AIR QUALITY AND GREENHOUSE GAS TECHNICAL REPORT

Brightline West Cajon Pass High-Speed Rail Project

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Abbreviations and Acronyms

AB	Assembly Bill
ACC	Advanced Clean Cars
AQ	air quality
AQMD	Air Quality Management District
AQMP	Air Quality Management Plan
AVAQMD	Antelope Valley Air Quality Management District
BAAQMD	Bay Area Air Quality Management District
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAP	criteria air pollutant
CARB	California Air Resources Board
CAT	Climate Action Team
CCAA	California Clean Air Act
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH_4	methane
CHP	California Highway Patrol
CO	carbon monoxide
CO_2	carbon dioxide
CPUC	California Public Utilities Commission
DOE	United States Department of Energy
EISA	Energy Independence and Security Act
EMFAC	California Air Resources Board's Emission FACtor model
EO	Executive Order
EV	Electric Vehicle
FR	Federal Register
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
g	gram
gal	gallon
GHG	greenhouse gas
GWP	global warming potential

HFC	hydrofluorocarbon
HSR	High Speed Rail
I-15	Interstate 15
IPCC	Intergovernmental Panel on Climate Change
L	Liter
lb	pound
LCFS	Low Carbon Fuel Standard
LOS	level of service
MDAB	Mojave Desert Air Basin
MDAQMD	Mojave Desert Air Quality Management District
MOU	memorandum of understanding
mph	miles per hour
MSAT	mobile-source air toxics
MWh	Megawatt hours
MY	model years
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHTSA	National Highway Traffic Safety Administration
NO	nitric oxide
NO_2	nitrogen dioxide
NO_X	oxides of nitrogen
O_3	Ozone
OFFROAD	California Air Resources Board's Emissions Inventory Program model
OPR	Office of Planning and Research
Pb	lead
PFC	perfluorocarbons
PL	Public Law
PM	particulate matter
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
ppb	parts per billion
ppm	parts per million
RTP	Regional Transportation Plan

RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
SafeTREC	Safe Transportation Research & Education Center
SB	Senate Bill
SBCTA	San Bernardino County Transportation Authority
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SCORE	Southern California Optimized Rail Expansion
SF_6	sulfur hexafluoride
SIP	State implementation plan
SLCP	short-lived climate pollutants
SO_2	sulfur dioxide
SO_X	oxides of sulfur
sqft	square feet
SR	State Route
TAC	toxic air contaminants
US	United States
USC	United States Code
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
VMT	vehicle miles traveled
VOC	volatile organic compound
ZE	zero emission
ZEV	zero emission vehicles

1. Introduction

DesertXpress Enterprises, LLC (dba "Brightline West") proposes to construct and operate the Cajon Pass High-Speed Rail Project (Project), a 49-mile train system capable of reaching a top speed of approximately 140 miles per hour (mph) between Victor Valley and Rancho Cucamonga, California. The Project includes two new railway stations—one in Hesperia, and one in Rancho Cucamonga. The connecting station in Victor Valley would be constructed as part of a separate project that was evaluated in the DesertXpress Final Environmental Impact Statement (Final EIS, FRA 2011).

The Project would be constructed within the Interstate 15 (I-15) right-of-way (ROW) for 48 miles and on existing transportation corridors for the last mile into the proposed Rancho Cucamonga station. The Project would be powered by overhead electric catenary and require construction of one new traction power substation (TPSS) in the Hesperia area. The maintenance facility that was evaluated with the Brightline West Victor Valley High-Speed Rail (HSR) Passenger Project would provide the primary maintenance functions, although layover tracks are anticipated at the Rancho Cucamonga station, which could include light maintenance capability, such as interior cleaning and daily inspection.

Trains are expected to operate daily on 45-minute headways between Victor Valley and Rancho Cucamonga. The trip between Victor Valley and Rancho Cucamonga would be approximately 35 minutes. Service would be coordinated with existing and planned Metrolink service at the Rancho Cucamonga station to provide a convenient connection between the high-speed rail and commuter rail systems.

The Project would be constructed and operated under a lease agreement with the California Department of Transportation (Caltrans) for the use of the I-15 right-of-way and the station at Hesperia. Brightline West would secure additional agreements with Caltrans for Right-of-Way Use, Design & Construction Oversight and Reimbursement, and Operations & Maintenance, as necessary. For the last mile of the project from I-15 to the Rancho Cucamonga Station, there will be Agreements with the City of Rancho Cucamonga and the San Bernardino County Transportation Authority (SBCTA) for land rights, construction, operations and maintenance.

2. Project Description

2.1. Background

Early Project coordination for HSR service from Victor Valley to Rancho Cucamonga began in 2020, with Brightline West meeting with the San Bernardino County Transportation Authority (SBCTA) to examine a connection between Victor Valley and Rancho Cucamonga. This meeting resulted in a memorandum of understanding (MOU) that was fully executed in July 2020 between Brightline West and SBCTA to study the potential of building HSR within the I-15 right-of-way between Victor Valley and Rancho Cucamonga. A separate MOU was executed in September 2020 between Brightline West and the Southern California Regional Rail Authority, which operates Metrolink, for connection to the existing Metrolink station in Rancho Cucamonga. Additionally, the California State Transportation Agency (CalSTA), Caltrans, the

California High-Speed Rail Authority, and Brightline West have executed an MOU regarding the Project. The MOU reflects both the regional and statewide interest and value in the Project, including interconnectivity opportunities, and outlines how the parties would work together to advance their shared interest in the success of the Project.

2.2. Project Area

The Project would construct and operate a 49-mile train system capable of speeds up to approximately 140 mph between Victor Valley, California and Rancho Cucamonga, California (Project). The Project includes two new railway stations: one in Hesperia, and one in Rancho Cucamonga, and will connect to another Brightline West station in Victor Valley. The proposed rail alignment would be located within the median of the I-15 freeway between Victor Valley and Rancho Cucamonga except for the last mile approaching the proposed Rancho Cucamonga station. The Project area is depicted in Figure 2-1.

2.3. Purpose of and Need for the Project

2.3.1. Purpose

The purpose of the Project is to provide reliable and safe passenger rail transportation between the Los Angeles metropolitan region and the High Desert of San Bernardino County. The Project would provide a convenient, efficient, and environmentally sustainable alternative to automobile travel on the highly congested I-15 freeway. The Project would add capacity to the overall transportation system by introducing a new HSR service from Victor Valley to Rancho Cucamonga. The Project would reduce travel time, improve reliability, and increase the mobility options for travel between metropolitan regions. Travel time from Victor Valley to Rancho Cucamonga for Project users would be approximately 30 percent faster during normal conditions and at least twice as fast during congestion peak periods. The Project would reduce automobile vehicle miles traveled (VMT), resulting in a corresponding reduction in greenhouse gas (GHG) and air quality emissions.

2.3.1.1. Multi-Modal Use of the I-15 Corridor

Operation of the Project would significantly increase the capacity of I-15 as a multi-modal corridor in Southern California. This increase in capacity would benefit freeway operations by providing an alternative to automobile travel that would reduce travel time. This shift of people from automobile to train travel along the I-15 corridor would reduce the need for programmed and/or planned freeway improvement and widening projects.

2.3.2. Need

The Project is needed to address transportation capacity deficiencies, major points of congestion, limited travel mode choices, safety deficiencies, and reduce GHG emissions.

Travel demand analysis completed on behalf of the Project forecasts 49.1 million one-way trips between Southern California and Las Vegas in 2025, with approximately 85 percent of travelers making the trip by automobile. Most of these trips use the Cajon Pass segment of the I-15, which is capacity-constrained. Further, the freeway system leading into the I-15 from points

west, east, and south, including I-10, State Route 210 (SR-210), I-215 and SR-60 have similar delays and capacity constraints. The Project would address this demand by providing a transportation alternative to vehicle travel, and it would allow access to the Brightline West service from the Greater Los Angeles and the Riverside-San Bernardino-Ontario Metropolitan areas, as well as points beyond, with a connection to the Metrolink system in Rancho Cucamonga.

