4.3 LOCAL SETTING

This subsection provides an overview of local energy resources and the Metro energy resources profile. Although the Proposed Project would traverse local utility jurisdictions of Burbank Water and Power, Glendale Water and Power, and Pasadena Water and Power, it is assumed that the ZEV buses would primarily utilize Metro facilities within the City of Los Angeles for recharging and maintenance. Additional charging may be supplemented at Pasadena City College (PCC), which would be provided by Pasadena Water and Power (PWP). The amount of charging that may occur at PCC is unknown at this time, and the proportion of electricity supplied by PCC would not change the total expenditure of energy resources associated with Proposed Project operations. Energy consumption at station platforms would result in negligible increases to electricity service providers other than LADWP. Therefore, the discussion of local electricity resources focuses on LADWP and Metro resources, as well as regional transportation fuels consumption.

4.3.1 Electricity Provision

LADWP provides electrical service throughout the City, serving approximately four million people within a service area of approximately 465 square miles. LADWP generates power from a variety of energy sources, such as wind, solar, and geothermal sources. According to LADWP's 2017 Power Strategic Long-Term Resource Plan, the department has a net dependable generation capacity greater than 7,880 MW and experienced a net record instantaneous peak demand of 6,500 MW in 2017. Approximately 30 percent of LADWP's 2017 electricity purchases were from renewable sources, which is similar to the statewide proportion. By 2030, LADWP forecasts its energy supply sourcing to be approximately 26 percent natural gas, 60 percent renewable, nine percent nuclear, and five percent large hydroelectric infrastructure. In 2019, LADWP committed with the City to achieve carbon neutrality by 2050, and updated its RPS targets to 50 percent by 2025, 55 percent by 2030, and 65 percent by 2036. As the power supply becomes more dependent upon renewable energy, overall grid efficiency will increase, and associated GHG emissions will be reduced. In the County of Los Angeles, 68,486,187,103 kWh (68,486 GWh) of electricity were consumed in 2018.

4.3.2 Natural Gas Supply

Natural gas is provided to the region by SoCalGas, which is the principal distributor of natural gas in Southern California, serving residential, commercial, and industrial markets. SoCalGas services approximately 21.6 million customers in more than 500 communities encompassing approximately 20,000 square miles throughout Central and Southern California. SoCalGas receives gas supplies from several sedimentary basins in the western U.S. and Canada, including supply basins located in New Mexico (San Juan Basin), West Texas (Permian Basin), the Rocky Mountains, and Western Canada as well as local California supplies. The traditional, southwestern U.S. sources of natural gas will continue to supply most of SoCalGas demand.

SoCalGas, along with five other California utility providers, released the 2018 California Gas Report, presenting a forecast of natural gas supplies and requirements for California through the year 2035. This report predicts gas demand for all sectors (residential, commercial, industrial, energy generation and wholesale exports) and presents best estimates, as well as scenarios for hot and cold years. Overall, SoCalGas predicts a decrease in natural gas demand in future years due to a decrease in per capita usage, energy efficiency policies, and the transition of the State to renewable energy displacing fossil fuels including natural gas.

4.3.3 Local Transportation Fuels

The CEC maintains a statewide database of annual transportation fuel retail sales in accordance with the Petroleum Industry Information Reporting Act (PIIRA) called the *California Retail Fuel Outlet Annual Reporting (CEC-A15)* system. Annual gasoline and diesel fuel sales are available by county within the database for years 2010 through 2018. According to the CEC-A15 data, retail transportation fuels sales in Los Angeles County in 2018 were approximately 3,638 million gallons of gasoline and approximately 253 million gallons of diesel fuel (CEC 2019). More transportation fuels were purchased in Los Angeles County than any other county in the state, accounting for 24 percent of statewide gasoline sales and 14 percent of statewide diesel sales. Retail transportation fuels are provided by approximately 2,078 service stations throughout the County.

4.3.4 Metro System Energy

Metro's contribution to regional energy consumption includes on-road vehicle fuel use (primarily compressed natural gas) and electricity for rail vehicle propulsion and maintenance and administrative facility operation. The *2019 Energy and Resource Report* (Metro 2017c) examined Metro energy use for the 2019 calendar year and refined estimates prepared by previous analysis. **Table 10** presents the Metro system energy consumption by end use between 2015 and 2019. As of 2019, the Metro system comprises 124,695,827 million revenue miles consuming approximately 53.5 megajoules (MJ) of energy per revenue mile, for a total of 6,667.1 million MJ. Metro system energy consumption has decreased by 6.9 percent during the period from 2015 to 2019. Metro has prioritized generating system energy from alternative fuels in recent years. Approximately 30 percent of Metro's electricity is generated by renewable sources, and Metro is on track to utilize 33 percent renewable energy by 2020. Metro plans to phase out all directly operated natural gas buses by 2030 to be replaced by ZEVs.

Table 10 – Metro Operations Energy Consumption

End Use	Annual Energy Consumption (Megajoules)				
	2015	2016	2017	2018	2019
Vehicle Fuel	5,796,786,075	5,644,897,527	5,787,683,879	5,317,489,842	5,357,290,785
Rail Propulsion	719,276,609	711,196,744	775,022,735	817,378,502	781,571,203
Facilities	642,626,521	660,898,312	564,325,336	491,666,179	528,225,942
Total	**7,158,689,205**	**7,016,992,583**	**7,127,031,949**	**6,626,534,523**	**6,667,087,930**

Notes: GGE = gasoline gallon equivalent; kWh = kilowatt hours
SOURCE: Metro, *Energy and Resource Report*, 2019.

5. Significance Thresholds & Methodology

5.1 SIGNIFICANCE THRESHOLDS

In accordance with Appendix G of the State CEQA Guidelines, the Project would have a significant impact related to energy resources if it would:

a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation; and/or,
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

As discussed in the CEQA Guidelines in order to assure that energy implications are considered in project decisions, CEQA requires that EIRs include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy (see PRC Section 21100(b)(3)). The CEQA Guidelines recommend that the assessment of energy impacts include the project's energy use for all phases and components, including transportation-related energy, during construction and operation.

Appendix F of the CEQA Guidelines addresses energy conservation. The objective of conserving energy involves the wise and efficient use of energy, which is achieved through intersecting efforts to decrease overall per capita energy consumption, decrease reliance on fossil fuels such as coal, natural gas, and oil, and increase reliance on renewable energy sources. The CEQA Guidelines acknowledge that environmental impacts analysis related to energy may consider:

- The project's energy requirements and its energy use efficiencies by amount and fuel type for each stage of the project including construction, operation, maintenance and/or removal.
- The effects of the project on local and regional energy supplies and on requirements for additional capacity.
- The effects of the project on peak and base period demands for electricity and other forms of energy.
- The degree to which the project complies with existing energy standards.
- The effects of the project on energy resources.

The above criteria are used to determine the potential significance of energy resources impacts associated with implementation of the Project. Consumption of electricity, natural gas, and transportation fuels during construction and operation of the Project are evaluated quantitatively in the context of local and regional resources. Consistency with relevant renewable energy and energy efficiency planning is addressed qualitatively.

5.2 METHODOLOGY

Under CEQA, energy impacts analyses should evaluate direct and indirect effects of a project on the environment. Direct energy effects for the Proposed Project include the one-time expenditure of gasoline and diesel fuels used by off-road equipment and on-road vehicles during construction activities, as well as operational electricity required for propulsion of the ZEV buses. Indirect energy effects for the Proposed Project include the induced change in regional transportation fuels consumption resulting from mode shift associated with the Project's BRT trips replacing passenger vehicle trips, and the expenditure of natural resources at power plants to produce the electricity for bus propulsion. Direct and indirect energy resources effects are quantified separately for construction and operations.

5.2.1 Evaluation of Construction-Period Impacts

Construction of the Proposed Project would result in the direct expenditure of gasoline and diesel fuels to power off-road equipment and on-road vehicles involved in construction activities. Preliminary planning by Metro determined that construction would last up to 30 months and would generally comprise sidewalk demotion and restoration, BRT station facilities installation, and roadway repaving and restriping. Landscaping features would also be installed in medians along certain segments of the corridor. Construction of the Proposed Project would employ diesel-fueled off-road equipment and on-road material delivery and debris hauling trucks, as well as gasoline-fueled vehicles associated with construction crew trips. The construction energy impacts analysis estimated the one-time expenditure of diesel fuel and gasoline fuel associated with Proposed Project implementation.

The California Emissions Estimator Model (CalEEMod) is the preferred regulatory tool for estimating construction emissions of air pollutants, including GHG emissions, from proposed land use and transportation development projects. Estimates of GHG emissions that would be generated by construction were produced using CalEEMod, as disclosed in the *Greenhouse Gas Emissions Technical Report*. The estimates of methane (CH_4) emissions from off-road equipment and estimates of carbon dioxide (CO_2) emissions from on-road vehicles were used to quantify construction diesel and gasoline fuel consumption using the emission factors presented in **Table 11**, derived from the EPA *Emission Factors for Greenhouse Gas Inventories* which is used by CARB in development of their OFFROAD and EMFAC models.

Table 11 – Mobile Fuel Combustion Factors

Vehicle Type	Fuel Type	Combustion Factor (Units)
Off-Road Equipment	Diesel	0.20 gCH_4/gallon
On-Road Trucks	Diesel	10.21 $kgCO_2$/gallon
On-Road Passenger Vehicles	Gasoline	8.78 $kgCO_2$/gallon

SOURCE: USEPA. *Emission Factors for Greenhouse Gas Inventories*, 2020.

The CalEEMod output emissions of CH_4 from off-road equipment and emissions of CO_2 from on-road vehicles were multiplied by the corresponding conversion factors to estimate the one-time expenditure of fuel consumption during construction. The passenger vehicle emissions

were multiplied by the CARB Off-Model Adjustment Factors published in response to the SAFE Vehicle Rule Part One, using the 2024 value of 1.0315. The CalEEMod output files and detailed energy calculation sheets can be found in the appendix to this Technical Report.

All construction activities would be conducted in accordance with the Metro *Green Construction Policy*, which includes best management practices that would control and minimize the consumption of fuels by off-road equipment and on-road vehicles. Although not accounted for in the quantitative analysis if energy resources, the following measures would be adhered to during construction to reduce fuel consumption to the maximum extent feasible:

- Maintain equipment according to manufacturer specifications.
- Restrict idling of construction equipment and on-road heavy duty trucks to a maximum of 5 minutes when not in use, except as provided to the applicable CARB regulations regarding idling for off-road and on-road equipment.
- Prepare haul routes that conform to local requirements to minimize traversing through congested streets or near sensitive receptor areas.
- Use electric power in lieu of diesel power where available.

5.2.2 Evaluation of Operation-Period Impacts

Operational energy impacts associated with Proposed Project implementation are analyzed in the design year of 2042. As mentioned previously, operational energy consumption would occur directly through the consumption of electricity for propulsion of the ZEV buses, and indirectly through induced changes to transportation fuels consumption through regional mode shift displacing on-road vehicle trips. In addition to the displacement of on-road vehicle trips, operation of the Proposed Project would supplant eastern portions (approximately 303,124 annual revenue miles) of the existing Metro 180 bus line operations, which currently uses compressed natural gas (CNG) for vehicle propulsion. Indirect energy effects resulting from reduced Metro 180 bus travel are accounted for assuming future conversion to electric propulsion. Additionally, natural and renewable resources are indirectly consumed at LADWP facilities to provide the electricity used to charge the ZEV buses, and consumption of these resources is addressed qualitatively based on the LADWP electricity generation profile described in Section 4.3.1 Local Electric Utilities.

Annual direct electricity demand was estimated using projected annual VRM of the ZEV buses as presented in the Project's *Operating Statistics and O&M Costs Report*, which relied upon an estimated one-way trip distance along the BRT corridor of 18.1 miles.

Table 12 presents a summary of the daily and annual VRM for the Proposed Project. Operations would result in approximately 1,348,500 VRM annually. In addition to VRM, the ZEV buses would need to travel to a Metro facility for overnight recharging and any maintenance required. As a conservative approach, it was assumed that the buses would recharge at the El Monte Metro Division, the farthest Metro Division from the route likely to accommodate the Project's fleet, which would increase daily VMT by 36.6 miles of "deadhead" travel per bus.

Table 12 – Project BRT Revenue Miles

Day of Week	Daily Trips (One-Way)	Daily VRM (miles)	Days per Year	Annual VRM (miles)
Monday-Thursday	208	4,012	203	814,400
Friday	220	4,243	52	220,600
Saturday	152	2,932	52	152,400
Sunday/Holiday	144	2,777	58	161,100
			Total Annual Vehicle Revenue Miles	**1,348,500**

SOURCE: Kimley-Horn, *Operating Statistics and O&M Costs Report Appendix C*, 2020.

Charging at PCC, the North Hollywood transit station, or another location on the route would result in less "deadhead" VMT. It was conservatively assumed that the fleet would use up to 20 individual buses per day for operations, and therefore total annual deadhead miles would be 267,180. When combined with VRM, the total annual BRT miles would be 1,615,680 for operations. The electricity consumption associated with ZEV bus propulsion was estimated using a fuel economy factor of 2.2 kWh per VMT (Metro 2019 Climate Action Adaptation Plan).

Implementation of the Proposed Project would also result in changes to regional on-road VMT through transportation mode shift displacing passenger vehicle trips. **Table 13** presents the results of regional transportation modeling Existing (2017) condition and the Existing plus Project (2017) condition along with the 2042 Baseline and Proposed Project conditions in 2042. The table shows that Proposed Project would reduce VMT in the existing and 2042 conditions. Year 2017 was used as the Baseline condition in this analysis to ensure consistency with the regional transportation model. There is a marginal difference (less than 0.1 percent) in regional VMT between 2017 and 2019 and the difference would have no effect to the impact conclusions presented in this analysis.

Table 13 – Regional On-Road Vehicle Miles Traveled

Scenario	Daily VMT	Annual VMT
Existing (2017)	428,794,449	148,791,691,153
Existing + Project (2017)	428,721,905	148,766,500,989
Change from Existing (2017)	-72,594	-25,190,164
Percent Change from Existing (2017)	-0.014%	-0.014%
2042 Baseline	511,871,989	177,619,580,183
Proposed Project (2042)	511,785,330	177,589,509,510
Change from 2042 Baseline	-86,659	-30,070,673
Percent Change from 2042 Baseline	-0.017%	-0.017%

SOURCE: Kimley-Horn, *Transportation Technical Report*, 2020.

The CARB mobile source emissions inventory contains projections for air pollutant. The CARB mobile source emissions inventory contains projections for air pollutant emissions and fuel consumption throughout California. Projected regional fuel consumption within Los Angeles County in 2017 and 2042 from EMFAC2017 was utilized to estimate daily and annual transportation fuels consumption by the on-road vehicle fleet under the Baseline and Proposed Project conditions. Based on the EMFAC2017 database for the operational year 2017, approximately 42.06 gallons of gasoline and 5.76 gallons of diesel fuel are consumed for every 1,000 on-road VMT by the regional fleet. In the operational year 2042, approximately 24.88 gallons of gasoline and 5.61 gallons of diesel fuel would be consumed. These factors were multiplied by the annual VMT for the Baseline and Proposed Project conditions to estimate changes in annual gasoline and diesel fuels consumption resulting from implementation of the Project.

Implementation of Metro's NextGen service and implementation of the Proposed Project would reduce service from existing bus lines that overlap with the proposed BRT route. The existing Metro Line 180 connects Hollywood with Pasadena and would be restructured to reduce service along the route by approximately 303,124 annual VRM under operations. The operational analysis accounted for the displaced bus VRM assuming that the Metro Line 180 would be operating ZEV buses in 2042. Therefore, the Metro consumption factor of 2.2 kWh per mile was applied to the reduction in annual Metro bus VRM resulting from operation of the Proposed Project.

Implementation of the Proposed Project is not anticipated to require the use of any natural gas resources by the operational year of 2042. When operations commence in 2024, it is possible that the fleet would operate CNG buses in its service until ZEV buses become available. The employment of CNG buses would be temporary and would not represent long-term operational conditions. As of 2019, Metro's directly operated natural gas bus fleet comprised 65,492,776 VRM annually and consumed approximately 44,203,405 Therms of natural gas averaging 0.675 Therms of natural gas per VRM (0.675 Therms per VRM), of which approximately 41 percent is sourced from RNG. A conservative estimate of annual natural gas consumption associated with operation of the BRT corridor in the opening year of 2024 is presented for informational disclosure using the 2019 natural gas consumption factor.

6. Impact Analysis

The following section includes the impact analysis, mitigation measures (if necessary), and significance after mitigation measures (if applicable). The potential for the Proposed Project to result in an impact to energy resources is independent of the specific alignment and Project components. The following impact conclusions are valid for the Proposed Project and all route variations, treatments, and configurations.

Impact a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

The analysis of whether the Proposed Project would result in wasteful, inefficient, or unnecessary consumption of energy resources considers the following criteria from the CEQA Guidelines:

- The energy requirements and energy use efficiencies by amount and fuel type for each stage of the project including construction, operation, maintenance and/or removal.
- The effects on local and regional energy supplies and on requirements for additional capacity.
- The effects on peak and base period demands for electricity and other forms of energy.
- The effects on energy resources.

Energy resource consumption is assessed during construction and future operation separately. Construction resource consumption represents a one-time expenditure, while future operational energy is characterized on an annual basis in the design year of 2042. The analysis includes quantitative effects on electricity, natural gas, and petroleum-based transportation fuels.

Construction

Less-Than-Significant Impact. During construction, energy would be consumed in the form of petroleum-based fuels associated with the use of off-road construction vehicles and equipment, construction worker travel, and delivery truck travel, and haul truck travel. Construction is anticipated to last up to 30 months, and as a conservative approach petroleum-based fuels consumption during construction activities accounted for the maximum construction duration. **Table 14** presents a summary of the one-time expenditure of petroleum-based fuels that would be required for construction.

Table 14 – Project Construction Energy Consumption

Construction Activity	Off-Road Equipment Diesel (Gallons)	On-Road Vehicles Diesel (Gallons)	Total Diesel (Gallons)	Construction Worker Gasoline (Gallons)
Demolition	75,500	18	75,518	2,269
Site Preparation	83,000	359	83,359	1,135
Station Construction	722,000	2,458	724,458	7,739
Paving	180,000	693	180,693	2,129
Roadway Striping	30,850	346	31,196	1,059
Total Construction Fuel Consumption (Gallons)			**1,099,225**	**14,331**
Annual Average Fuel Consumption (Gallons)			***438,090***	***5,733***

SOURCE: Terry A. Hayes Associates Inc., 2020.

In total, construction would consume approximately 1,099,225 gallons of diesel fuel through off-road equipment engine combustion, approximately 3,875 gallons of diesel fuel through on-road truck engine combustion, and approximately 14,331 gallons of gasoline through on-road worker vehicle engine combustion. Annual average petroleum-based fuels consumption during construction activities would be approximately 438,090 gallons of diesel fuel and 5,733 gallons of motor gasoline. As disclosed in Section 4.3.3, Local Transportation Fuels, 2018 Los Angeles County retail sales of diesel fuel and gasoline were approximately 253 million gallons and 3,658 million gallons, respectively. Relative to existing petroleum-based transportation fuels consumption in Los Angeles County, construction would temporarily increase annual diesel fuel consumption within the County by approximately 0.17 percent and would temporarily increase annual gasoline fuel consumption by approximately 0.0002 percent.

All equipment and vehicles that would be used in construction activities would comply with applicable CARB regulations, the Pavley and Low Carbon Fuel Standards, the CAFE Standards. Construction would not place an undue burden on available petroleum-based fuel resources. Based on the CARB EMFAC2017 mobile source inventory, and given that the Proposed Project fleet will be fully ZEV by no later than 2030, the one-time expenditure of gasoline would be offset by operations within one year and the one-time expenditure of diesel fuel would be offset within five years of operation through transportation mode shift. The temporary additional transportation fuels consumption does not require additional capacity provided at the local or regional level.

Construction activities may include lighting for security and safety in construction zones. Lighting would be sparse and would not require additional capacity provided at the local or regional level.

The Proposed Project would adhere to the provisions of the Metro *Green Construction Policy* to control and minimize emissions to the maximum extent feasible. At least 50 percent of debris generated by demolition activities will be diverted from landfills, and all equipment and vehicles would be maintained in accordance with manufacturer specifications and would be subject to

idling limits. Thus, based on the substantiation provided above, construction would not result in wasteful, inefficient, or unnecessary consumption of energy resources. Therefore, the Proposed Project would result in a less-than-significant impact related to construction activities.

Operations

Less-Than-Significant Impact in the Near Term; No Impact in the Long Term. Operations would result in changes to energy resources consumption through direct electricity demand for ZEV bus propulsion and indirect, induced displacement of transportation fuels combustion from passenger vehicles on the regional roadway network. Operation of the BRT corridor would annually comprise 1,348,500 VRM and 267,180 deadhead miles, for a total of 1,615,680 bus miles. **Table 15** presents the direct annual energy consumption associated with operations. Using Metro's electric bus fuel economy of 2.2 kWh per mile, annual electricity consumption would be approximately 3,554.5 MWh in 2042. In 2019, Metro system operations consumed 323,391 MWh of electricity. In the Existing condition, operations would increase systemwide electricity consumption by 1.1 percent. The annual electricity consumption of 3,554.5 MWh assuming that the BRT line is powered by electricity. If the BRT line employed vehicles powered by natural gas, Proposed Project operations would directly consume approximately 1,090,480 Therms annually.

Table 15 – Project Direct Operational Energy Consumption

Route	Annual Vehicle Miles	Electric Bus Fuel Economy (kWh/mile)	Annual Electricity Consumption (MWh)	Metro CNG Bus Fuel Economy (Therms/mile)	Annual Natural Gas Consumption (Therms)
Proposed Project	1,615,680	2.2	3,554.5	0.675	1,090,480
Metro Line 180	-303,124	2.2	-666.9	0.675	-204,589
Net Total	**1,312,556**	**Electricity**	**2,887.6**	**Natural Gas**	**885,891**

SOURCE: Terry A. Hayes Associates Inc., 2020.

Baseline Year 2017 Analysis

Metro system operations consumed approximately 341,592 MWh of electricity in 2017. If operational in 2017, the Existing plus Project electric vehicles would result in a net consumption of 2,887.6 MWh after accounting for reduced Metro Line 180 service, representing a 0.8 percent systemwide increase in electricity use. Electricity to charge buses would potentially be provided by LADWP, SCE, or PWP. Although the Proposed Project would traverse local utility jurisdictions of Burbank Water and Power, Glendale Water and Power, and PWP, it is assumed that the ZEV buses would primarily utilize Metro facilities within the City of Los Angeles for recharging and maintenance. Additional charging may be supplemented at Pasadena City College, which would be provided by PWP, or at the El Monte Maintenance and Storage Facility, which would be provided by SCE. The amount of charging that may occur at Pasadena City College or El Monte Maintenance and Storage Facility is unknown at this time, and the proportion of electricity supplied by PWP or SCE would not change the total expenditure of energy resources associated with Proposed Project operations. Energy consumption at station

platforms would result in negligible increases to electricity service providers other than LADWP. Therefore, the discussion of local electricity resources focuses on LADWP and Metro resources, as well as regional transportation fuels consumption.

According to LADWP's 2017 Power Strategic Long-Term Resource Plan, there is a net dependable generation capacity greater than 7,880 MW and the electrical infrastructure experienced a net record instantaneous peak demand of 6,500 MW in 2017. A 1.1 percent increase in Metro's contribution to the peak demand on the LADWP infrastructure would have a negligible impact on available energy resources. Existing plus Project operations would also eliminate approximately 303,124 annual VRM from Metro Line 180, which would result in a reduction of 667 MWh of electrical demand associated with Metro system operations. The net annual electricity consumption of the Proposed Project would be approximately 2,887.6 MWh per year, which would not constitute a significant increase in demand.

If operational in 2017 and electric buses were not available, Existing plus Project operations would require approximately 1,090,480 Therms of natural gas annually, and produce a net increase in consumption of approximately 885,891 Therms after accounting for the reduced Metro Line 180 operations. In 2017, Metro's directly operated bus fleet consumed approximately 38,562,151 Therms of natural gas. If operational in 2017, Existing plus Project operations would increase Metro bus fleet natural gas consumption by approximately 2.3 percent. The 2.3 percent increase in Metro natural gas consumption in 2017 would not place an undue burden on regional RNG resources. Therefore, the Proposed Project's near-term energy impact would be less than significant.

In addition to direct energy consumption, implementation of the Proposed Project would displace on-road regional VMT by displacing vehicle trips. **Table 16** presents the annual VMT and the corresponding gasoline and diesel fuel consumption in the operational year of 2042 with and without the Proposed Project. Existing plus Project operations would reduce regional transportation fuels consumption by approximately 1,059,489 gallons of gasoline and 145,106 gallons of diesel fuel annually based on fuel consumption of the regional fleet. Reducing on-road VMT is a key land use and transportation strategy for improving air quality, reducing GHG emissions, and decreasing reliance on petroleum-based transportation fuels for regional mobility. The results of the regional transportation modeling and operational fuels consumption analysis demonstrate that the Existing plus Project condition would not have a significant effect related to transportation fuels consumption.

Table 16 – Regional Vehicle Miles Traveled and Fuels Consumption (Year 2017)

Scenario	Annual VMT	Annual Gasoline Consumption (Gallons)	Annual Diesel Fuel Consumption (Gallons)
Existing Conditions (2017)	148,791,691,153	6,258,126,454	857,105,515
Existing + Proposed Project (2017)	148,766,500,989	6,257,066,965	856,960,409
Net Difference	**-25,190,164**	**-1,059,489**	**-145,106**

SOURCE: Terry A. Hayes Associates Inc., 2020.

Energy effects of the Proposed Project related to electricity, natural gas, and transportation fuels consumption are evaluated in total by converting to MJ. Electricity is converted to MJ using a factor of 3,600 MJ/MWh based on Metro's energy conversion chart. For transportation fuels, the conversion factors to MJ include of 1.155 gasoline gallon equivalents (GGE) per diesel gallon and 131.2 MJ per GGE. **Table 17** presents a summary of total Proposed Project energy effects. If operational in 2017 and employing electric propulsion buses, the Proposed Project would reduce annual transportation fuels energy consumption by approximately 150,572,368 MJ. The use of natural gas buses for Existing plus Project (2017) operations would result in a net annual reduction of approximately 67,501,280 MJ.

Table 17 – Proposed Project Total Energy Consumption (Year 2017)

Source	Value	Conversion Factor	Annual Energy (MJ/year)
ELECTRIC BUSES			
Bus Propulsion Electricity	2,887.6 MWh	3,600 MJ/MWh	10,395,360
Displaced Gasoline Fuel	-1,059,489 Gal	131.2 MJ/Gallon	-138,982,453
Displaced Diesel Fuel	-145,106 Gal	151.5 MJ/Gallon	-21,985,275
		Total Energy	**-150,572,368**
NATURAL GAS BUSES			
Bus Propulsion NG	885,891 Therms	105.5 MJ/Therm	93,466,448
Displaced Gasoline Fuel	-1,059,489 Gal	131.2 MJ/Gallon	-138,982,453
Displaced Diesel Fuel	-145,106 Gal	151.5 MJ/Gallon	-21,985,275
		Total Energy	**-67,501,280**

SOURCE: Terry A. Hayes Associates Inc., 2020.