The Project would also support federal and state policies focused on climate change and the need to reduce VMT and associated GHG emissions.

2.3.2.1. Capacity Constraints

I-15 through the Cajon Pass is one of the most congested segments of I-15, with no alternative routes that provide comparable direct road travel capability because of the mountainous topography. Through the Cajon Pass, I-15 supports daily workforce commuters, recreational travel, and regional and interstate freight and goods movement. According to the traffic study prepared for the I-15 Corridor Project Initial Study/Environmental Assessment (Caltrans and SBCTA 2018), unreliability in travel time along segments of I-15 and surrounding roadways is caused by roadway capacity constraints, frequent accidents, and various factors that cause unanticipated congestion. Travelers using the Project would no longer need to drive through the most congested parts of the corridor in the Cajon Pass for interstate or commuter trips, thereby avoiding driving next to many large freight trucks, idling and inefficient stop-and-go traffic conditions.

By 2045, travel speeds are expected to decrease on all but one segment of I-15 between the San Bernardino Valley and Apple Valley in the AM peak period, and travel speeds on most segments would also decrease—some by more than 10 mph—in the PM peak period (SCAG 2020). Based on the Project Report for the I-15 Corridor Study (addition of express lanes), traffic volumes on I-15 between I-10 and SR-210 are expected to increase in the range of 31 to 38 percent from 2014 to 2045. The Project Report states the existing LOS is acceptable in most locations but that there are bottlenecks in each direction of travel that degrade traffic operation, especially between Baseline Road and SR-210. Because the express lane project is increasing capacity by adding express lanes, the traffic volumes are projected to increase by an additional 27 percent. The Project Report further mentions that, although the express lane project would improve conditions in the general purpose lanes in many segments, it would cause the segment between the I-10 and Fourth Street to worsen in the PM peak hour (both directions). In the AM peak hour, the segment between Arrow Route and Fourth Street would worsen in the southbound direction. The segment between Baseline Road and SR-210 would continue to operate at over capacity conditions in all scenarios.

SCAG's Connect SoCal Goods Movement Technical Report identifies I-15 as part of the U.S. Department of Transportation's (USDOT) Primary Highway Freight Network and among the network segments that carry the highest volumes of truck traffic in the region. It also identifies the entirety of the Cajon Pass as a truck bottleneck, with over 15,000 annual vehicle hours of delay.

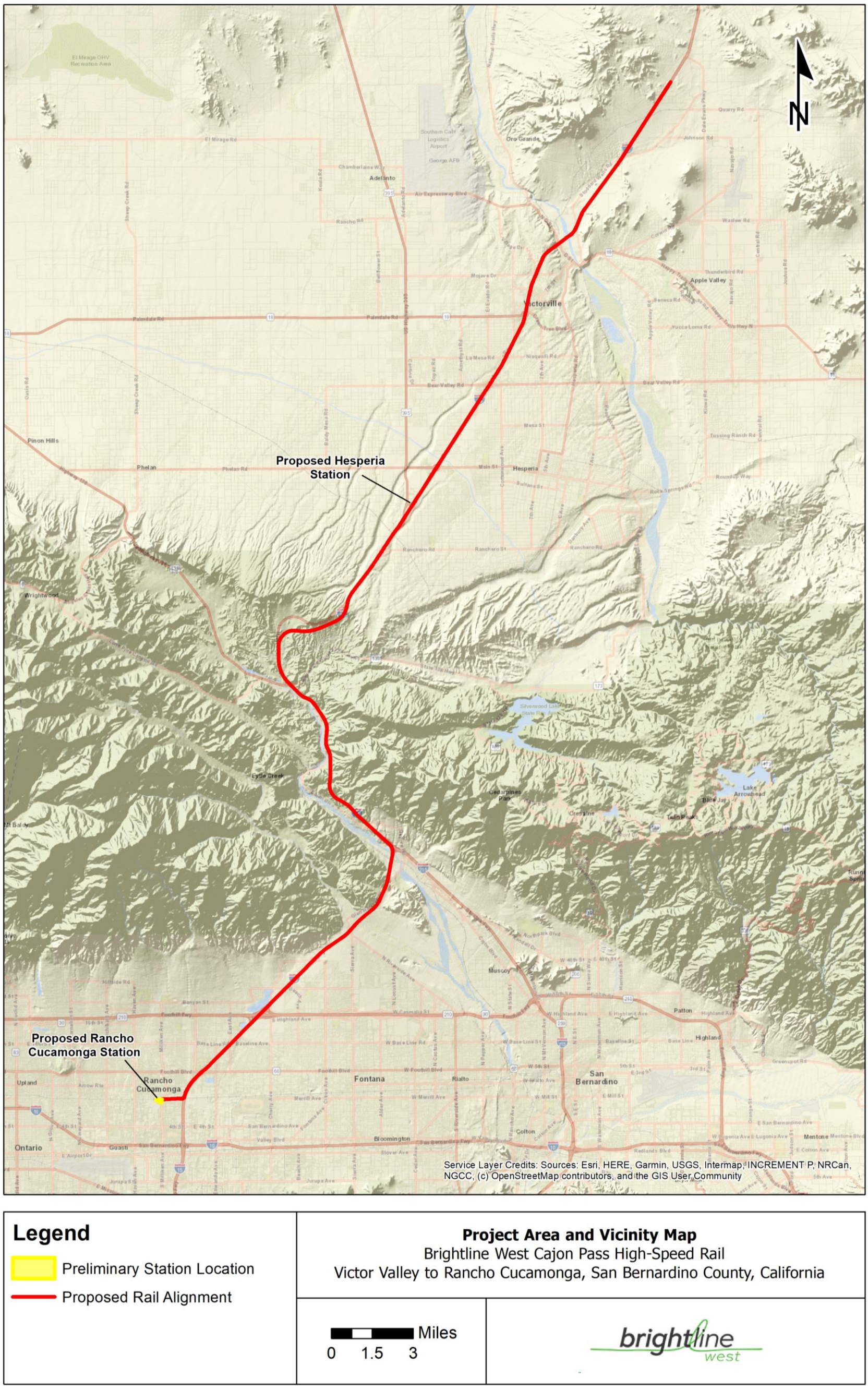

Figure 2-1 Project Area and Vicinity

As documented above, given the attractiveness of the origins and destinations, the transportation capacity constraints on I-15 as described in current and predicted average daily traffic (ADT) and LOS limit reasonable highway access between Rancho Cucamonga, Hesperia, and Victor Valley.

2.3.2.2. Travel Demand

The anticipated substantial increases in population, housing, and employment in San Bernardino County will result in greater demand for transportation facilities and services, including increased travel demand that will result in congestion on roadways if capacity does not keep up with the demand. The proposed Hesperia station would provide convenient connections between High Desert communities and the more urbanized San Bernardino Valley and Metropolitan Los Angeles. The High Desert provides lower cost housing options for Southern California residents, while the Rancho Cucamonga/Ontario area around Ontario International Airport has become a significant employment center.

SCAG forecasts, in its 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), that the population of San Bernardino County will grow to 2,815,000 by 2045, a 29 percent increase from the U.S. Census Bureau's 2018 population estimate of 2,180,085, and that the number of households will grow to 875,000, a 39 percent increase over the 2018 household estimate of 630,633 (U.S. Census Bureau 2020). Additionally, the 2020-2045 RTP/SCS forecasts employment in San Bernardino County will increase to 1,064,000 by 2045, a 72 percent increase from the US Census Bureau's estimate of 617,828 in 2018.

While the proposed Victor Valley station site would be located at the convergence of all the highways *en route* to Las Vegas for Southern California travelers, the Rancho Cucamonga station would be closer to major population centers in Southern California. Compared to the Victor Valley station, the proposed HSR station in Rancho Cucamonga, located about 45 miles east of Downtown Los Angeles, would provide more direct access to the densely populated centers in Southern California for both drivers and Metrolink riders; 87 percent of the potential market for trips between Las Vegas and Southern California (equivalent to 42.7 million of the one-way, in-scope trips in 2025) live within 75 miles of the location of the proposed Rancho Cucamonga station.