If operational in 2017, the Proposed Project would result in marginal increases to Metro system electricity or natural gas use, depending on the type of vehicle available, and would not create a disproportionate demand on existing energy resources. Implementation of the Proposed Project would result in less than significant short-term energy impacts.

Baseline Year 2042 Analysis

In the operational year 2042, all of Metro's directly operated bus fleet will be fully converted to electric propulsion and there would no possibility for the employment of natural gas vehicles. Operation of the Proposed Project in 2042 would result in a net electricity demand of approximately 2,887.6 MWh per year. As of 2018, approximately 32 percent of LADWP's electric generation profile came from renewable sources. LADWP is committed to achieving a doubling of energy efficiency in electricity generation between 2017 and 2027 and producing 65 percent of its electricity from renewable resources in 2036. The expenditure of natural resources to produce LADWP electricity will be cut in half by 2036, according to compliance with its own energy efficiency planning initiatives. Operation of the Proposed Project in 2042 would not result in a significant impact to electric utilities.

Under the 2042 Baseline condition, annual VMT would be approximately 177,619,580,813, resulting in the consumption of approximately 4,460,414,998 gallons of gasoline and 995,923,521 gallons of diesel fuel. Implementation of the Proposed Project would reduce annual VMT by over 30 million and would decrease regional gasoline and diesel fuels consumption by 755,140 gallons and 168,608 gallons, respectively. **Table 18** presents the annual change in regional on-road VMT and annual transportation fuels consumption resulting from implementation of the Proposed Project in 2042. The reduction of on-road VMT and the minimization of regional dependence on petroleum-based transportation fuels is a primary focus of regional land use and transportation planning strategies.

Table 18 – Regional Vehicle Miles Traveled and Fuels Consumption (Year 2042)

Scenario	Annual VMT	Annual Gasoline Consumption (Gallons)	Annual Diesel Fuel Consumption (Gallons)
2042 Baseline	177,619,580,813	4,460,414,998	995,923,521
Proposed Project	177,589,509,510	4,459,659,858	995,754,913
Net Difference	-30,071,303	-755,140	-168,608

SOURCE: Terry A. Hayes Associates Inc., 2020.

Stations would include low-level lighting for safety and security of riders. Lighting would comply with State and local regulations, including Title 24 energy efficiency requirements. Electricity use for station lighting would be minimal. Lighting would not require additional capacity provided at the local or regional level.

The effects of Proposed Project operations on regional petroleum-based transportation would not constitute a wasteful or inefficient use of energy resources. On the contrary, implementation of the Proposed Project would improve regional transportation energy efficiency. Therefore, the Proposed Project would not result in a significant impact related to operational activities.

Mitigation Measures

No mitigation measures are required.

Significance of Impacts after Mitigation

Less-than-significant impact.

Impact b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

The assessment of potential energy impacts addresses the following criteria outlined in Appendix F of the CEQA Guidelines:

- The project's energy requirements and its energy use efficiencies by amount and fuel type for each stage of the project including construction, operation, maintenance and/or removal.
- The degree to which the project complies with existing energy standards.

Construction

Less-Than-Significant Impact. Energy resources consumption during construction would be predominantly combustion of petroleum-based transportation fuels. As disclosed in the discussion above, construction would result in a one-time expenditure of approximately 1,095,225 gallons of diesel fuel and 14,331 gallons of gasoline. Average annual fuel consumption would be approximately 438,090 gallons of diesel fuel and 5,733 gallons of gasoline. Implementation of Metro's *Green Construction Policy*, the CALGreen Code, and Title 24 would ensure that construction would be consistent with state and local energy plans and policies to reduce energy consumption. The *Green Construction Policy* commits Metro contractors to using 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 rights-of-way. Best practices include Tier 4 emission standards for off-road diesel-powered construction equipment with greater than 50 horsepower and restricting idling to a maximum of five minutes. The CALGreen Code requires reduction, disposal, and recycling of at least 50 percent of nonhazardous construction materials and requires demolition debris to be recycled and/or salvaged. Therefore, the Proposed Project would result in a less-than-significant impact related to construction activities.

Operations

No Impact. Implementation of the Proposed Project would operate a BRT system providing energy efficient mass transit to communities in need of enhanced accessibility options. The BRT system would displace passenger vehicle trips and reduce reliance on petroleum-based transportation fuels. The benefits of the Proposed Project are consistent with the goals, objectives, and policies of SCAG and the cities of Los Angeles, Burbank, Glendale, and Pasadena outlined in the local regulatory framework above. As the renewable energy portfolios of Metro and LADWP expand over time, natural resources consumption to provide the electricity required for BRT operations would become more energy efficient. Operation of the Proposed Project would not conflict with any adopted plan or regulation to enhance energy efficiency or reduce transportation fuels consumption and would support the initiatives of the Metro *2019 Climate Action and Adaptation Plan*. The Proposed Project would not interfere with LADWP renewable portfolio targets and would not result in a wasteful or inefficient expenditure of LADWP resources. The Proposed Project would positively contribute to statewide, regional, and local efforts to create a more efficient and sustainable transportation infrastructure network. Therefore, the Proposed Project would not result in a significant impact related to operational activities.

Mitigation Measures

No mitigation measures are required.

Significance of Impacts after Mitigation

No impact.

7. Cumulative Analysis

CEQA Guidelines Section 15355 defines cumulative impacts as two or more individual actions that, when considered together, are considerable or will compound other environmental impacts. CEQA Guidelines Section 15130(a) requires that an Environmental Impact Report (EIR) discuss the cumulative impacts of a project when the project's incremental effect is "cumulatively considerable." As set forth in CEQA Guidelines Section 15065(a)(3), "cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects. Thus, the cumulative impact analysis allows the EIR to provide a reasonable forecast of future environmental conditions to more accurately gauge the effects of multiple projects.

In accordance with CEQA Guidelines Section 15130(a)(3), a project's contribution is less than cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact. In addition, the lead agency is required to identify facts and analysis supporting its conclusion that the contribution will be rendered less than cumulatively considerable.

CEQA Guidelines Section 15130(b) further provides that the discussion of cumulative impacts reflects "the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone." Rather, the discussion is to "be guided by the standards of practicality and reasonableness and should focus on the cumulative impact to which the identified other projects contribute." CEQA Guidelines Sections 15130(b)(1)(A) and (B) include two methodologies for assessing cumulative impacts. One method is a list of past, present, and probable future projects producing related or cumulative impacts. The other method is a summary of projections contained in an adopted local, regional, or statewide plan, or related planning document that describes or evaluates conditions contributing to the cumulative effect. Such plans may include a general plan, regional transportation plan, or plans for reducing GHG emissions. The cumulative effect on GHG emissions in the Project Area is best addressed through consideration of adopted local, regional, or statewide plan, or related planning documents.

Related Projects that are considered in the cumulative impact analysis are those projects that may occur in the Project Site's vicinity within the same timeframe as the Proposed Project. In this context, "Related Projects" includes past, present, and reasonably probable future projects. Related Projects associated with this growth and located within half a mile of the Project Site are depicted graphically in **Figures 3a** through **3c** and listed in **Table 19**. Related projects of particular relevance to the Proposed Project are discussed below.