The proposed station in Rancho Cucamonga, with a Metrolink connection to Los Angeles, would further meet the forecasted demand of the 49.1 million one-way trips between Las Vegas and Southern California estimated in 2025. Similarly, the proposed Hesperia station would be at the convergence of US Highway 395 (US-395) and I-15, so it would serve commuters to Greater Los Angeles from the major corridors in the Victor Valley.

The Project would also support SCAG's Connect SoCal Passenger Rail Technical Report, which identifies closing connectivity gaps as a major strategy to increase mobility and improve sustainability. The Project would facilitate transit connections and would allow residents of the Greater Los Angeles and the Riverside-San Bernardino-Ontario Metropolitan areas to travel exclusively by mass transit and passenger rail to and from the High Desert of San Bernardino and connect to the BLW station at Victor Valley for a connection to Las Vegas. Southern California residents could take the Los Angeles Metro rail, regional bus systems, Amtrak, or Metrolink to Los Angeles Union Station to connect via the Metrolink San Bernardino Line to the Rancho Cucamonga station. Residents could also take the planned West Valley Connector Bus

Rapid Transit service that will operate between the Pomona station on the Metrolink Riverside Line in eastern Los Angeles County and the Rancho Cucamonga station. While still in early planning and design stages, the planned Tunnel to Ontario International Airport (ONT) project may provide an additional connection from the Rancho Cucamonga station to the Ontario International Airport.

Additionally, SBCTA and SCAG's 2015 Advanced Regional Rail Integrated Vision – East (ARRIVE Corridor) plan proposes strategies for transitioning the Metrolink San Bernardino Line, which would serve the Rancho Cucamonga station, from a traditional commuter rail line to one that promotes transit-oriented development. Improvements to Metrolink, its transit connections, and additional development of the station areas with transit-supportive uses at greater densities and intensities will encourage the formation of areas that are walkable and that provide mobility options in the region. The Project would further the goals of the ARRIVE Corridor plan by increasing the activity centers that can be accessed by Southern California's rail network. Additionally, the Southern California Optimized Rail Expansion (SCORE) program is intended to increase speeds, reliability, and capacity on Metrolink lines including on the San Gabriel Subdivision which serves the Rancho Cucamonga station.

In 2010, the San Bernardino Associated Governments (the predecessor agency to SBCTA) completed the Victor Valley Long Distance Commuter Needs Assessment, which identified a phased set of commuter improvement projects. Those projects ranged from expanded park and ride facilities to an express bus service linking the Victor Valley area of the High Desert to the Rancho Cucamonga Metrolink station. The Joshua Street Park & Ride is next to the Project's proposed station in Hesperia. Such commuter-focused planned improvements highlight the need for travel options that reduce the number of single occupancy automobiles on I-15 in San Bernardino County, particularly through the Cajon Pass.

FHWA's Southern California Regional Freight Study (USDOT 2020) identifies I-15 as a major interstate highway corridor that provides access to the interior of the United States for goods arriving at the ports of the Los Angeles region and ranks it among the highest truck volume corridors in the western United States. Caltrans' 2015 Interregional Transportation Strategic Plan identifies I-15 as a high priority corridor, among six nationally identified "Corridors of the Future," and a "vital link between Mexico, Southern California, and locations to the north and east of the region." I-15 also connects Southern California and the southwestern United States to the San Joaquin Valley's agricultural goods via SR-58. By providing passenger rail capacity in the corridor, the Project would help maintain freeway capacity for truck freight use by removing passenger vehicles from the roadway network.

2.3.2.3. Safety

Alternatives to automobile travel would provide improved safety conditions on the I-15 corridor with diversion of vehicle trips to HSR. On a national level, comparing miles traveled via commercial aircraft, train, and automobiles on highways, auto travel on highways has by far the highest rate of passenger fatalities per mile traveled. In 2019, the average rate of passenger fatalities from highway travel was more than 75 times the comparable rate for travel by air and 34 times the comparable rate by rail. For 2016, the Bureau of Transportation Statistics' National Transportation Statistics (USDOT 2018) reported a rate of passenger fatalities per 100 million

passenger miles traveled by highway nearly 10 times greater than the rates for travel by air or rail. HSR is one of the safest forms of travel.

The California Office of Traffic Safety ranks San Bernardino County 16th-worst out of 58 counties for total fatal and injury crashes in 2018 (the most recent year of data available). According to the University of California, Berkeley, and SafeTREC's Transportation Injury Mapping System, there were 819 collisions with one or more deaths or injuries along I-15 in San Bernardino County in 2019. Of these, nearly one quarter (199) occurred in the 12 miles of the Cajon Pass, although the Cajon Pass accounts for only 6.5 percent of the length of I-15 in the county.

A study by the I-15 Mobility Alliance found that the segment of I-15 from I-215 in San Bernardino to I-40 in Barstow had a fatality rate 0.009 per million VMT, well above the alliance's performance goal of 0.003 fatalities per million. By connecting the Victor Valley to Rancho Cucamonga, the Project would allow more travelers to stay off segments of I-15.

3. Project Baseline and Alternatives

3.1. Project Baseline

The AQ analyses performed for any project under NEPA are based on the changes (i.e., increments) in project-related emissions and air quality relative to a baseline condition. The definition of baseline under NEPA for this Project is discussed below:

- The NEPA Baseline represents conditions in the 'build-out' year of the Project. In this case, the No Build Alternative in the year 2025 will represent the NEPA baseline.

Under the No Build Alternative, none of the Project features would be constructed. The No Build Alternative provides a baseline against which to compare the Build Alternative. The existing transportation facilities within the Project area would remain unchanged except for planned and programmed improvements under other projects, such as projects listed in state and local plans.

3.2. Build Alternative

The Build Alternative (i.e., the Project) consists of a proposed HSR passenger railway with associated infrastructure, including two proposed passenger stations. Nearly all of the Project would be built within the I-15 right-of-way. Near the proposed southern terminus station in Rancho Cucamonga, approximately 1 mile of the rail alignment would be in city street, railroad, or utility rights-of-way.

The proposed rail alignment would be located within the median of the I-15 freeway between Victor Valley and Rancho Cucamonga except at the approach to the proposed Rancho Cucamonga station. The rail alignment would be predominately at grade (the same elevation as the existing freeway), with select segments of the alignment on aerial structures or in a trench to allow for grade separations (including 4 BNSF and 3 UP railroad crossings) and to provide a safe incline for train operation. The rail alignment would be predominantly single-track, with limited double-track segments in Victor Valley (2.6 miles, including 0.9 miles constructed as part of the DesertXpress High-Speed Passenger Train Project), Hesperia (5.5 miles), and Rancho

Cucamonga (2 miles). This would allow for 45-minute headways in the opening year between Victor Valley and Rancho Cucamonga and 22.5-minute headways by year 11. These headways, along with the ability to couple trains (double passenger capacity), would address projected ridership needs for the foreseeable future.

For analytical purposes, the Build Alternative is described in three sections. Sections were developed to reflect similarly developed areas with similar environmental sensitivity. The sections include:

- **Section 1:** High Desert – from the Victor Valley station, continuing south along I-15, to the I-15/Oak Hill Road interchange in Hesperia
- **Section 2:** Cajon Pass – from the I-15/Oak Hill Road interchange, continuing south along I-15, through the Cajon Pass, to the I-15/Kenwood Avenue interchange
- **Section 3:** Greater Los Angeles – from the I-15/Kenwood Avenue interchange in San Bernardino, continuing south along I-15, through the existing Metrolink station in Rancho Cucamonga to Haven Avenue

3.2.1. Section 1 – High Desert

The proposed rail alignment would connect to the DesertXpress High Speed Train alignment approximately one mile south of the Victor Valley station in Apple Valley. The Victor Valley station was proposed by the DesertXpress High Speed Train Project (DesertXpress Project) and approved in 2011 and modified by the re-evaluation in 2020. From this point, the alignment would continue south within the I-15 median. The rail alignment throughout Section 1 would be predominantly single track; however, the rail alignment would be double-track north of Stoddard Wells Road to the northern terminus of the alignment as it approaches the train platforms of the Victor Valley station. The Project would include a new structure over the existing CEMEX railroad bridge. Based on future discussion with CEMEX, the existing railroad bridge may be reconstructed as part of the DesertXpress project, in which case the alignment would run at-grade in the median under the railroad bridge.

Brightline West will build a new Southbound on ramp and bridge at South Stoddard Wells Road to replace similar existing facilities further south.[1] This in-turn requires modifications of I-15 up to and including the Mojave River crossing.

At the Mojave River, a new rail bridge will be constructed within the median of I-15.[2] The existing I-15 bridge would be widened to accommodate the rail line. The alignment would then continue at grade in the I-15 median with minor roadway widenings for the remainder of Segment 1. This portion of the alignment would interface with the following interchanges: Stoddard Wells Road North, Stoddard Wells Road South, D Street/E Street, Mojave Drive, Roy Rogers Drive/Hook Road, Palmdale Road, La Mesa Road/Nisqualli Road, Bear Valley Road, Main Street/Phelan Road, Joshua Street, US-395, Ranchero Road, and Oak Hill Road.

[1] These improvements would be consistent with Caltrans' planned Interstate 15 Interchange Reconstruction (D Street, E Street, Stoddard Wells Road, and Mojave River Bridge)project, which was originally analyzed under an Initial Study / Environmental Assessment in 2008.

[2] Air quality modeling was conducted based on a prior version of the alignment that ran to the east of the I-15 right-of-way before crossing into the median. However, project changes to move the Project into the median would not affect the analysis.

A new substation would be constructed to support the Project along I-15, between Mesa Street and Mojave Street. The area is currently largely undeveloped, other than existing overhead power lines and utility access.

Hesperia Station

Section 1 includes a new passenger station in Hesperia, at the I-15/Joshua Street interchange. This station would serve daily travelers between the High Desert of San Bernardino County and the Los Angeles Basin. This would be a limited service for select southbound AM and northbound PM weekday on selected Brightline train coaches. The northbound on-ramp to Joshua Street would be realigned closer to the freeway, and station parking would be on the north side of Joshua Street. Parking would be accessed at the location of the existing northbound ramp intersection. To accommodate the rail alignment, the existing US-395 northbound connector and the existing Joshua Street bridge would be replaced. The Joshua Street bridge would be reconstructed at a higher elevation, requiring raising of the I-15 ramps and Mariposa Road. The passenger platform would be located within the I-15 median, with direct access from the reconstructed Joshua Street bridge at the southern end of the double-track segment in Hesperia. The Project design includes adequate parking areas to accommodate parking demand in the opening year.

Design Elements

Segment 1 of the Project includes the following design elements.

- Reconstructions/Interchange Modifications: Widening portions of the I-15 freeway and modifications to interchanges at Stoddard Wells Road southbound off-ramp, D Street/E Street, Mojave Drive, Roy Rogers Drive/Hook Road, Palmdale Road, La Mesa/Nisqualli Road, Bear Valley Road, Main Street/Phelan Road, US-395, Ranchero Road, Oak Hill Road and Joshua Street
- Station Area: Hesperia station platform, station access/infrastructure, surface parking lot accommodating approximately 360 vehicles, bus pick up/drop off areas, Kiss and Ride

3.2.2. Section 2 – Cajon Pass

Beginning at the I-15/Oak Hill Road interchange and traveling south, the alignment would run on the west side of the I-15 northbound lanes at grade and within the existing I-15 right-of-way. In this area, the I-15 runs through the San Bernardino National Forest for approximately 12 miles. The rail alignment throughout Section 2 would be entirely single-track. The Project would require replacement of California Highway Patrol (CHP) emergency crossovers where the new guideway would block existing crossovers. Four new crossover locations would be placed to take advantage of existing CHP access between the separated I-15 alignments at the following locations

- West of Forestry Road crossing the northbound lanes.
- Approximately 1.25 miles in the southbound direction along I-15 from the crossover near Forestry Road, across the northbound lanes.
- West of the Baldy Mesa (Trestles) OHV Staging Area, across the northbound lanes.

- West of Perdew Canyon and approximately 1.25 miles north of Mathews Ranch Road, across both the north and southbound lanes.

The alignment would remain at grade throughout Segment 2.

Where I-15 northbound and southbound lanes reconnect at the foot of the Cajon Pass, the rail alignment would be within the I-15 median. This would require widening portions of the I-15 freeway and minor realignment of ramps at the I-15/SR-138 interchange.

Design Elements

Segment 2 of the Project includes the following design elements.

- Bridges/Viaducts: None
- Reconstructions/Interchange Modifications: Widening portions of the I-15 freeway including several miles of retained fill, and realignment of ramps at the I-15/ SR-138 interchange
- Other Facilities: CHP emergency crossovers

3.2.3. Section 3 – Greater Los Angeles

Beginning at the Kenwood Avenue interchange, the proposed rail alignment would continue at grade in the I-15 median. At the I-15/I-215 interchange, the alignment would continue between the divided I-15 freeway at the same elevation as the freeway including the Devore interchange viaduct, curving to the southwest parallel to freeway. The rail alignment would require I-15 freeway and interchange ramp modifications at Baseline Avenue. SR-210, Beech Avenue, Duncan Canyon Road, Sierra Avenue, and Glen Helen Parkway.

The rail alignment would transition to an aerial alignment and elevate over the I-15 southbound lanes south of Church Street and cross at Foothill Boulevard. It would continue along the west side of the I-15 freeway on an elevated alignment to enter the San Gabriel Subdivision and Eighth Street corridor. The alignment would transition onto an aerial structure and would turn west, running parallel to and partially within the existing rail corridor and partially within the Eighth Street right-of-way before entering the existing Rancho Cucamonga Metrolink station area on an elevated structure. The rail alignment would maintain a single-track configuration prior to the existing the freeway median south of Church Street, where it would transition to a double-track configuration for the remaining distance to the Rancho Cucamonga station. At the Rancho Cucamonga station, an elevated station with a center platform and tracks on either side would be constructed parallel to and above the existing eastbound Metrolink platform, extending over Milliken Avenue. . A new parking structure is proposed a Rancho Cucamonga station, and would replace existing surface parking to accommodate increased parking demand. The Project design includes adequate parking areas to accommodate parking demand in the opening year.

Design Elements

Segment 3 of the Project includes the following design elements.

- Bridges/Viaducts: Viaduct of approximately 3.5 miles to cross I-15 southbound lanes and along existing rail corridor near Rancho Cucamonga station

- Reconstructions/Interchange Modifications: I-15 freeway and interchange ramp modifications at SR-210, Beech Avenue, Duncan Canyon Road, and Glen Helen Parkway
- Station: Dedicated Brightline station adjacent to the existing Rancho Cucamonga Metrolink station, with vertical circulation down to the platform, shared access with existing Metrolink station, a share parking structure for vehicles, and a bus plaza

3.2.4. Construction

In general, construction activities would consist of clearing, grading, excavation, placing fill, stockpiling materials, constructing bridges and walls, installing drainage, installing sub-ballast and subgrade, placing and anchoring railroad ties, placing ballast material, and tamping ballast, constructing stations, substations, mobilization and demobilization. Construction equipment would likely include dump trucks, excavators, loaders, cranes, water trucks, backhoes, scrapers, rollers, ballast tampers, concrete trucks, and drill rigs.

For new and reconstructed overpasses and bridges, construction activities would include clearing, grubbing, demolition of existing structures, excavation and drilling for foundations, concrete pouring, formwork and rebar placement for foundations, falsework installation, construction of bridge decking, placement of ballast and ties, mobilization and demobilization.