Figure 3a – Cumulative Impact Study Area

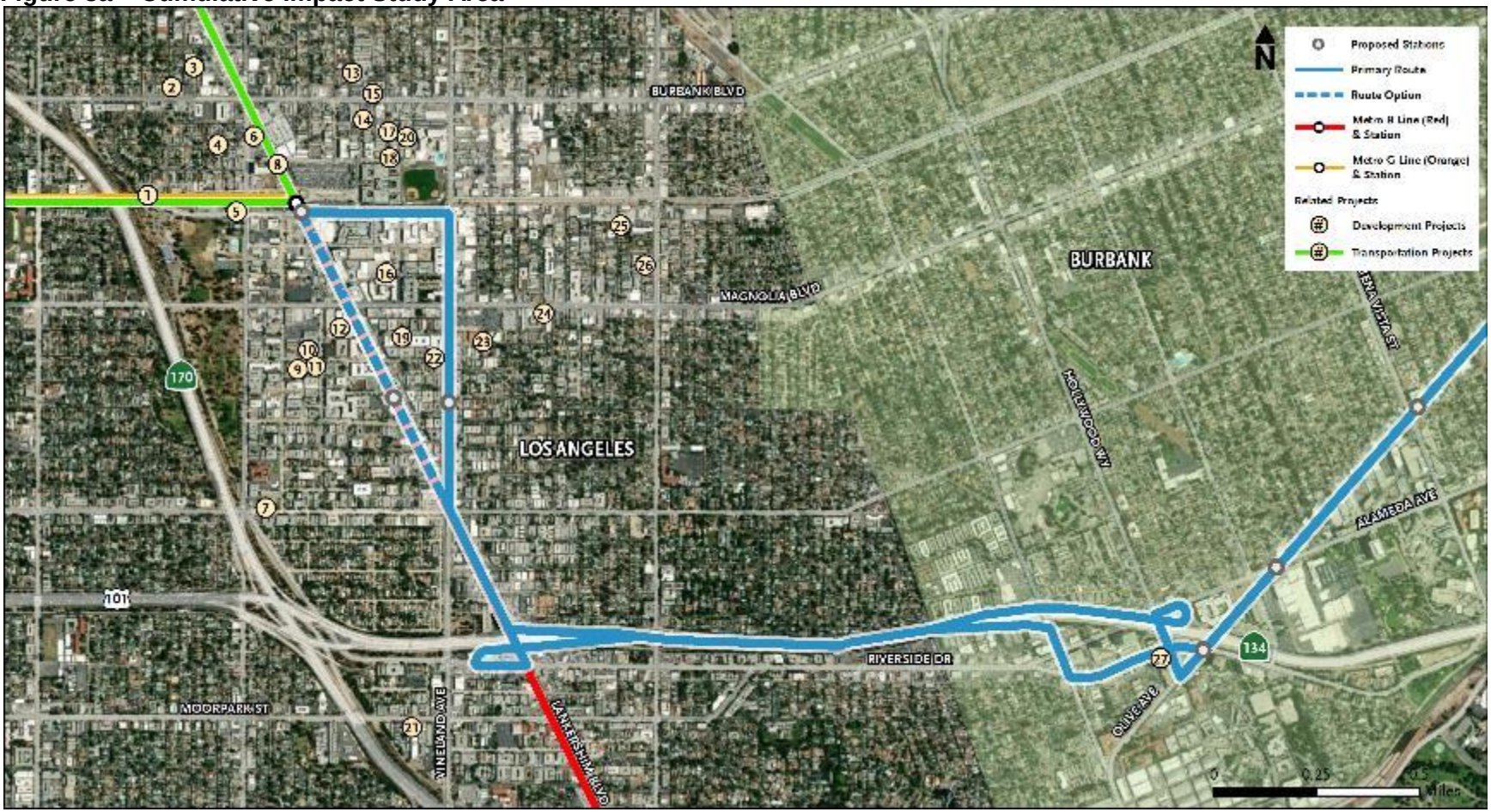


Figure 3b – Cumulative Impact Study Area

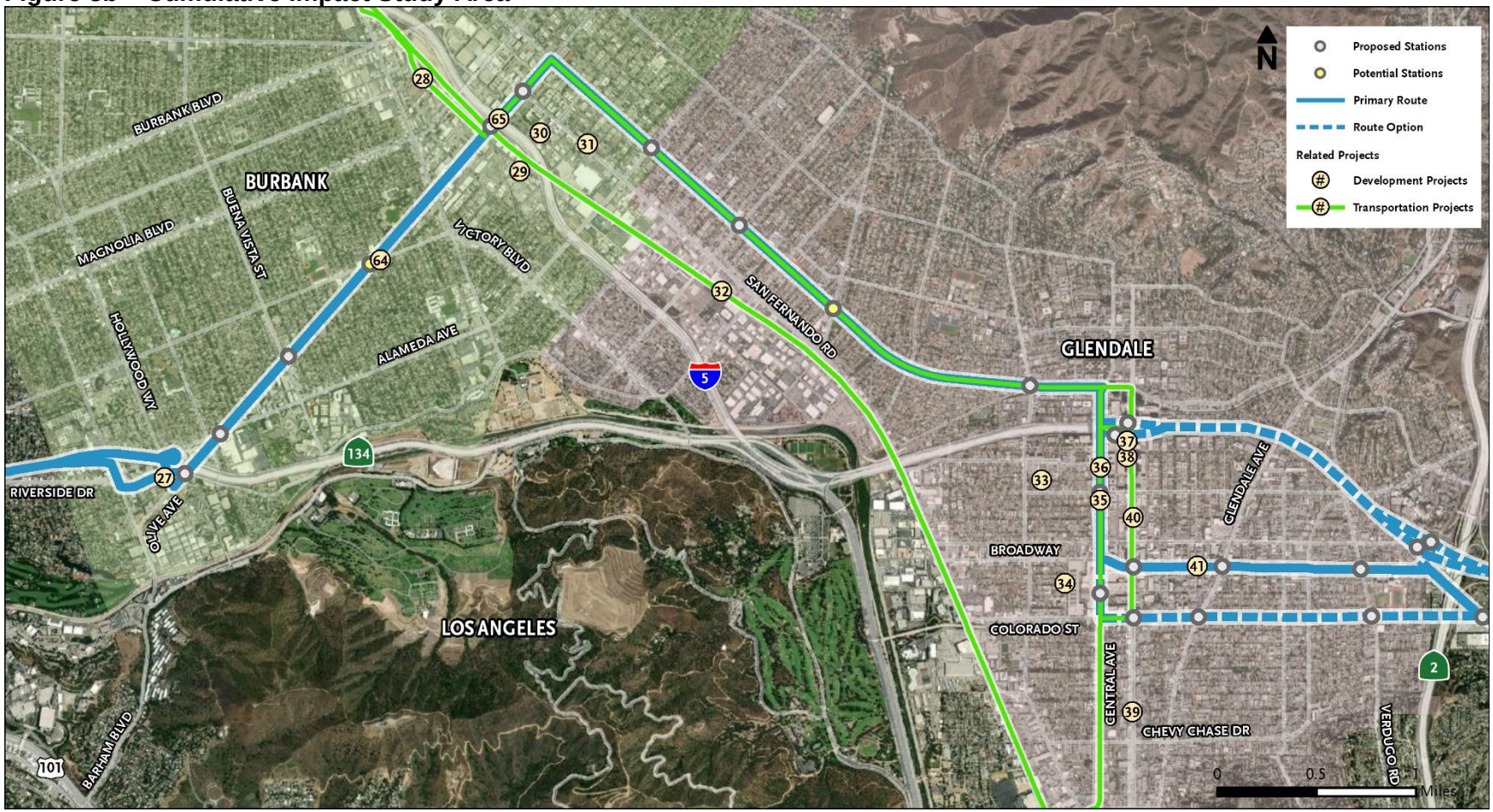
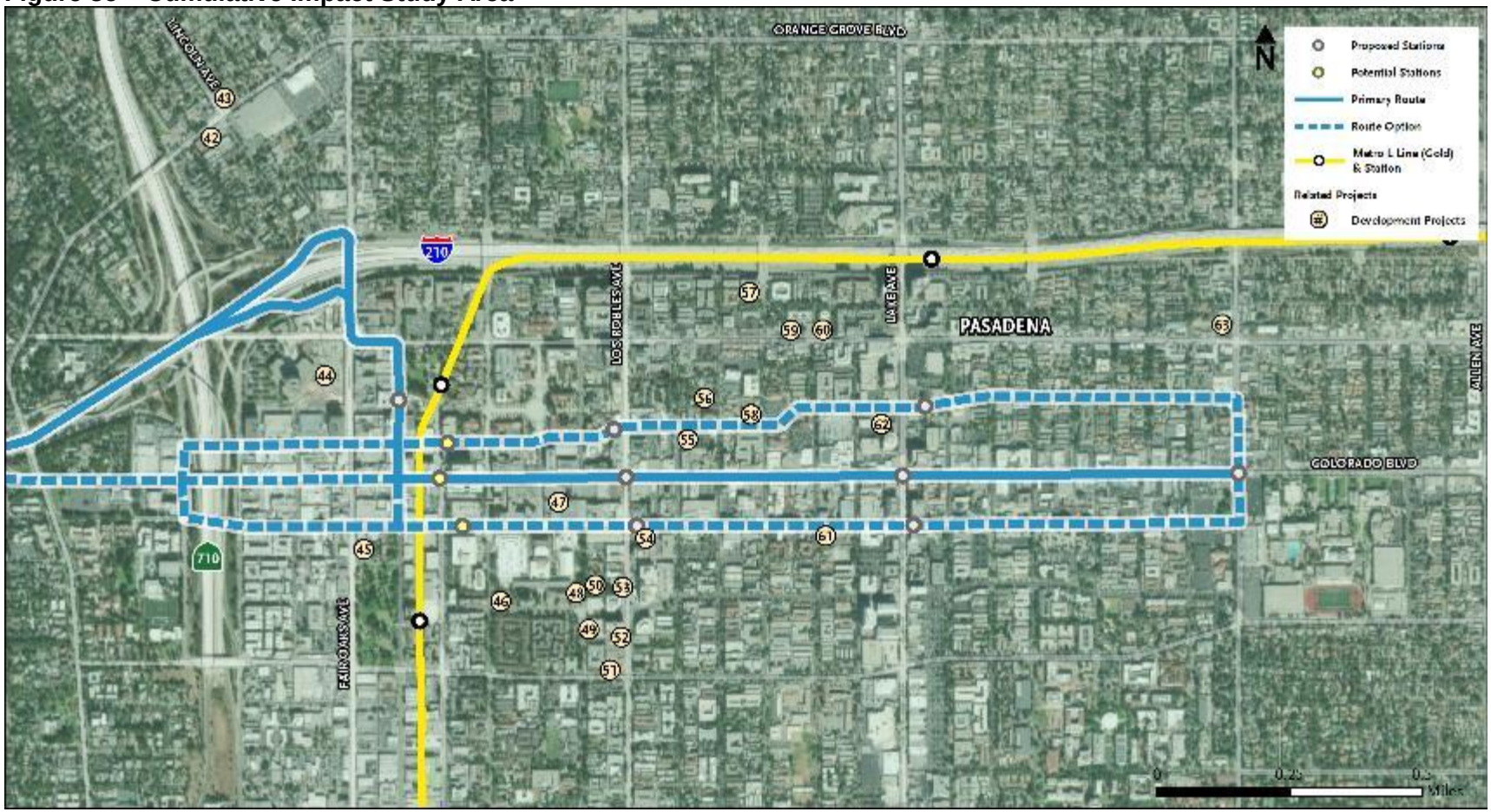


Figure 3c – Cumulative Impact Study Area



Metro

Table 19 – Related Projects

Map ID	Project Name	Location	Description	Status
REGIONAL				
N/A	NextGen Bus Plan	Los Angeles County	The NextGen Bus Plan will revise the existing Metro bus network to improve ridership and make bus use more attractive to current and future riders. The Plan will adjust bus routes and schedules based upon existing origin/destination ridership data with a phased approach to future infrastructure investments in transit convenience, safety, and rider experience.	Implementation early 2021
N/A	East San Fernando Valley LRT Project	San Fernando Valley	New 9-mile LRT line that will extend north from the Van Nuys Metro G Line (Orange) station to the Sylmar/San Fernando Metrolink Station.	Planning
8	North San Fernando Valley BRT Project	San Fernando Valley	New 18-mile BRT line from North Hollywood B/G Line (Red/Orange) Station to Chatsworth.	Planning
32	Los Angeles – Glendale-Burbank Feasibility Study	Amtrak corridor from Los Angeles Union Station to Bob-Hope Airport	Metro is studying a 13-mile transit corridor between Los Angeles Union Station and the Hollywood Burbank Airport. A range of options are under study including both light rail and enhanced commuter rail.	Planning and feasibility
BURBANK				
27	Mixed-Use Development	3700 Riverside Dr.	49-unit residential condominium and 2,000 sq. ft. of retail	Active Project Submission
28	San Fernando Bikeway	San Fernando Blvd. Corridor	Three-mile Class I bike path along San Fernando Blvd. near the Downtown Metrolink Station in the City of Burbank. This project will complete a 12-mile long regional bike path extending from Sylmar to the Downtown Burbank Metrolink Station along the San Fernando Blvd. rail corridor	Planning
29	Commercial Development	411 Flower St.	Commercial building (size unknown)	Active Project Submission
30	Mixed-Use Development	103 Verdugo Ave.	Two mixed-use buildings (size unknown)	Active Project Submission
31	Mixed-Use Development	624 San Fernando Blvd.	42-unit, 4-story mixed-use building with 14,800 sq. ft. of ground-floor commercial	Active Project Submission
64	Olive Ave./Sparks St./Verdugo Ave.	Olive Ave./Sparks St./Verdugo Ave.	Various intersection improvements.	Planning

Map ID	Project Name	Location	Description	Status
	Intersection Improvements			
65	Olive Ave. Overpass Rehabilitation	Olive Ave. over Interstate 5	Improvements to operational efficiency, pedestrian safety, and bicycle connections.	Planning
GLENDALE				
33	Multi-Family Development	452 Milford St.	15-unit building	Active Project Submission
34	Multi-Family Development	401 Hawthorne St.	23-unit building	Active Project Submission
35	Commercial Development	340 Central Ave.	14,229 sq. ft. office	Active Project Submission
36	Multi-Family Development	520 Central Ave.	98-unit building	Active Project Submission
37	Commercial Development	611 Brand Blvd.	Hotel (857 hotel rooms and 7,500 sq. ft. of restaurant/retail)	Active Project Submission
38	Multi-Family Development	601 Brand Blvd.	604 units in 3 buildings	Active Project Submission
39	Commercial Development	901 Brand Blvd.	34,228 sq. ft. parking structure for car dealership	Active Project Submission
40	Glendale Streetcar	Downtown Glendale	Streetcar connecting the Larry Zarian Transportation Center with Downtown Glendale	Planning and feasibility
41	Commercial Development	517 Broadway	Medical/office/retail building (size unknown)	Active Project Submission
LOS ANGELES				
1	Multi-Family Development	11525 Chandler Blvd.	60-unit building	Active Building Permit
2	Multi-Family Development	5610 Camellia Ave.	62-unit building	Active Building Permit
3	Multi-Family Development	5645 Farmdale Ave.	44-unit building	Active Building Permit
4	Multi-Family Development	11433 Albers St.	59-unit building	Active Building Permit
5	Mixed-Use Development	11405 Chandler Blvd.	Mixed-use building with residential and commercial components (size unknown)	Active Building Permit
6	Mixed-Use Development	5530 Lankershim Blvd.	15-acre joint development at the North Hollywood Metro Station. Includes 1,275-1,625 residential units (275-425 affordable units), 125,000-150,000 sq. ft. of retail, and 300,000-400,000 sq. ft. of office space	Active Project Submission
7	Mixed-Use Development	11311 Camarillo St.	Mixed-use building (size unknown)	Active Building Permit
9	Multi-Family Development	11262 Otsego St.	49-unit building	Active Building Permit
10	Multi-Family Development	11241 Otsego St.	42-unit building	Active Building Permit
11	Multi-Family Development	11246 Otsego St.	70-unit building	Active Building Permit
12	Mixed-Use Development	5101 Lankershim Blvd.	297 units in a mixed-use housing complex	Active Building Permit

Map ID	Project Name	Location	Description	Status
13	Multi-Family Development	5630 Fair Ave.	15-unit building	Active Building Permit
14	Multi-Family Development	5550 Bonner Ave.	48-unit building	Active Building Permit
15	Commercial Development	11135 Burbank Blvd.	4-story hotel with 70 guestrooms	Active Building Permit
16	Commercial Development	11115 McCormick St.	Apartment/Office building (size unknown)	Active Building Permit
17	Multi-Family Development	5536 Fulcher Ave.	36-unit building	Active Building Permit
18	Multi-Family Development	11111 Cumpston St.	41-unit building	Active Building Permit
19	Multi-Family Development	11050 Hartsook St.	48-unit building	Active Building Permit
20	Multi-Family Development	5525 Case Ave.	98-unit building	Active Building Permit
21	Multi-Family Development	11036 Moorpark St.	96-unit building	Active Building Permit
22	Multi-Family Development	11011 Otsego St.	144-unit building	Active Building Permit
23	Multi-Family Development	10925 Hartsook St.	42-unit building	Active Building Permit
24	Multi-Family Development	10812 Magnolia Blvd.	31-unit building	Active Building Permit
25	Multi-Family Development	5338 Cartwright Ave.	21-unit building	Active Building Permit
26	Multi-Family Development	5252 Willow Crest Ave.	25-unit building	Active Building Permit
PASADENA				
42	Mixed-Use Development	690 Orange Grove Blvd.	48-unit building with commercial space	Active Project Submission
43	Multi-Family Development	745 Orange Grove Blvd.	35-unit building	Active Project Submission
44	Mixed-Use Development	100 Walnut St.	Mixed-use planned development: office building, 93-unit apartment building, and a 139-unit building	Active Building Permit
45	Multi-Family Development	86 Fair Oaks Ave.	87-unit building with commercial space	Active Project Submission
46	Commercial Development	190 Marengo Ave.	7-story hotel with 200 guestrooms	Active Project Submission
47	Multi-Family Development	39 Los Robles Ave.	Residential units above commercial space (size unknown)	Active Building Permit
48	Mixed-Use Development	178 Euclid Ave.	42-unit building with 940 sq. ft. of office space	Active Building Permit
49	Multi-Family Development	380 Cordova St.	48-unit building	Active Building Permit
50	Mixed-Use Development	170 Euclid Ave.	42-unit building with 10,000 sq. ft. of commercial space	Active Project Submission
51	Multi-Family Development	399 Del Mar Blvd.	55-unit building	Active Building Permit
52	Multi-Family Development	253 Los Robles Ave.	92-unit building	Active Project Submission
53	Mixed-Use Development	171 Los Robles Ave.	8-unit building	Active Project Submission
54	Commercial Development	98 Los Robles Ave.	School of medicine building	Active Building Permit

Map ID	Project Name	Location	Description	Status
55	Multi-Family Development	530 Union St.	55-unit building with retail space	Active Building Permit
56	Multi-Family Development	119 Madison Ave.	81-unit building	Active Building Permit
57	Multi-Family Development	289 El Molino Ave.	105-unit building	Active Building Permit
58	Multi-Family Development	99 El Molino Ave.	40-unit building	Active Building Permit
59	Commercial Development	711 Walnut St.	Mixed-use building with condominiums, commercial space, food facility, parking structure (size unknown)	Active Building Permit
60	Commercial Development	737 Walnut St.	42-unit building with commercial space	Active Project Submission
61	Mixed-Use Development	740 Green St.	273-unit building	Active Project Submission
62	Mixed-Use Development	83 Lake Ave.	54-unit building with office space	Active Project Submission
63	Multi-Family Development	231 Hill Ave.	59-unit building	Active Project Submission

SOURCE: Terry A. Hayes Associates Inc., 2020.

North San Fernando Valley (SFV) Bus Rapid Transit (BRT) Project. The North SFV BRT Project is a proposed new 18-mile BRT line that is intended to serve the portions of the San Fernando Valley that are north of the Metro G Line (Orange) service area. The project would provide a new, high-quality bus service between the communities of Chatsworth to the west and North Hollywood to the east. The project would enhance existing bus service and increase transit system connectivity.