Most construction activities would occur on Caltrans right-of-way. Some, for the rail stations and power substations, would occur on public property owned by the City of Rancho Cucamonga, SBCTA, or State of California. Temporary construction areas, or TCAs, are properties that would be temporarily utilized for construction staging and storage. The Project would require TCAs along the alignment between Victor Valley and Rancho Cucamonga.

4. Methodology

4.1. Regulatory Framework

Statutes, regulations, plans, and policies have been adopted that address air quality issues. The Project alignment and station areas are subject to air quality regulations developed and implemented at the federal and state levels. Those regulations, plans, and policies that are relevant to the Project are discussed below.

4.1.1. Federal Regulations

Air quality is regulated at the federal level under the Clean Air Act (CAA) of 1970[3] and the Final Conformity Rule.[4] The Clean Air Act Amendments of 1990[5] direct the USEPA to implement environmental policies and regulations that will ensure better air quality. According to Section 176(c) of the Clean Air Act Amendments: “No federal agency may approve, accept, or fund any transportation plan, program, or project unless such plan, program or project has been found to conform to any applicable SIP in effect under this act.” Section 176(c) defines *conformity* as follows: conformity to an implementation plan’s purpose of eliminating or reducing the severity

3 42 United States Code (USC) §7401 et seq. 1970.

4 40 Code of Federal Regulations (CFR) Parts 51 and 93.

5 Public Law (PL) 101-549, 1990.

and number of violations of the NAAQS and achieving expeditious attainment of such standards; such activities will not cause any of the following occurrences:

- Cause or contribute to any new violation of any NAAQS in any area,
- Increase the frequency or severity of any existing violation of any NAAQS in any area, or
- Delay timely attainment of any NAAQS or any required interim emissions reductions or other milestones in any area.

The federal CAA requires states to submit a SIP for areas designated as nonattainment for federal air quality standards. The SIP, which is reviewed and approved by USEPA, must demonstrate how the federal standards will be achieved. Failing to submit a plan or secure approval could lead to denial of federal funding and permits. In cases where the SIP is submitted by the state but fails to demonstrate achievement of the standards, USEPA is directed to prepare a federal implementation plan.

4.1.1.1. Transportation Conformity Rule

The concept of transportation conformity was introduced in the 1977 federal CAA, which includes a provision to ensure that federal transportation investments conform to the SIP for meeting the NAAQS.[6] Conformity requirements were made substantially more rigorous in the federal CAA amendments of 1990, and the transportation conformity regulation that details implementation of the conformity requirements was first issued in November 1993, though the requirements have been amended many times. The amendments to the Transportation Conformity Rule are found at Title 40 Code of Federal Regulations (CFR) parts 51 and 93).[7]

Since federal funding would not be used to construct or operate the Project, the Project would not be subject to transportation conformity requirements. Instead, the Project would be subject to general conformity requirements, which are described below. The General Conformity Rule applies to all federal actions except programs and projects requiring funding or approval from the United States Department of Transportation (USDOT), the Federal Highway Administration, the Federal Transit Administration, or a Metropolitan Planning Organization. In lieu of a general conformity analysis, these latter types of programs and projects must comply with the Transportation Conformity Rule promulgated by the USDOT on November 24, 1993 (58 FR 62197).

4.1.1.2. General Conformity Rule

The General Conformity Rule was promulgated in 1993 in Volume 58 of the Federal Register (FR) page 63214 (58 FR 63214) to implement the conformity provision of Title I, section 176(c)(1) of the federal Clean Air Act.[8] The General Conformity Regulations were revised by USEPA in March 2010 to improve the process federal entities use to demonstrate that their actions will not contribute to a violation of a national air quality standard.[9] Section 176(c)(1) requires that the federal government not engage, support, or provide financial assistance for

6 United States Environmental Protection Agency (USEPA). 1993. *Transportation Conformity Regulations.*

7 40 CFR Parts 51 and 93.

8 USEPA. 1993. *General Conformity Regulations.*

9 USEPA. 2010. *Revisions to the General Conformity Regulations.*

licensing or permitting, or approving any activity not conforming to an approved CAA implementation plan.

The General Conformity Rule is codified in Title 40 CFR Part 51, Subpart W and Part 93, Subpart B, Determining Conformity of General Federal Actions to State or Federal Implementation Plans. The General Conformity Rule applies to all federal actions except programs and projects requiring funding or approval from the USDO), the Federal Highway Administration, the Federal Transit Administration, or a Metropolitan Planning Organization.

4.1.1.3. Federal Climate Change Policy

There are currently no federal standards related to greenhouse gas (GHG) emissions and no federal framework for considering GHG impacts in NEPA analyses.

Massachusetts v. USEPA

In April 2007, in Massachusetts v. USEPA,[10] the United States (US) Supreme Court directed the Administrator of the USEPA to determine whether GHG emissions from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making these decisions, the USEPA Administrator was directed to follow the language of Section 202(a) of the CAA. In December 2009, the Administrator signed a final rule with two distinct findings regarding GHGs under Section 202(a) of the CAA:

- Elevated concentrations of GHGs— carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)—in the atmosphere threaten the public health and welfare of current and future generations. This is referred to as the "endangerment finding."
- The combined emissions of GHGs—CO_2, CH_4, N_2O, and HFCs—from new motor vehicles and new motor vehicle engines contribute to the GHG air pollution that endangers public health and welfare. This is referred to as the "cause or contribute finding." [11]

These two findings were necessary to establish the foundation for regulation of GHGs from new motor vehicles as air pollutants under the CAA.

Federal Plan to Reduce GHG Emissions by 2025

In 2015, President Obama signed Executive Order (EO) 13693,[12] which was intended to reduce the federal government's GHG emissions by 40 percent by 2025 by requiring the following:

1. Ensuring that 25 percent of total energy consumption is from clean energy sources;
2. Reducing energy use in federal buildings by 2.5 percent per year between 2015 and 2025;

10 Massachusetts v. USEPA. 2007. *549 US 497.*

11 USEPA. n.d. *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act.*

12 Federal Register. 2015. *Executive Order 13693: Planning for Federal Sustainability in the Next Decade.*

3. Reducing per-mile GHG emissions from federal fleets by 30 percent (from 2014 levels) by 2025 and increasing the percentage of zero-emissions and plug-in hybrid vehicles in federal fleets; and
4. Reducing water intensity in federal buildings by 2 percent per year through 2025.

This executive order was revoked by President Trump's EO 13834 in May 2018, which requires Federal agencies meet statutory requirements in a manner that increases efficiency, optimizes performance, eliminates unnecessary use of resources, and protects the environment. In implementing this policy, each agency shall prioritize actions that reduce waste, cut costs, enhance the resilience of Federal infrastructure and operations, and enable more effective accomplishment of its mission.[13] President Biden's EO 13990 revoked Executive Order 13834 except for sections 6 (Duties of the Federal Chief Sustainability Officer), 7 (Duties of Heads of Agencies), and 11 (General Provisions). EO 13990 directs Federal agencies to immediately review, and take action to address, Federal regulations put into effect and other actions taken during the Trump Administration that conflict with national objectives to improve public health and the environment; ensure access to clean air and water; limit exposure to dangerous chemicals and pesticides; hold polluters accountable, including those who disproportionately harm communities of color and low-income communities; reduce greenhouse gas emissions; bolster resilience to the impacts of climate change; restore and expand our national treasures and monuments; and prioritize both environmental justice and employment. [14]

Executive Order 14008

On January 27, 2021, President Biden issued an Executive Order on Tackling the Climate Crisis at Home and Abroad (Executive Order 14008).[15] Part I of the Order highlights putting the climate crisis at the center of United States foreign policy and national security. Addressing the climate crisis will require significant short-term global reductions in GHG emissions and net zero global emissions by mid-century or sooner. The United States will pursue green recovery efforts and initiatives to advance the clean energy transition.