Joint Development - North Hollywood Station Project. The Joint Development - North Hollywood Station project would construct facilities at the North Hollywood B/G Line (Red/Orange) Station that would be shared by the Proposed Project. The project has been identified in the Measure M Expenditure Plan, with a projected opening date between Fiscal Year 2023-25 and $180 million of funding.

NextGen Bus Plan. In January 2018, Metro began the NextGen Bus Plan aimed at reimagining the bus network to be more relevant, reflective of, and attractive to the diverse customer needs within Los Angeles County. The NextGen Bus Plan will realign Metro's bus network based upon data of existing ridership and adjust bus service routes and schedules to improve the overall network. The Proposed Project would be included in the Plan and replace some select bus services in the region. The NextGen Bus Plan is anticipated to begin implementation in the beginning of 2021.

East SFV Light Rail Transit (LRT) Project. The East SFV LRT Project will be a 9-mile LRT line that will extend north from the Van Nuys Metro G Line (Orange) station to the Sylmar/San Fernando Metrolink Station. Light rail trains will operate in the median of Van Nuys Boulevard for 6.7 miles to San Fernando Road. From San Fernando Road, the trains will transition onto the existing railroad right-of-way that's adjacent to San Fernando Road, which it will share with Metrolink for 2.5 miles to the Sylmar/San Fernando Metrolink Station. The project includes 14 at-grade stations. The Draft EIR/Environmental Impact Statement (EIR/EIS) was published in August 2017 and the Final EIR/EIS is currently being prepared by Metro.

There is an existing cumulative impact in the Project Area related to energy resources. The cumulative setting for energy is both regional and statewide. State, regional, and local agencies and jurisdictions have published a wide range of documents intended to reduce energy consumption and increase the use of renewable energy. The intent is typically to reduce the use of nonrenewable energy to reduce pollution that contributes to global warming. In total, construction would consume approximately 1,091,350 gallons of diesel fuel through off-road equipment engine combustion, approximately 3,875 gallons of diesel fuel through on-road truck engine combustion, and approximately 14,331 gallons of gasoline through on-road worker vehicle engine combustion. Annual average petroleum-based fuels consumption during construction activities would be approximately 438,090 gallons of diesel fuel and 5,733 gallons of motor gasoline. As disclosed in 4.3.3 Local Transportation Fuels, 2018 Los Angeles County retail sales of diesel fuel and gasoline were approximately 253 million gallons and 3,658 million gallons, respectively. Relative to existing petroleum-based transportation fuels consumption in Los Angeles County, construction of the Project would temporarily increase annual diesel fuel consumption within the County by approximately 0.17 percent and would temporarily increase

annual gasoline fuel consumption by approximately 0.0002 percent. All equipment and vehicles that would be used in construction activities would comply with applicable CARB regulations, the Pavley and Low Carbon Fuel Standards, and the CAFE Standards. The Proposed Project would adhere to the provisions of the Metro Green Construction Policy to control and minimize emissions to the maximum extent feasible. Adherence to the energy reduction policies and the relatively low use of energy resources for construction ensure that the Proposed Project would not result in a significant impact. The Proposed Project would also be consistent with GHG reduction plans. Therefore, Proposed Project construction activities would not contribute to the existing cumulatively considerable impact.

Regarding operational activities, Operations would result in changes to energy resources consumption through direct electricity demand for ZEV bus propulsion and indirect, induced displacement of transportation fuels combustion from passenger vehicles on the regional roadway network. Using Metro's electric bus fuel economy of 2.2 kWh per mile, annual electricity consumption would be approximately 3,554.5 MWh in 2042. Metro 2019 system operations consumed 323,391 MWh of electricity. If operational in 2019, operations would increase systemwide electricity consumption by 1.1 percent. The annual electricity consumption of 3,554.5 MWh would equal approximately 12,796,186 MJ of electrical power demand. In addition to direct energy consumption, implementation of the Proposed Project would displace on-road regional VMT. Implementation of the Proposed Project would reduce annual VMT by over 30 million and would decrease regional gasoline and diesel fuels consumption by 755,140 gallons and 168,608 gallons, respectively. The effects of Proposed Project operations on regional petroleum-based transportation would not constitute a wasteful or inefficient use of energy resources. On the contrary, implementation of the Proposed Project would improve regional transportation energy efficiency. Therefore, Proposed Project operational activities would not contribute to the existing cumulatively considerable impact

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9. List of Preparers

TERRY A. HAYES ASSOCIATES INC.

Sam Silverman, Senior Associate
Anders Sutherland, Environmental Scientist

Appendices to the Energy Technical Report

Construction Energy Consumption - Transportation Fuels

USEPA 2020

Construction Equipment	Diesel	0.2	gCH4/gal
Mobile Combustion CO2			
On-Road PV	Gasoline	8.78	kgCO2/gal
On-Road Trucks	Diesel	10.21	kgCO2/gal

CalEEMod Output

Phase	Year	Source	MTCO2/year	MTCH4/year	ADJ_FACTOR	kgCO2/year	gCH4/year	Equipment Diesel (gallons)	Hauling Diesel (gallons)	Vendor Diesel (gallons)	Worker Gas (gallons)
Demo	2022	Equipment	100.368	0.0151	1	100368.0	15100	75,500	--	--	--
Demo	2022	Hauling	0.1883	0.00001	1	188.3	10	--	18	--	--
Demo	2022	Vendor	0	0	1	0.0	0	--	--	-	--
Demo	2022	Worker	17.1748	0.00047	1.1601	19924.5	470	--	--	--	2,269
SP	2022	Equipment	51.3023	0.0166	1	51302.3	16600	83,000	--	--	--
SP	2022	Hauling	0	0	1	0.0	0	--	-	--	--
SP	2022	Vendor	3.665	0.00022	1	3665.0	220	--	--	359	--
SP	2022	Worker	8.5874	0.00024	1.1601	9962.2	240	--	--	--	1,135
CON	2022	Equipment	133.9274	0.0433	1	133927.4	43300	216,500	--	--	--
CON	2022	Hauling			1	0.0	0	--	-	--	--
CON	2022	Vendor	7.6964	0.00046	1	7696.4	460	--	--	754	--
CON	2022	Worker	18.0335	0.0005	1.1601	20920.7	500	--	--	--	2,383
CON	2023	Equipment	312.6388	0.1011	1	312638.8	101100	505,500	--	--	--
CON	2023	Hauling			1	0.0	0	--	-	--	--
CON	2023	Vendor	17.3962	0.00095	1	17396.2	950	--	--	1,704	--
CON	2023	Worker	40.5385	0.00104	1.1601	47028.7	1040	--	--	--	5,356
Paving	2023	Equipment	17.1073	0.0054	1	17107.3	5400	27,000	--	--	--
Paving	2023	Hauling			1	0.0	0	--	-	--	--
Paving	2023	Vendor	1.0651	0.00006	1	1065.1	60	--	--	104	--
Paving	2023	Worker	2.482	0.00006	1.1601	2879.4	60	--	--	--	328
Paving	2024	Equipment	96.94	0.0306	1	96940.0	30600	153,000	--	--	--
Paving	2024	Hauling			1	0.0	0	--	-	--	--
Paving	2024	Vendor	6.0114	0.00032	1	6011.4	320	--	--	589	--
Paving	2024	Worker	13.6283	0.00033	1.1601	15810.2	330	--	--	--	1,801
Roadway Striping	2025	Equipment	31.745	0.00617	1	31745.0	6170	30,850	--	--	--
Roadway Striping	2025	Hauling			1	0.0	0	--	-	--	--
Roadway Striping	2025	Vendor	3.5361	0.00019	1	3536.1	190	--	--	346	--
Roadway Striping	2025	Worker	8.0166	0.0002	1.1601	9300.1	200	--	--	--	1,059

Equipment Total	Debris Hauling Total	Material Delivery Total	Worker Trips Total (Gasoline Gallons)
1,091,350	18	3,856	14,331

Trucks Diesel Gallons Total	Worker Gas Gallons Total
3,875	**14,331**

Annual Avg Diesel	Annual Avg Gas
438,090.0	5732.4

EMFAC2017 Regional Fleet Average Fuel Consumption Factor

calendar_year	sub_area	vehicle_class	fuel	vmt	Daily Fuel (Gallons)	
2017	Los Angeles (SC)	HHDT	DSL	6,037,372.3	1018505.239	
2017	Los Angeles (SC)	LDA	DSL	912,439.2	22310.02818	
2017	Los Angeles (SC)	LDT1	DSL	10,682.2	510.8026878	
2017	Los Angeles (SC)	LDT2	DSL	207,353.3	6912.541289	
2017	Los Angeles (SC)	LHDT1	DSL	1,731,309.9	86946.8853	
2017	Los Angeles (SC)	LHDT2	DSL	679,103.2	37850.8752	
2017	Los Angeles (SC)	MDV	DSL	424,102.5	18372.21742	
2017	Los Angeles (SC)	MH	DSL	46,027.9	4608.437095	**Diesel Gallons per 1000VMT**
2017	Los Angeles (SC)	MHDT	DSL	3,494,883.0	372474.0875	**5.76**
2017	Los Angeles (SC)	LDA	ELEC	1,343,229.1	0	
2017	Los Angeles (SC)	LDT1	ELEC	28,710.8	0	
2017	Los Angeles (SC)	LDT2	ELEC	117,330.7	0	
2017	Los Angeles (SC)	MDV	ELEC	10,221.0	0	
2017	Los Angeles (SC)	HHDT	GAS	6,043.4	1666.139237	
2017	Los Angeles (SC)	LDA	GAS	153,495,121.0	5724490.54	
2017	Los Angeles (SC)	LDT1	GAS	14,955,796.2	650138.4	
2017	Los Angeles (SC)	LDT2	GAS	50,006,207.5	2441632.56	
2017	Los Angeles (SC)	LHDT1	GAS	4,146,504.7	416517.1285	
2017	Los Angeles (SC)	LHDT2	GAS	616,644.1	71210.69807	
2017	Los Angeles (SC)	MCY	GAS	1,017,982.0	28555.35621	
2017	Los Angeles (SC)	MDV	GAS	31,946,630.7	1878807.403	
2017	Los Angeles (SC)	MH	GAS	185,859.6	38380.3826	
2017	Los Angeles (SC)	MHDT	GAS	796,695.7	167351.7955	**Gas Gallons per 1000VMT**
2017	Los Angeles (SC)	HHDT	NG	70,465.2	33533.54035	**42.06**

2017 Scenario	Annual VMT	Annual Gasoline Gallons	Annual Diesel Gallons
Existing	148,791,691,153	6,258,126,454	857,105,515
Existing + Project	148,766,500,989	6,257,066,965	856,960,408.71
	Difference	(1,059,489)	(145,106)

EMFAC2017 Regional Fleet Average Fuel Consumption Factor

calendar_year	sub_area	vehicle_class	fuel	vmt		Daily fuel (1000-gallons)
2042	Los Angeles (SC)	HHDT	Dsl	9181469.987	HHDT	968.1328179
2042	Los Angeles (SC)	LDA	Dsl	1804701.484	LDA	29.52162795
2042	Los Angeles (SC)	LDT1	Dsl	2899.882048	LDT1	0.093478584
2042	Los Angeles (SC)	LDT2	Dsl	576365.1254	LDT2	12.55773259
2042	Los Angeles (SC)	LHDT1	Dsl	4277849.257	LHDT1	162.0518328
2042	Los Angeles (SC)	LHDT2	Dsl	1672768.814	LHDT2	70.45904882
2042	Los Angeles (SC)	MDV	Dsl	1210601.304	MDV	34.11070874
2042	Los Angeles (SC)	MH	Dsl	88052.31525	MH	6.936408112
2042	Los Angeles (SC)	MHDT	Dsl	5457191.636	MHDT	401.3694488
2042	Los Angeles (SC)	LDA	Elec	9684296.9		
2042	Los Angeles (SC)	LDT1	Elec	790328.7124		
2042	Los Angeles (SC)	LDT2	Elec	1810599.577		
2042	Los Angeles (SC)	MDV	Elec	1315753.042		
2042	Los Angeles (SC)	HHDT	Gas	8104.053992	HHDT	1.487816954
2042	Los Angeles (SC)	LDA	Gas	145452499.9	LDA	3572.57091
2042	Los Angeles (SC)	LDT1	Gas	20223213.19	LDT1	579.9509454
2042	Los Angeles (SC)	LDT2	Gas	56079268.52	LDT2	1587.852367
2042	Los Angeles (SC)	LHDT1	Gas	3739992.199	LHDT1	293.9066857
2042	Los Angeles (SC)	LHDT2	Gas	655858.0316	LHDT2	59.23806722
2042	Los Angeles (SC)	MCY	Gas	1466790.105	MCY	42.08508304
2042	Los Angeles (SC)	MDV	Gas	33778005.18	MDV	1169.752789
2042	Los Angeles (SC)	MH	Gas	204560.2991	MH	32.31334321
2042	Los Angeles (SC)	MHDT	Gas	872737.2248	MHDT	138.6988989
2042	Los Angeles (SC)	HHDT	NG	201698.2268	HHDT	69.74976445

Total VMT		Total Fuel	Agg Fleet gal/mi
300555605	Diesel (Gal)	1685233.10	**0.0056**
	Gas (Gal)	7477856.905	**0.0249**

% Gas	87.40%	GasAgg
% Diesel	8.08%	DieselAgg
% Electric (No Fuel)	4.53%	

APPENDIX A

CalEEMod Models and GHG Emissions Calculations

Proposed BRT Operations Electricity Consumption

Day of Week	Daily Trips (One-Way)	Daily Vehicle Revenue Miles	Annual VRM
Monday-Thursday	208	4,012	814,400
Friday	220	4,243	220,600
Saturday	152	2,932	152,400
Sunday/Holiday	144	2,777	161,100
		Total Annual VRM	1,348,500
		Total Deadhead Miles	267,180
		Total Annual BRT Miles	**1,615,680**
		Electricity Consumption Factor (kWh/mi)	2.2
		Total Annual Electricity (MWh)	**3,554.5**
		Metro Line 180 Displaced VRM	303,124
		Metro Line 180 Displaced Electricity (MWh)	**666.9**

Informational Disclosure - 2024 Operational RNG Consumption

Actual Vehicle Miles - All Modes					
	2015	2016	2017	2018	2019
Actual Vehicle Miles - All Modes	**2,056,780**	**2,066,164**	**2,057,667**	**2,032,095**	**1,766,449**
Rapid Bus - Directly Operated (RBDO)	*2,056,780*	*2,066,164*	*2,057,667*	*2,032,095*	*1,766,449*

Total Vehicle Revenue Miles					
	2015	2016	2017	2018	2019
Total Vehicle Revenue Miles					
Metro Bus Fleet - Directly Operated (MBDO)	*68,177,492*	*67,611,016*	*65,800,835*	*65,132,766*	*65,492,776*

				2018	2019
Metro Bus Fleet - CNG Consumption (Therms)				34,948,916	26,077,885
Metro Bus Fleet - RNG Consumption (Therms)			1,671,747	8,810,778	18,125,520
Metro Bus Fleet - CNG Consumption (GGE)	38,585,485	37,547,667	36,890,404		

CNG Therm/Mi	0.398179564
RNG Therm/Mi	0.27675602
NG Therm/VRM	**0.675**
Proposed Project VRM	1,615,680
2024 NG Consumption (Therms)	**1,090,480**

Regional On-Road VMT Transportation Fuels Consumption

	Daily VMT		Annual VMT	
	Y2042 No Project	Proposed Project	Y2042 No Project	Proposed Project
Total Vehicle Miles Traveled	511,871,989	511,785,330	177,619,580,183	177,589,509,510
CHANGE FROM NO PROJECT				
Subtotal		(86,659)		(30,070,642)
		-0.017%		-0.017%

	2042 Fleetwide Fuel Consumption Factor (gallons/VMT)	No Project Fuel (Daily Gal)	Proposed Project Fuel (Daily Gal)	No Project Fuel (Annual Gal)	Proposed Project Fuel (Annual Gal)
Gasoline	0.02511	12,854,222	12,852,046	4,460,414,999	4,459,659,858
Diesel	0.00561	2,870,097	2,869,611	995,923,522	995,754,914
CHANGE FROM NO PROJECT					
Gas			(2,176.19)		(755,139.39)
Diesel			(485.90)		(168,607.87)

EMFAC2017 Regional Fleet Average Fuel Consumption Factor

calendar_year	sub_area	vehicle_class	fuel	vmt		Daily fuel (1000-gallons)
2042	Los Angeles (SC)	HHDT	Dsl	9181469.987	HHDT	968.1328179
2042	Los Angeles (SC)	LDA	Dsl	1804701.484	LDA	29.52162795
2042	Los Angeles (SC)	LDT1	Dsl	2899.882048	LDT1	0.093478584
2042	Los Angeles (SC)	LDT2	Dsl	576365.1254	LDT2	12.55773259
2042	Los Angeles (SC)	LHDT1	Dsl	4277849.257	LHDT1	162.0518328
2042	Los Angeles (SC)	LHDT2	Dsl	1672768.814	LHDT2	70.45904882
2042	Los Angeles (SC)	MDV	Dsl	1210601.304	MDV	34.11070874
2042	Los Angeles (SC)	MH	Dsl	88052.31525	MH	6.936408112
2042	Los Angeles (SC)	MHDT	Dsl	5457191.636	MHDT	401.3694488
2042	Los Angeles (SC)	LDA	Elec	9684296.9		
2042	Los Angeles (SC)	LDT1	Elec	790328.7124		
2042	Los Angeles (SC)	LDT2	Elec	1810599.577		
2042	Los Angeles (SC)	MDV	Elec	1315753.042		
2042	Los Angeles (SC)	HHDT	Gas	8104.053992	HHDT	1.487816954
2042	Los Angeles (SC)	LDA	Gas	145452499.9	LDA	3572.57091
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2042	Los Angeles (SC)	LDT2	Gas	56079268.52	LDT2	1587.852367
2042	Los Angeles (SC)	LHDT1	Gas	3739992.199	LHDT1	293.9066857
2042	Los Angeles (SC)	LHDT2	Gas	655858.0316	LHDT2	59.23806722
2042	Los Angeles (SC)	MCY	Gas	1466790.105	MCY	42.08508304
2042	Los Angeles (SC)	MDV	Gas	33778005.18	MDV	1169.752789
2042	Los Angeles (SC)	MH	Gas	204560.2991	MH	32.31334321
2042	Los Angeles (SC)	MHDT	Gas	872737.2248	MHDT	138.6988989
2042	Los Angeles (SC)	HHDT	NG	201698.2268	HHDT	69.74976445

Total VMT		Total Fuel	Agg Fleet gal/mi
300555605	Diesel (Gal)	1685233.10	**0.0056**
	Gas (Gal)	7477856.905	**0.0249**

% Gas	87.40%	GasAgg
% Diesel	8.08%	DieselAgg
% Electric (No Fuel)	4.53%	

Construction Energy Consumption - Transportation Fuels

USEPA 2020

Construction Equipment	Diesel	0.2	gCH4/gal
Mobile Combustion CO2			
On-Road PV	Gasoline	8.78	kgCO2/gal
On-Road Trucks	Diesel	10.21	kgCO2/gal

CalEEMod Output

Phase	Year	Source	MTCO2/year	MTCH4/year	ADJ_FACTOR	kgCO2/year	gCH4/year	Equipment Diesel (gallons)	Hauling Diesel (gallons)	Vendor Diesel (gallons)	Worker Gas (gallons)
Demo	2022	Equipment	100.368	0.0151	1	100368.0	15100	75,500	--	--	--
Demo	2022	Hauling	0.1883	0.00001	1	188.3	10	--	18	--	--
Demo	2022	Vendor	0	0	1	0.0	0	--	--	-	--
Demo	2022	Worker	17.1748	0.00047	1.1601	19924.5	470	--	--	--	2,269
SP	2022	Equipment	51.3023	0.0166	1	51302.3	16600	83,000	--	--	--
SP	2022	Hauling	0	0	1	0.0	0	--	-	--	--
SP	2022	Vendor	3.665	0.00022	1	3665.0	220	--	--	359	--
SP	2022	Worker	8.5874	0.00024	1.1601	9962.2	240	--	--	--	1,135
CON	2022	Equipment	133.9274	0.0433	1	133927.4	43300	216,500	--	--	--
CON	2022	Hauling			1	0.0	0	--	-	--	--
CON	2022	Vendor	7.6964	0.00046	1	7696.4	460	--	--	754	--
CON	2022	Worker	18.0335	0.0005	1.1601	20920.7	500	--	--	--	2,383
CON	2023	Equipment	312.6388	0.1011	1	312638.8	101100	505,500	--	--	--
CON	2023	Hauling			1	0.0	0	--	-	--	--
CON	2023	Vendor	17.3962	0.00095	1	17396.2	950	--	--	1,704	--
CON	2023	Worker	40.5385	0.00104	1.1601	47028.7	1040	--	--	--	5,356
Paving	2023	Equipment	17.1073	0.0054	1	17107.3	5400	27,000	--	--	--
Paving	2023	Hauling			1	0.0	0	--	-	--	--
Paving	2023	Vendor	1.0651	0.00006	1	1065.1	60	--	--	104	--
Paving	2023	Worker	2.482	0.00006	1.1601	2879.4	60	--	--	--	328
Paving	2024	Equipment	96.94	0.0306	1	96940.0	30600	153,000	--	--	--
Paving	2024	Hauling			1	0.0	0	--	-	--	--
Paving	2024	Vendor	6.0114	0.00032	1	6011.4	320	--	--	589	--
Paving	2024	Worker	13.6283	0.00033	1.1601	15810.2	330	--	--	--	1,801
Roadway Striping	2025	Equipment	31.745	0.00617	1	31745.0	6170	30,850	--	--	--
Roadway Striping	2025	Hauling			1	0.0	0	--	-	--	--
Roadway Striping	2025	Vendor	3.5361	0.00019	1	3536.1	190	--	--	346	--
Roadway Striping	2025	Worker	8.0166	0.0002	1.1601	9300.1	200	--	--	--	1,059

Equipment Total	Debris Hauling Total	Material Delivery Total	Worker Trips Total (Gasoline Gallons)
1,091,350	18	3,856	14,331

Trucks Diesel Gallons Total	Worker Gas Gallons Total
3,875	**14,331**

Annual Avg Diesel	Annual Avg Gas
438,090.0	5732.4

NoHo to Pasadena BRT Route

Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	23.00	1000sqft	0.53	23,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	12			**Operational Year**	2024
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	834	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 Intensity Factor consistent with LADWP's 2017 Power Strategic Long-Term Resource Plan, p. C-15.

Land Use -

Construction Phase - Schedule reflect 30-month construction duration.

Off-road Equipment - Construction equipment to be used during the curb/pavement demo phase.

Off-road Equipment - Construction equipment to be used during Site Preparation phase.

Off-road Equipment - Construction equipment to be used during Station Construction.

Off-road Equipment - Construction equipment to be used during paving phase.

Off-road Equipment - Construction equipment to be used during roadway striping phase.

Grading -

Demolition -

Trips and VMT - Assume 5 vendor trips per day during Site Prep, Station Construction, Paing, and Roadway Striping. Assume 30 worker trips per day.

Construction Off-road Equipment Mitigation - Tier 4 construction equipment will be used consistent with Metro's Green Construction Policy.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00

tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
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tblConstructionPhase	NumDays	5.00	60.00
tblConstructionPhase	NumDays	100.00	420.00
tblConstructionPhase	NumDays	10.00	120.00
tblConstructionPhase	NumDays	5.00	120.00
tblConstructionPhase	NumDays	1.00	60.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	PhaseEndDate	6/29/2022	7/6/2024
tblConstructionPhase	PhaseEndDate	6/15/2022	12/9/2023
tblConstructionPhase	PhaseEndDate	1/21/2022	5/28/2022
tblConstructionPhase	PhaseEndDate	6/22/2022	4/27/2024

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tblConstructionPhase	PhaseEndDate	1/24/2022	8/6/2022
tblConstructionPhase	PhaseStartDate	6/23/2022	4/29/2024
tblConstructionPhase	PhaseStartDate	1/27/2022	8/8/2022
tblConstructionPhase	PhaseStartDate	6/16/2022	12/11/2023
tblConstructionPhase	PhaseStartDate	1/22/2022	5/30/2022
tblOffRoadEquipment	OffRoadEquipmentType		Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentType		Paving Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType	Forklifts	Rough Terrain Forklifts
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	PhaseName		Station Construction
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Roadway Striping
tblProjectCharacteristics	CO2IntensityFactor	1227.89	834
tblTripsAndVMT	VendorTripNumber	0.00	5.00
tblTripsAndVMT	VendorTripNumber	4.00	5.00
tblTripsAndVMT	VendorTripNumber	0.00	5.00
tblTripsAndVMT	VendorTripNumber	0.00	5.00
tblTripsAndVMT	WorkerTripNumber	15.00	30.00

tblTripsAndVMT	WorkerTripNumber	10.00	30.00
tblTripsAndVMT	WorkerTripNumber	10.00	30.00
tblTripsAndVMT	WorkerTripNumber	23.00	30.00
tblTripsAndVMT	WorkerTripNumber	2.00	30.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.1828	1.7955	2.1400	3.8700e-003	0.0856	0.0771	0.1627	0.0177	0.0724	0.0901	0.0000	340.9431	340.9431	0.0769	0.0000	342.8661
2023	0.1548	1.6881	2.7051	4.4200e-003	0.0562	0.0623	0.1184	0.0150	0.0573	0.0723	0.0000	391.2278	391.2278	0.1086	0.0000	393.9434
2024	0.0827	0.6649	1.0296	1.8200e-003	0.0292	0.0307	0.0599	7.8100e-003	0.0286	0.0364	0.0000	159.8774	159.8774	0.0378	0.0000	160.8224
Maximum	**0.1828**	**1.7955**	**2.7051**	**4.4200e-003**	**0.0856**	**0.0771**	**0.1627**	**0.0177**	**0.0724**	**0.0901**	**0.0000**	**391.2278**	**391.2278**	**0.1086**	**0.0000**	**393.9434**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.0875	1.3664	2.4182	3.8700e-003	0.0856	0.0111	0.0968	0.0177	0.0111	0.0288	0.0000	340.9428	340.9428	0.0769	0.0000	342.8657
2023	0.1034	1.7815	3.0007	4.4200e-003	0.0562	0.0195	0.0757	0.0150	0.0195	0.0345	0.0000	391.2274	391.2274	0.1086	0.0000	393.9430
2024	0.0357	0.6480	1.1389	1.8200e-003	0.0292	2.5200e-003	0.0317	7.8100e-003	2.5100e-003	0.0103	0.0000	159.8773	159.8773	0.0378	0.0000	160.8222
Maximum	**0.1034**	**1.7815**	**3.0007**	**4.4200e-003**	**0.0856**	**0.0195**	**0.0968**	**0.0177**	**0.0195**	**0.0345**	**0.0000**	**391.2274**	**391.2274**	**0.1086**	**0.0000**	**393.9430**

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**46.08**	**8.50**	**-11.63**	**0.00**	**0.00**	**80.50**	**40.14**	**0.00**	**79.10**	**62.96**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**1-10-2022**	**4-9-2022**	0.4520	0.2954
2	**4-10-2022**	**7-9-2022**	0.5215	0.2874
3	**7-10-2022**	**10-9-2022**	0.5326	0.4195
4	**10-10-2022**	**1-9-2023**	0.4998	0.4862
5	**1-10-2023**	**4-9-2023**	0.4567	0.4710
6	**4-10-2023**	**7-9-2023**	0.4611	0.4755
7	**7-10-2023**	**10-9-2023**	0.4662	0.4808
8	**10-10-2023**	**1-9-2024**	0.4539	0.4485
9	**1-10-2024**	**4-9-2024**	0.4196	0.3915
10	**4-10-2024**	**7-9-2024**	0.2787	0.2463
		Highest	0.5326	0.4862