Part II of the Order relays the government-wide approach to the climate crisis, which involves reducing climate pollution in every sector of the economy, especially through innovation, commercialization, and deployment of clean energy technologies and infrastructure. A National Climate Task Force is established to focus on addressing the climate crisis through key federal actions to reduce climate change impacts. A 100 percent carbon pollution-free electricity sector is targeted by no later than 2035 and a net-zero emissions economy is to be achieved by no later than 2050. Offshore wind is aimed to be doubled by 2030. Opportunities for federal funding of clean energy technology and infrastructure shall be identified. Federal permitting decisions need to consider the effects of GHG emissions and climate change.

13 Federal Register. 2018. *Executive Order 13834: Efficient Federal Operations.*

14 White House Briefing Room. 2021a. *Executive Order on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis.*

15 White House Briefing Room. 2021b. *Executive Order on Tackling the Climate Crisis at Home and Abroad.*

Paris Climate Agreement

On June 1, 2017, President Trump withdrew the United States from the Paris Agreement.[16] The Paris Agreement was negotiated within the United Nations Framework Convention on Climate Change in 2015 to reduce GHG emissions internationally. The goal of the Paris Agreement was to keep the global temperature rise this century to below 2 degrees Celsius above pre-industrial standards, with efforts to limit temperature increase even further to 1.5 degrees Celsius. The Paris Agreement became effective on November 4, 2016. As of October 5, 2016, 155 of 197 parties had ratified the Paris Agreement.[17] On January 20, 2021, President Biden signed an Executive Order formally rejoining the United States to the Paris Agreement.[18]

Federal Vehicle Standards

In response to the *Massachusetts v. USEPA* decision discussed above, in 2007, President Bush directed the USEPA, the Department of Transportation (USDOT), and the Department of Energy (DOE) to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. In 2009, the National Highway Traffic Safety Administration (NHTSA) issued a final rule regulating fuel efficiency for and GHG emissions from cars and light-duty trucks for model year 2011; and, in 2010, the USEPA and NHTSA issued a final rule regulating cars and light-duty trucks for model years 2012–2016.

In August 2017, the USEPA asked for additional information and data relevant to assessing whether the GHG emissions standards for model years 2022-2025 remain appropriate. In early 2018, the USEPA Administrator announced that the midterm evaluation for the GHG emissions standards for cars and light-duty trucks for model years 2022-2025 was completed and stated his determination that the current standards should be revised in light of recent data. Subsequently, in 2018, the USEPA and NHTSA proposed to amend certain existing Corporate Average Fuel Economy (CAFE) standards and tailpipe carbon dioxide emissions standards for passenger cars and light trucks and establish new standards, covering model years 2021-2026. Compared to maintaining the post-2020 standards now in place, the pending proposal would increase US fuel consumption.[19] California and other states have announced their intent to challenge federal actions that would delay or eliminate GHG reductions. In April 2020, NHTSA and USEPA amended the CAFE and GHG emissions standards for passenger cars and light trucks and established new less stringent standards, covering model years 2021 through 2026.

In 2010, President Obama issued a memorandum directing the same federal agencies to establish additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, the USEPA and NHTSA proposed stringent, coordinated federal GHG and fuel economy standards for model year 2017–2025 light-duty vehicles.

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011, the USEPA and NHTSA announced fuel economy and GHG standards for medium- and heavy-

16 USEPA. 2017. *Administrator Scott Pruitt Speech on Paris Accord, As Prepared.*

17 United Nations Framework Convention on Climate Change. 2017. *The Paris Agreement.*

18 White House Briefing Room. 2021c. *Paris Climate Agreement.*

19 Federal Register. 2018. *The Safer Affordable Fuel-Efficient (SAFE) Vehicles Final Rule for Model Years 2021-2026 Passenger Cars and Light Trucks.*

duty trucks for model years 2014–2018. The standards for CO_2 emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles.

In August 2016, the USEPA and NHTSA announced the adoption of the phase two program related to the fuel economy and GHG standards for medium- and heavy-duty trucks. The phase two program will apply to vehicles with model year 2018 through 2027 for certain trailers, and model years 2021 through 2027 for semi-trucks, large pickup trucks, vans, and all types of sizes of buses and work trucks. The final standards are expected to lower carbon dioxide emissions by approximately 1.1 billion MT and reduce oil consumption by up to two billion barrels over the lifetime of the vehicles sold under the program.[20]

On September 27, 2019, the USEPA and NHTSA published the SAFE Rule (Part One).[21] The SAFE Rule (Part One) went into effect in November 2019, and revoked California's authority to set its own GHGs standards and set zero emission vehicle mandates in California. The SAFE Rule (Part One) froze new zero emission vehicle (ZEV) sales at model year 2020 levels for year 2021 and beyond. The SAFE Rule was subject to ongoing litigation and on February 8, 2021, the D.C. Circuit Court of Appeals granted the Biden Administration's motion to stay litigation over Part One of the SAFE Rule. On April 22 and April 28, 2021, respectively, NHTSA and USEPA formally announced their intent to reconsider the Safe Rule (Part One).[22,23] In December 2021, after reviewing all the public comments submitted on NHTSA's April 2021 Notice of Proposed Rulemaking, NHTSA finalized the CAFE Preemption rulemaking to withdraw its portions of the SAFE Rule (Part One).[24] Also in December 2021, USEPA finalized revised national GHG emissions standards for passenger cars and light trucks for Model Years 2023-2026.[25] On March 9, 2022, EPA reinstated California's authority under the CAA to implement its own GHG emission standards and zero emission vehicle sales mandate and entirely rescinded the SAFE Rule (Part One).

Energy Independence and Security Act

The Energy Independence and Security Act of 2007 (EISA) facilitates the reduction of national GHG emissions by requiring the following:

- Increasing the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard 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;

20 USEPA and National Highway Traffic Safety Agency (NHTSA), 2016. *Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium and Heavy-Duty Engines and Vehicles – Phase 2.*

21 USEPA and NHTSA. 2019. *Federal Register, Vol. 84, No. 188, The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program.*

22 NHTSA. 2021a. *NHTSA Advances Biden-Harris Administration's Climate & Jobs Goals.*

23 USEPA. 2021a. F*ederal Register, Vol. 86, No. 80, California State Motor Vehicle Pollution Control Standards; Advanced Clean Car Program; Reconsideration of a previous Withdrawal of a Waiver of Preemption; Opportunity for Public Hearing and Public Comment.*

24 NHTSA. 2021b. *NHTSA Repeals SAFE I Rule*.

25 USEPA. 2021b. *Final Rule to Revise Existing National GHG Emissions Standards for Passenger Cars and Light Trucks Through Model Year 2026.*

- Requiring approximately 25 percent greater efficiency for light bulbs by phasing out 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 the USEPA and NHTSA actions described above, (i) establishing miles per gallon targets for cars and light trucks and (ii) 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."

4.1.2. California Regulations

Air quality is regulated at the state level by the California Air Resources Board (CARB), the agency designated to prepare the SIP required by the federal CAA under the California Clean Air Act of 1988 (Assembly Bill [AB] 2595) and other provisions of the California Health and Safety Code.[26] California's Clean Air Act (CCAA) requires all districts designated as nonattainment for any pollutant to "adopt and enforce rules and regulations to achieve and maintain the state and federal ambient air quality standards in all areas affected by emission sources under their jurisdiction."

The responsibility for controlling air pollution in California is shared by 35 local or regional air pollution control and air quality management districts, CARB, and USEPA. The districts issue permits for industrial pollutant sources and adopt air quality management plans and rules. CARB establishes the state ambient air quality standards, adopts and enforces emission standards for mobile sources, adopts standards and suggested control measures for toxic air contaminants, provides technical support to the districts, oversees district compliance, approves local air quality plans, and prepares and submits the SIP to USEPA. USEPA establishes NAAQS, sets emission standards for certain mobile sources (airplanes and locomotives), oversees the state air programs, and reviews and approves the SIP. CARB inventories sources of air pollution in California's air basins and is required to update the inventory triennially, starting in 1998.[27] CARB also identifies air basins that are affected by transported air pollution.[28]

4.1.2.1. California Climate Change Policy

The State of California considers GHG emissions and the impacts of climate change to be a serious threat to the public health, environment, economic well-being, and natural resources of California, and has taken an aggressive stance to mitigate the State's impact on climate change through the adoption of policies and legislation. CARB is responsible for the coordination and oversight of State and local air pollution control programs in California. California has numerous regulations aimed at reducing the State's GHG emissions. Some of the major initiatives are summarized below.