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.8300e-003	0.0000	2.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.7000e-004	5.7000e-004	0.0000	0.0000	6.1000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.8300e-003**	**0.0000**	**2.9000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**5.7000e-004**	**5.7000e-004**	**0.0000**	**0.0000**	**6.1000e-004**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.8300e-003	0.0000	2.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.7000e-004	5.7000e-004	0.0000	0.0000	6.1000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.8300e-003**	**0.0000**	**2.9000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**5.7000e-004**	**5.7000e-004**	**0.0000**	**0.0000**	**6.1000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Curb/Pavement Demolition	Demolition	1/10/2022	5/28/2022	6	120	
2	Site Preparation	Site Preparation	5/30/2022	8/6/2022	6	60	
3	Station Construction	Building Construction	8/8/2022	12/9/2023	6	420	
4	Paving	Paving	12/11/2023	4/27/2024	6	120	
5	Roadway Striping	Architectural Coating	4/29/2024	7/6/2024	6	60	

Acres of Grading (Site Preparation Phase): 60

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.53

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 1,380 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Roadway Striping	Air Compressors	2	6.00	78	0.48
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
Curb/Pavement Demolition	Concrete/Industrial Saws	2	8.00	81	0.73
Station Construction	Skid Steer Loaders	2	8.00	65	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Graders	2	8.00	187	0.41
Paving	Pavers	2	7.00	130	0.42
Paving	Rollers	2	7.00	80	0.38
Curb/Pavement Demolition	Rubber Tired Dozers	2	1.00	247	0.40
Roadway Striping	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Station Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Curb/Pavement Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Station Construction	Rough Terrain Forklifts	4	8.00	100	0.40
Site Preparation	Tractors/Loaders/Backhoes	2	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Curb/Pavement Demolition	6	30.00	0.00	5.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	4	30.00	5.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Station Construction	9	30.00	5.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	9	30.00	5.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Roadway Striping	4	30.00	5.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Curb/Pavement Demolition - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.3000e-004	0.0000	5.3000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0703	0.6189	0.6949	1.1600e-003		0.0324	0.0324		0.0312	0.0312	0.0000	100.3680	100.3680	0.0151	0.0000	100.7459
Total	**0.0703**	**0.6189**	**0.6949**	**1.1600e-003**	**5.3000e-004**	**0.0324**	**0.0329**	**8.0000e-005**	**0.0312**	**0.0313**	**0.0000**	**100.3680**	**100.3680**	**0.0151**	**0.0000**	**100.7459**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.0000e-005	6.4000e-004	1.6000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1883	0.1883	1.0000e-005	0.0000	0.1886
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.2600e-003	5.4500e-003	0.0627	1.9000e-004	0.0197	1.6000e-004	0.0199	5.2400e-003	1.5000e-004	5.3800e-003	0.0000	17.1748	17.1748	4.7000e-004	0.0000	17.1866
Total	**7.2800e-003**	**6.0900e-003**	**0.0629**	**1.9000e-004**	**0.0198**	**1.6000e-004**	**0.0199**	**5.2500e-003**	**1.5000e-004**	**5.3900e-003**	**0.0000**	**17.3631**	**17.3631**	**4.8000e-004**	**0.0000**	**17.3752**

3.2 Curb/Pavement Demolition - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.3000e-004	0.0000	5.3000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0221	0.4234	0.7418	1.1600e-003		1.6700e-003	1.6700e-003		1.6700e-003	1.6700e-003	0.0000	100.3679	100.3679	0.0151	0.0000	100.7457
Total	**0.0221**	**0.4234**	**0.7418**	**1.1600e-003**	**5.3000e-004**	**1.6700e-003**	**2.2000e-003**	**8.0000e-005**	**1.6700e-003**	**1.7500e-003**	**0.0000**	**100.3679**	**100.3679**	**0.0151**	**0.0000**	**100.7457**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.0000e-005	6.4000e-004	1.6000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1883	0.1883	1.0000e-005	0.0000	0.1886
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.2600e-003	5.4500e-003	0.0627	1.9000e-004	0.0197	1.6000e-004	0.0199	5.2400e-003	1.5000e-004	5.3800e-003	0.0000	17.1748	17.1748	4.7000e-004	0.0000	17.1866
Total	**7.2800e-003**	**6.0900e-003**	**0.0629**	**1.9000e-004**	**0.0198**	**1.6000e-004**	**0.0199**	**5.2500e-003**	**1.5000e-004**	**5.3900e-003**	**0.0000**	**17.3631**	**17.3631**	**4.8000e-004**	**0.0000**	**17.3752**

3.3 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0318	0.0000	0.0318	3.4400e-003	0.0000	3.4400e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0348	0.4160	0.2376	5.8000e-004		0.0154	0.0154		0.0142	0.0142	0.0000	51.3023	51.3023	0.0166	0.0000	51.7171
Total	**0.0348**	**0.4160**	**0.2376**	**5.8000e-004**	**0.0318**	**0.0154**	**0.0473**	**3.4400e-003**	**0.0142**	**0.0176**	**0.0000**	**51.3023**	**51.3023**	**0.0166**	**0.0000**	**51.7171**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.4000e-004	0.0141	3.8000e-003	4.0000e-005	9.4000e-004	3.0000e-005	9.7000e-004	2.7000e-004	3.0000e-005	3.0000e-004	0.0000	3.6650	3.6650	2.2000e-004	0.0000	3.6705
Worker	3.6300e-003	2.7200e-003	0.0314	9.0000e-005	9.8600e-003	8.0000e-005	9.9400e-003	2.6200e-003	7.0000e-005	2.6900e-003	0.0000	8.5874	8.5874	2.4000e-004	0.0000	8.5933
Total	**4.0700e-003**	**0.0168**	**0.0352**	**1.3000e-004**	**0.0108**	**1.1000e-004**	**0.0109**	**2.8900e-003**	**1.0000e-004**	**2.9900e-003**	**0.0000**	**12.2524**	**12.2524**	**4.6000e-004**	**0.0000**	**12.2638**

3.3 Site Preparation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0318	0.0000	0.0318	3.4400e-003	0.0000	3.4400e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0107	0.1859	0.3515	5.8000e-004		9.5000e-004	9.5000e-004		9.5000e-004	9.5000e-004	0.0000	51.3022	51.3022	0.0166	0.0000	51.7170
Total	**0.0107**	**0.1859**	**0.3515**	**5.8000e-004**	**0.0318**	**9.5000e-004**	**0.0328**	**3.4400e-003**	**9.5000e-004**	**4.3900e-003**	**0.0000**	**51.3022**	**51.3022**	**0.0166**	**0.0000**	**51.7170**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.4000e-004	0.0141	3.8000e-003	4.0000e-005	9.4000e-004	3.0000e-005	9.7000e-004	2.7000e-004	3.0000e-005	3.0000e-004	0.0000	3.6650	3.6650	2.2000e-004	0.0000	3.6705
Worker	3.6300e-003	2.7200e-003	0.0314	9.0000e-005	9.8600e-003	8.0000e-005	9.9400e-003	2.6200e-003	7.0000e-005	2.6900e-003	0.0000	8.5874	8.5874	2.4000e-004	0.0000	8.5933
Total	**4.0700e-003**	**0.0168**	**0.0352**	**1.3000e-004**	**0.0108**	**1.1000e-004**	**0.0109**	**2.8900e-003**	**1.0000e-004**	**2.9900e-003**	**0.0000**	**12.2524**	**12.2524**	**4.6000e-004**	**0.0000**	**12.2638**

3.4 Station Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0578	0.7026	1.0356	1.5300e-003		0.0288	0.0288		0.0265	0.0265	0.0000	133.9274	133.9274	0.0433	0.0000	135.0103
Total	**0.0578**	**0.7026**	**1.0356**	**1.5300e-003**		**0.0288**	**0.0288**		**0.0265**	**0.0265**	**0.0000**	**133.9274**	**133.9274**	**0.0433**	**0.0000**	**135.0103**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.2000e-004	0.0295	7.9700e-003	8.0000e-005	1.9800e-003	6.0000e-005	2.0400e-003	5.7000e-004	5.0000e-005	6.3000e-004	0.0000	7.6964	7.6964	4.6000e-004	0.0000	7.7079
Worker	7.6300e-003	5.7200e-003	0.0659	2.0000e-004	0.0207	1.7000e-004	0.0209	5.5000e-003	1.5000e-004	5.6500e-003	0.0000	18.0335	18.0335	5.0000e-004	0.0000	18.0459
Total	**8.5500e-003**	**0.0353**	**0.0738**	**2.8000e-004**	**0.0227**	**2.3000e-004**	**0.0229**	**6.0700e-003**	**2.0000e-004**	**6.2800e-003**	**0.0000**	**25.7300**	**25.7300**	**9.6000e-004**	**0.0000**	**25.7539**

3.4 Station Construction - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0348	0.6989	1.1531	1.5300e-003		8.0300e-003	8.0300e-003		8.0300e-003	8.0300e-003	0.0000	133.9273	133.9273	0.0433	0.0000	135.0101
Total	**0.0348**	**0.6989**	**1.1531**	**1.5300e-003**		**8.0300e-003**	**8.0300e-003**		**8.0300e-003**	**8.0300e-003**	**0.0000**	**133.9273**	**133.9273**	**0.0433**	**0.0000**	**135.0101**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.2000e-004	0.0295	7.9700e-003	8.0000e-005	1.9800e-003	6.0000e-005	2.0400e-003	5.7000e-004	5.0000e-005	6.3000e-004	0.0000	7.6964	7.6964	4.6000e-004	0.0000	7.7079
Worker	7.6300e-003	5.7200e-003	0.0659	2.0000e-004	0.0207	1.7000e-004	0.0209	5.5000e-003	1.5000e-004	5.6500e-003	0.0000	18.0335	18.0335	5.0000e-004	0.0000	18.0459
Total	**8.5500e-003**	**0.0353**	**0.0738**	**2.8000e-004**	**0.0227**	**2.3000e-004**	**0.0229**	**6.0700e-003**	**2.0000e-004**	**6.2800e-003**	**0.0000**	**25.7300**	**25.7300**	**9.6000e-004**	**0.0000**	**25.7539**

3.4 Station Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1261	1.5316	2.4133	3.5600e-003		0.0574	0.0574		0.0528	0.0528	0.0000	312.6388	312.6388	0.1011	0.0000	315.1667
Total	**0.1261**	**1.5316**	**2.4133**	**3.5600e-003**		**0.0574**	**0.0574**		**0.0528**	**0.0528**	**0.0000**	**312.6388**	**312.6388**	**0.1011**	**0.0000**	**315.1667**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5900e-003	0.0521	0.0167	1.8000e-004	4.6300e-003	6.0000e-005	4.6900e-003	1.3400e-003	6.0000e-005	1.3900e-003	0.0000	17.3962	17.3962	9.5000e-004	0.0000	17.4199
Worker	0.0167	0.0121	0.1413	4.5000e-004	0.0483	3.7000e-004	0.0487	0.0128	3.5000e-004	0.0132	0.0000	40.5385	40.5385	1.0400e-003	0.0000	40.5646
Total	**0.0183**	**0.0641**	**0.1580**	**6.3000e-004**	**0.0530**	**4.3000e-004**	**0.0534**	**0.0142**	**4.1000e-004**	**0.0146**	**0.0000**	**57.9346**	**57.9346**	**1.9900e-003**	**0.0000**	**57.9844**

3.4 Station Construction - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0812	1.6307	2.6906	3.5600e-003		0.0187	0.0187		0.0187	0.0187	0.0000	312.6384	312.6384	0.1011	0.0000	315.1663
Total	**0.0812**	**1.6307**	**2.6906**	**3.5600e-003**		**0.0187**	**0.0187**		**0.0187**	**0.0187**	**0.0000**	**312.6384**	**312.6384**	**0.1011**	**0.0000**	**315.1663**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5900e-003	0.0521	0.0167	1.8000e-004	4.6300e-003	6.0000e-005	4.6900e-003	1.3400e-003	6.0000e-005	1.3900e-003	0.0000	17.3962	17.3962	9.5000e-004	0.0000	17.4199
Worker	0.0167	0.0121	0.1413	4.5000e-004	0.0483	3.7000e-004	0.0487	0.0128	3.5000e-004	0.0132	0.0000	40.5385	40.5385	1.0400e-003	0.0000	40.5646
Total	**0.0183**	**0.0641**	**0.1580**	**6.3000e-004**	**0.0530**	**4.3000e-004**	**0.0534**	**0.0142**	**4.1000e-004**	**0.0146**	**0.0000**	**57.9346**	**57.9346**	**1.9900e-003**	**0.0000**	**57.9844**

3.5 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.2700e-003	0.0884	0.1241	2.0000e-004		4.3700e-003	4.3700e-003		4.0300e-003	4.0300e-003	0.0000	17.1073	17.1073	5.4000e-003	0.0000	17.2423
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.2700e-003**	**0.0884**	**0.1241**	**2.0000e-004**		**4.3700e-003**	**4.3700e-003**		**4.0300e-003**	**4.0300e-003**	**0.0000**	**17.1073**	**17.1073**	**5.4000e-003**	**0.0000**	**17.2423**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0000e-004	3.1900e-003	1.0200e-003	1.0000e-005	2.8000e-004	0.0000	2.9000e-004	8.0000e-005	0.0000	9.0000e-005	0.0000	1.0651	1.0651	6.0000e-005	0.0000	1.0665
Worker	1.0200e-003	7.4000e-004	8.6500e-003	3.0000e-005	2.9600e-003	2.0000e-005	2.9800e-003	7.9000e-004	2.0000e-005	8.1000e-004	0.0000	2.4820	2.4820	6.0000e-005	0.0000	2.4835
Total	**1.1200e-003**	**3.9300e-003**	**9.6700e-003**	**4.0000e-005**	**3.2400e-003**	**2.0000e-005**	**3.2700e-003**	**8.7000e-004**	**2.0000e-005**	**9.0000e-004**	**0.0000**	**3.5470**	**3.5470**	**1.2000e-004**	**0.0000**	**3.5501**