26 Health and Safety Code §3900 et seq.

27 Health and Safety Code §39607 and 3607.3.

28 Health and Safety Code §38500 et seq.

Executive Order S-3-05

In 2005, Governor Schwarzenegger issued EO S-3-05, which identifies Statewide GHG emission reduction targets to achieve long-term climate stabilization as follows:

- Reduce GHG emissions to 1990 levels by 2020; and
- Reduce GHG emissions to 80 percent below 1990 levels by 2050.

In response to EO S-3-05, California Environmental Protection Agency (CalEPA) created the Climate Action Team (CAT), which in March 2006 published the Climate Action Team Report (the "2006 CAT Report").[29] The 2006 CAT Report identified a recommended list of strategies that the State could pursue to reduce GHG emissions. These are strategies that could be implemented by various State agencies to ensure that the emission reduction targets in EO S-3-05 are met and can be met with existing authority of the State agencies. The strategies include, but are not limited to, the reduction of passenger and light-duty truck emissions, the reduction of idling times for diesel trucks, an overhaul of shipping technology/infrastructure, increased use of alternative fuels, increased recycling, and landfill CH_4 capture.

Assembly Bill 32 (AB 32)

Assembly Bill (AB) 32,[30] the California Global Warming Solutions Act of 2006, was enacted after considerable study and expert testimony before the Legislature. The heart of AB 32 is the requirement that statewide GHG emissions be reduced to 1990 levels by 2020. To achieve this reduction mandate, AB 32 requires California Air Resources Board to adopt rules and regulations in an open public process that achieve the maximum technologically feasible and cost-effective GHG reductions.

In 2007, CARB approved a statewide limit on the GHG emissions level for year 2020 consistent with the determined 1990 baseline. CARB's adoption of this limit is in accordance with Health & Safety Code Section 38550, as codified through enactment of AB 32.

Per Health & Safety Code Section 38561(b), CARB also is required to prepare, approve and amend a scoping plan that identifies and makes recommendations on "direct emission reduction measures, alternative compliance mechanisms, market-based compliance mechanisms, and potential monetary and nonmonetary incentives for sources and categories of sources that [CARB] finds are necessary or desirable to facilitate the achievement of the maximum feasible and cost-effective reductions of GHG emissions by 2020."[31]

In 2008, CARB adopted the Climate Change Scoping Plan: A Framework for Change (2008 Scoping Plan) in accordance with Health & Safety Code Section 38561. During the development of the 2008 Scoping Plan, CARB created a planning framework that is comprised of eight emissions sectors: (1) transportation; (2) electricity; (3) commercial and residential; (4) industry; (5) recycling and waste; (6) high GWP gases; (7) agriculture; and (8) forest net emissions. The 2008 Scoping Plan established an overall framework for the measures that will be adopted to reduce California's GHG emissions from the eight emissions sectors to 1990 levels by 2020.[32]

29 California Environmental Protection Agency (CalEPA), 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature.*

30 Assembly bill (AB) 32. 2006.

31 Health & Safety Code Section §38561(b).

32 California Air Resources Board (CARB). 2008. *Climate Change Scoping Plan: A Framework for Change (December 2008).*

In the 2011 Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document (2011 Final Supplement), CARB revised its estimates of the projected 2020 emissions level in light of the economic recession and the availability of updated information about GHG reduction regulations.

In 2014, CARB adopted the First Update to the Climate Change Scoping Plan: Building on the Framework (2014 First Update).[33] The stated purpose of the 2014 First Update is to "highlight […] California's success to date in reducing its GHG emissions and lay […] the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050."[34] The 2014 First Update found that California is on track to meet the 2020 emissions reduction mandate established by AB 32, and noted that California could reduce emissions further by 2030 to levels squarely in line with those needed to stay on track to reduce emissions to 80 percent below 1990 levels by 2050 if the State realizes the expected benefits of existing policy goals.[35] The 2014 Update also identified key recommended actions in the following sectors that would facilitate achievement of the 2050 reduction target: (1) energy; (2) transportation (vehicles/equipment, sustainable communities, housing, fuels, and infrastructure); (3) agriculture; (4) water; (5) waste management; and (6) natural and working lands.

In November 2017, CARB published California's 2017 Climate Change Scoping Plan (2017 Scoping Plan), which was subsequently adopted by CARB's Board in December 2017.[36] The 2017 Scoping Plan identifies CARB's strategy for achieving the State's 2030 GHG target as established in Senate Bill (SB) 32 (discussed below). The strategy includes continuation of the Cap-and-Trade Program through 2030 and incorporates a Mobile Source Strategy that includes strategies targeted to increase zero emission vehicle fleet penetration and a more stringent target for the Low Carbon Fuel Standard by 2030. The 2017 Scoping Plan also incorporates approaches to cutting short-lived climate pollutants (SLCPs) under the Short-Lived Climate Pollutant Reduction Strategy (a planning document that was adopted by CARB in March 2017) and acknowledges the need for reducing emissions in agriculture and highlights the work underway to ensure that California's natural and working lands increasingly sequester carbon.

The 2022 Scoping Plan Update will assess progress towards achieving the Senate Bill 32 2030 target and lay out a path to achieve carbon neutrality no later than 2045. As of January 2022, this plan update has not yet been finalized, but there have been numerous workshops held pertaining to scenario inputs, building decarbonization, natural and working lands scenarios, the electricity sector, short lived climate pollutants, and engineered carbon removal. The plan is expected to be considered by the Board in late 2022.

Senate Bill 605 – Short-Lived Climate Pollutants

Short-lived climate pollutants (i.e., black carbon, fluorinated gases, and CH_4) are powerful climate forcers that remain in the atmosphere for a much shorter period of time than longer-lived climate pollutants. Their relative potency, when measured in terms of how they heat the atmosphere, can be tens, hundreds, or even thousands of times greater than that of CO_2. The

33 Health & Safety Code Section 38561(h) requires CARB to update the Scoping Plan every five years.

34 CARB, 2014. *First Update to the Climate Change Scoping Plan: Building on the Framework*

35 Ibid.

36 CARB. 2017a. *California's 2017 Climate Change Scoping Plan.*

impacts of short-lived climate pollutants are especially strong over the short term. Reducing these emissions can make an immediate beneficial impact on climate change.[37] Governor Brown signed SB 605 on September 21, 2014, which directed CARB to develop a Short-Lived Climate Pollutant Strategy by January 1, 2016. In September 2015, CARB released a draft of their Short-Lived Climate Pollutant Strategy. Several updates to the draft were made since September 2015, with the most current version dated March 2017. The Strategy aims for a 40 percent reduction in CH_4 and HFC emissions below 2013 levels by 2030 and a 50 percent reduction in anthropogenic emissions of black carbon below 2013 levels by 2030.[38]

Cap-and-Trade Program

California's Cap-and-Trade Program regulates the emissions of large electric power plants, large industrial plants, and fuel distributors (including transportation fuel and natural gas). These sources are responsible for about 85 percent of the State's total GHG emissions inventory.[39,40]

In the Cap-and-Trade Program, the State regulates the quantity of emissions by determining, in advance, how many allowances to issue—i.e., setting the "cap." Each allowance is essentially a permit issued by the State authorizing a certain quantity of GHG emissions. There are only a finite number of allowances, ensuring that covered entities may only lawfully emit a certain quantity of GHGs. If a covered entity wishes to emit carbon, it must obtain allowances to authorize those emissions.

Importantly, the Cap-and-Trade Program has been designed to provide a firm cap, ensuring that the 2020 statewide emissions limit identified by CARB in the 2008 Scoping Plan will not be exceeded.[41] Thus, for the emission sources covered by the Program, which are nearly all of the sources associated with land use development projects, compliance with AB 32's 2020 mandate is assured by the Cap-and-Trade Program.