3.5 Paving - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.7300e-003	0.0827	0.1424	2.0000e-004		3.1000e-004	3.1000e-004		3.1000e-004	3.1000e-004	0.0000	17.1073	17.1073	5.4000e-003	0.0000	17.2422
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.7300e-003**	**0.0827**	**0.1424**	**2.0000e-004**		**3.1000e-004**	**3.1000e-004**		**3.1000e-004**	**3.1000e-004**	**0.0000**	**17.1073**	**17.1073**	**5.4000e-003**	**0.0000**	**17.2422**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0000e-004	3.1900e-003	1.0200e-003	1.0000e-005	2.8000e-004	0.0000	2.9000e-004	8.0000e-005	0.0000	9.0000e-005	0.0000	1.0651	1.0651	6.0000e-005	0.0000	1.0665
Worker	1.0200e-003	7.4000e-004	8.6500e-003	3.0000e-005	2.9600e-003	2.0000e-005	2.9800e-003	7.9000e-004	2.0000e-005	8.1000e-004	0.0000	2.4820	2.4820	6.0000e-005	0.0000	2.4835
Total	**1.1200e-003**	**3.9300e-003**	**9.6700e-003**	**4.0000e-005**	**3.2400e-003**	**2.0000e-005**	**3.2700e-003**	**8.7000e-004**	**2.0000e-005**	**9.0000e-004**	**0.0000**	**3.5470**	**3.5470**	**1.2000e-004**	**0.0000**	**3.5501**

3.5 Paving - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0505	0.4702	0.7055	1.1200e-003		0.0228	0.0228		0.0211	0.0211	0.0000	96.9400	96.9400	0.0306	0.0000	97.7046
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0505**	**0.4702**	**0.7055**	**1.1200e-003**		**0.0228**	**0.0228**		**0.0211**	**0.0211**	**0.0000**	**96.9400**	**96.9400**	**0.0306**	**0.0000**	**97.7046**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.4000e-004	0.0180	5.6100e-003	6.0000e-005	1.6100e-003	2.0000e-005	1.6300e-003	4.6000e-004	2.0000e-005	4.8000e-004	0.0000	6.0114	6.0114	3.2000e-004	0.0000	6.0195
Worker	5.5000e-003	3.8200e-003	0.0457	1.5000e-004	0.0168	1.3000e-004	0.0169	4.4500e-003	1.2000e-004	4.5700e-003	0.0000	13.6283	13.6283	3.3000e-004	0.0000	13.6366
Total	**6.0400e-003**	**0.0218**	**0.0513**	**2.1000e-004**	**0.0184**	**1.5000e-004**	**0.0185**	**4.9100e-003**	**1.4000e-004**	**5.0500e-003**	**0.0000**	**19.6396**	**19.6396**	**6.5000e-004**	**0.0000**	**19.6560**

3.5 Paving - 2024

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0155	0.4685	0.8071	1.1200e-003		1.7400e-003	1.7400e-003		1.7400e-003	1.7400e-003	0.0000	96.9399	96.9399	0.0306	0.0000	97.7045
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0155**	**0.4685**	**0.8071**	**1.1200e-003**		**1.7400e-003**	**1.7400e-003**		**1.7400e-003**	**1.7400e-003**	**0.0000**	**96.9399**	**96.9399**	**0.0306**	**0.0000**	**97.7045**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.4000e-004	0.0180	5.6100e-003	6.0000e-005	1.6100e-003	2.0000e-005	1.6300e-003	4.6000e-004	2.0000e-005	4.8000e-004	0.0000	6.0114	6.0114	3.2000e-004	0.0000	6.0195
Worker	5.5000e-003	3.8200e-003	0.0457	1.5000e-004	0.0168	1.3000e-004	0.0169	4.4500e-003	1.2000e-004	4.5700e-003	0.0000	13.6283	13.6283	3.3000e-004	0.0000	13.6366
Total	**6.0400e-003**	**0.0218**	**0.0513**	**2.1000e-004**	**0.0184**	**1.5000e-004**	**0.0185**	**4.9100e-003**	**1.4000e-004**	**5.0500e-003**	**0.0000**	**19.6396**	**19.6396**	**6.5000e-004**	**0.0000**	**19.6560**

3.6 Roadway Striping - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	3.2000e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0195	0.1600	0.2427	3.7000e-004		7.6400e-003	7.6400e-003		7.3200e-003	7.3200e-003	0.0000	31.7450	31.7450	6.1700e-003	0.0000	31.8994
Total	**0.0227**	**0.1600**	**0.2427**	**3.7000e-004**		**7.6400e-003**	**7.6400e-003**		**7.3200e-003**	**7.3200e-003**	**0.0000**	**31.7450**	**31.7450**	**6.1700e-003**	**0.0000**	**31.8994**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.2000e-004	0.0106	3.3000e-003	4.0000e-005	9.4000e-004	1.0000e-005	9.6000e-004	2.7000e-004	1.0000e-005	2.8000e-004	0.0000	3.5361	3.5361	1.9000e-004	0.0000	3.5409
Worker	3.2300e-003	2.2500e-003	0.0269	9.0000e-005	9.8600e-003	8.0000e-005	9.9400e-003	2.6200e-003	7.0000e-005	2.6900e-003	0.0000	8.0166	8.0166	2.0000e-004	0.0000	8.0215
Total	**3.5500e-003**	**0.0128**	**0.0302**	**1.3000e-004**	**0.0108**	**9.0000e-005**	**0.0109**	**2.8900e-003**	**8.0000e-005**	**2.9700e-003**	**0.0000**	**11.5527**	**11.5527**	**3.9000e-004**	**0.0000**	**11.5624**

3.6 Roadway Striping - 2024

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	3.2000e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.4500e-003	0.1449	0.2505	3.7000e-004		5.4000e-004	5.4000e-004		5.4000e-004	5.4000e-004	0.0000	31.7450	31.7450	6.1700e-003	0.0000	31.8994
Total	**0.0107**	**0.1449**	**0.2505**	**3.7000e-004**		**5.4000e-004**	**5.4000e-004**		**5.4000e-004**	**5.4000e-004**	**0.0000**	**31.7450**	**31.7450**	**6.1700e-003**	**0.0000**	**31.8994**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.2000e-004	0.0106	3.3000e-003	4.0000e-005	9.4000e-004	1.0000e-005	9.6000e-004	2.7000e-004	1.0000e-005	2.8000e-004	0.0000	3.5361	3.5361	1.9000e-004	0.0000	3.5409
Worker	3.2300e-003	2.2500e-003	0.0269	9.0000e-005	9.8600e-003	8.0000e-005	9.9400e-003	2.6200e-003	7.0000e-005	2.6900e-003	0.0000	8.0166	8.0166	2.0000e-004	0.0000	8.0215
Total	**3.5500e-003**	**0.0128**	**0.0302**	**1.3000e-004**	**0.0108**	**9.0000e-005**	**0.0109**	**2.8900e-003**	**8.0000e-005**	**2.9700e-003**	**0.0000**	**11.5527**	**11.5527**	**3.9000e-004**	**0.0000**	**11.5624**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.545348	0.044620	0.206559	0.118451	0.015002	0.006253	0.020617	0.031756	0.002560	0.002071	0.005217	0.000696	0.000850

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

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

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.8300e-003	0.0000	2.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.7000e-004	5.7000e-004	0.0000	0.0000	6.1000e-004
Unmitigated	1.8300e-003	0.0000	2.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.7000e-004	5.7000e-004	0.0000	0.0000	6.1000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	3.2000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.4900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.0000e-005	0.0000	2.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.7000e-004	5.7000e-004	0.0000	0.0000	6.1000e-004
Total	**1.8400e-003**	**0.0000**	**2.9000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**5.7000e-004**	**5.7000e-004**	**0.0000**	**0.0000**	**6.1000e-004**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	3.2000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.4900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.0000e-005	0.0000	2.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.7000e-004	5.7000e-004	0.0000	0.0000	6.1000e-004
Total	**1.8400e-003**	**0.0000**	**2.9000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**5.7000e-004**	**5.7000e-004**	**0.0000**	**0.0000**	**6.1000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

VMT GHG Emissions

Scenario	Total Daily VMT	Annual VMT	Average CO2e (g/mile)	Average CO2e (MT/mile)	CO2e (MT/year)
No-Build	511,871,989	177,619,580,183	305.53	0.00030553	54,268,110.33
Proposed Project	511,785,330	177,589,509,510	305.53	0.00030553	54,258,922.84

Emissions from Buses Traveling Route

Annual Revenue Miles (NoHo to Pasadena)	kWh/mile	MWh/year	LADWP CO2 Intensity Factor (lb/Mwh)	LADWP CH4 Intensity Factor (lb/Mwh)	CH4 Intensity Factor Adjusted for GWP*	LADWP N2O Intensity Factor (lb/Mwh)	N2O Intensity Factor Adjusted for GWP*	CO2e lb/year	CO2e MT/year
1,348,500	2.2	2966.7	834.00	0.029	0.725	0.00617	1.83866	2,481,833.41	1,125.73

*GWP for CH4 and N20 is 25 and 298, respectively.

Emissions from Buses Displaced by Proposed Project

Annual Revenue Miles Displaced	kWh/mile	MWh/year	LADWP CO2 Intensity Factor (lb/Mwh)	LADWP CH4 Intensity Factor (lb/Mwh)	CH4 Intensity Factor Adjusted for GWP*	LADWP N2O Intensity Factor (lb/Mwh)	N2O Intensity Factor Adjusted for GWP*	CO2e lb/year	CO2e MT/year
303,124	2.2	666.8728	834.00	0.029	0.725	0.00617	1.83866	557881.5503	253.05

*GWP for CH4 and N20 is 25 and 298, respectively.

Emissions from Deadhead Miles to Metro Division

Annual Miles to and from Sun Valley*	kWh/mile	MWh/year	LADWP CO2 Intensity Factor (lb/Mwh)	LADWP CH4 Intensity Factor (lb/Mwh)	CH4 Intensity Factor Adjusted for GWP**	LADWP N2O Intensity Factor (lb/Mwh)	N2O Intensity Factor Adjusted for GWP**	CO2e lb/year	CO2e MT/year
267,180	2.2	587.796	834.00	0.029	0.725	0.00617	1.83866	491728.7731	223.04

*Proposed Project route is approximately 18.3 miles from Sun Valley Metro Division. Assumed 20 buses would make one round trip (36.6 miles) per day.

**GWP for CH4 and N20 is 25 and 298, respectively.

Proposed BRT Operations Electricity Consumption

Day of Week	Daily Trips (One-Way)	Daily Vehicle Revenue Miles	Annual VRM
Monday-Thursday	208	4,012	814,400
Friday	220	4,243	220,600
Saturday	152	2,932	152,400
Sunday/Holiday	144	2,777	161,100
		Total Annual VRM	1,348,500
		Total Deadhead Miles	267,180
		Total Annual BRT Miles	**1,615,680**
		Electricity Consumption Factor (kWh/mi)	2.2
		Total Annual Electricity (MWh)	**3,554.5**
		Metro Line 180 Displaced VRM	303,124
		Metro Line 180 Displaced Electricity (MWh)	**666.9**

Regional On-Road VMT Transportation Fuels Consumption

	Daily VMT		Annual VMT	
	Y2042 No Project	Proposed Project	Y2042 No Project	Proposed Project
Total Vehicle Miles Traveled	511,871,989	511,785,330	177,619,580,183	177,589,509,510
CHANGE FROM NO PROJECT				
Subtotal		(86,659)		(30,070,642)
		-0.017%		-0.017%

	2042 Fleetwide Fuel Consumption Factor (gallons/VMT)	No Project Fuel (Daily Gal)	Proposed Project Fuel (Daily Gal)	No Project Fuel (Annual Gal)	Proposed Project Fuel (Annual Gal)
Gasoline	0.02511	12,854,222	12,852,046	4,460,414,999	4,459,659,858
Diesel	0.00561	2,870,097	2,869,611	995,923,522	995,754,914
CHANGE FROM NO PROJECT					
Gas			(2,176.19)		(755,139.39)
Diesel			(485.90)		(168,607.87)

Informational Disclosure - 2024 Operational RNG Consumption

Actual Vehicle Miles - All Modes					
	2015	2016	2017	2018	2019
Actual Vehicle Miles - All Modes	**2,056,780**	**2,066,164**	**2,057,667**	**2,032,095**	**1,766,449**
Rapid Bus - Directly Operated (RBDO)	*2,056,780*	*2,066,164*	*2,057,667*	*2,032,095*	*1,766,449*

Total Vehicle Revenue Miles					
	2015	2016	2017	2018	2019
Total Vehicle Revenue Miles					
Metro Bus Fleet - Directly Operated (MBDO)	*68,177,492*	*67,611,016*	*65,800,835*	*65,132,766*	*65,492,776*

				2018	2019
Metro Bus Fleet - CNG Consumption (Therms)				34,948,916	26,077,885
Metro Bus Fleet - RNG Consumption (Therms)			1,671,747	8,810,778	18,125,520
Metro Bus Fleet - CNG Consumption (GGE)	38,585,485	37,547,667	36,890,404		

CNG Therm/Mi	0.398179564
RNG Therm/Mi	0.27675602
NG Therm/VRM	**0.675**
Proposed Project VRM	1,615,680
2024 NG Consumption (Therms)	**1,090,480**