AB 398 extended the statutorily-defined horizon year of the Cap-and-Trade Program to December 31, 2030, thereby facilitating continued reliance on the Cap-and-Trade Program for purposes of achieving SB 32's 2030 statewide reduction target.[42]

Executive Order B-30-15 and Senate Bill 32

In April 2015, Governor Brown signed EO B-30-15, which established the following GHG emission reduction goal for California: by 2030, reduce GHG emissions to 40 percent below 1990 levels.[43] This EO also directed all state agencies with jurisdiction over GHG-emitting sources to implement measures designed to achieve the new interim 2030 goal, as well as the pre-existing, long-term 2050 goal identified in EO S-3-05 (see discussion above). Additionally, the EO directed CARB to update its Scoping Plan (see discussion above) to address the 2030 goal.

37 CARB. 2016. *Reducing Short-Lived Climate Pollutants in California.*

38 CARB. 2017b. *Short-Lived Climate Pollutant Reduction Strategy.*

39 California Code of Regulations. 2015. *Article 5. California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms.*

40 CARB, 2015. *Overview of CARB Emissions Trading Program.*

41 CARB, 2008. *Climate Change Scoping Plan: A Framework for Change*

42 Assembly Bill 398. 2017.

43 Office of the Governor Edmund G. Brown Jr. 2015. *Governor Brown Establishes Most Ambitious Greenhouse Gas Reduction Target in North America.*

Enacted in 2016, SB 32 codifies the 2030 emissions reduction goal of EO B-30-15 by requiring CARB to ensure that statewide GHG emissions are reduced to 40 percent below 1990 levels by 2030.[44]

Executive Order B-55-18

In September 2018, Governor Brown signed EO B-55-18, which established a new statewide goal "to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter." This EO directs CARB to "work with relevant state agencies to ensure future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal."

In January 2019, CARB kicked off workshops regarding carbon neutrality in California,[45] during which CARB staff explained that the definitional parameters and meaning of the term – carbon neutrality – are still being explored. CARB held additional workshops throughout 2019 and 2020 to explore specific topics related to the pursuit of carbon neutrality, engage with other experts in the field and stakeholders, and conduct research to ensure that any path to carbon neutrality balances scientific, economic, and social justice principles.

Energy Sources

Renewable Portfolio Standard

As most recently amended by SB 100,[46] California's Renewables Portfolio Standard requires retail sellers of electric services and local publicly-owned electric utilities to increase procurement from eligible renewable energy resources to 50 percent of total retail sales by 2026, and 60 percent of total retail sales by 2030. SB 100 also established a state policy goal to achieve 100 percent renewables by 2045.

In March 2021, the California Energy Commission (CEC), California Public Utilities Commission (CPUC), and CARB released a joint-agency report evaluating the current feasibility of achieving the energy resource and GHG reductions goals of SB 100. The report finds that SB 100 is technically feasible when analyzed under scenarios of varying timelines, advancements in energy generation technology, and energy source portfolios. Under the SB 100 Core Scenario, it is anticipated that California will need to triple its current electricity power capacity.[47]

Building Energy Efficiency Standards

Title 24, Part 6 of the California Code of Regulations regulates the design of building shells and building components. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods.

The CEC's 2019 Building Energy Efficiency Standards (2019 Building Standards), which became effective January 1, 2020, are the currently applicable version of these standards. In general, single-family homes built to the 2019 standards are anticipated to use about 7% less energy due to energy efficiency measures than those built to the 2016 standards, and nonresidential

44 State Bill 32. 2016.

45 CARB. 2019. *Carbon Neutrality in California Context Webinar.*

46 Senate Bill 100. 2018.

47 CEC. 2021. *2021 SB 100 Joint Agency Report, Achieving 100 Percent Clean Electricity in California: An Initial Assessment.*

buildings built to the 2019 standards will use an estimated 30% less energy than those built to the 2016 standards.[48]

In addition to the CEC's efforts, in 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Part 11 of Title 24) is commonly referred to as CalGreen Building Standard (CalGreen), and establishes voluntary and mandatory standards pertaining to the planning and design of sustainable site development, energy efficiency, water conservation, material conservation, and interior air quality. Like Part 6 of Title 24, the CalGreen standards are periodically updated, with increasing energy savings and efficiencies associated with each code update.

Mobile Sources

Sustainable Communities Strategy Plans

SB 375,[49] the Sustainable Communities and Climate Protection Act, coordinates land use planning, regional transportation plans (RTP), and funding priorities to reduce GHG emissions from passenger vehicles through better-integrated regional transportation, land use, and housing planning that provides easier access to jobs, services, public transit, and active transportation options. SB 375 specifically requires the Metropolitan Planning Organization relevant to the Project area (here, the Southern California Association of Governments [SCAG] and San Bernardino County Transportation Authority [SBCTA]) to include a Sustainable Communities Strategy in its RTP that, if implemented, will achieve GHG emission reduction targets set by CARB by reducing VMT from light-duty vehicles through the development of more compact, complete, and efficient communities.

Senate Bill 743

Public Resources Code Section 21099(c)(1), as codified through enactment of SB 743,[50] authorized the Office of Planning and Research (OPR) to establish "alternative metrics to the metrics used for traffic levels of service for transportation impacts outside transit priority areas." SB 743 reflects a legislative policy to balance the needs of congestion management with statewide goals related to infill development, promotion of public health through active transportation, and reduction of GHG emissions. As finalized in December 2018, amendments to the State California Environmental Quality Act (CEQA) Guidelines adopted in furtherance of SB 743 establish VMT, in lieu of level of service (LOS), as the new metric for transportation analysis.

Pavley Regulations

AB 1493 required CARB to adopt regulations to reduce GHG emissions from non-commercial passenger vehicles and light-duty trucks for model years 2009–2016. CARB obtained a waiver from the USEPA that allows for implementation of these regulations notwithstanding possible federal pre-emption concerns.[51]

Low Carbon Fuel Standard

48 CEC. 2018. *2019 Building Energy Efficiency Standards – Frequently Asked Questions.*

49 Senate Bill (SB) 375. 2008.

50 SB 743, 2013.

51 AB 1493. 2002.

EO S-1-07, as issued by Governor Schwarzenegger, called for a 10 percent or greater reduction in the average fuel carbon intensity for transportation fuels in California regulated by CARB by 2020. In response, CARB approved the Low Carbon Fuel Standard (LCFS) regulations in 2009, which became fully effective in April 2010. Thereafter, a lawsuit was filed challenging CARB's adoption of the regulations; and, in 2013, a court order was issued compelling CARB to remedy substantive and procedural defects of the LCFS adoption process under CEQA. However, the court allowed implementation of the LCFS to continue pending correction of the identified defects. In September 2015, CARB re-adopted the LCFS regulations. The LCFS would reduce GHG emissions by reducing the carbon intensity of transportation fuels used in California by at least 10% by 2020 and, as amended in 2018, by at least 20% by 2030.

Advanced Clean Cars Program

In 2012, CARB approved the Advanced Clean Cars (ACC) program, a new emissions-control program for non-commercial passenger vehicles and light-duty truck for model years 2017-2025. The program combines the control of smog, soot, and GHGs with requirements for greater numbers of zero emission vehicles. By 2025, when the rules will be fully implemented, new automobiles will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions. At the time of this writing, CARB has developed draft Advanced Clean Cars II (ACC II) regulations which "will seek to reduce criteria and GHG emissions from new light- and medium-duty vehicles beyond the 2025 model year and increase the number of ZEVs for sale".[52] The regulations are expected to be presented to the Board in June 2022.

Zero Emission Vehicles Program

ZEVs include hydrogen fuel cell electric vehicles and plug-in electric vehicles, such as battery electric vehicles and plug-in hybrid electric vehicles.

In 2012, Governor Brown issued EO B-16-2012, which calls for the increased penetration of ZEVs into California's vehicle fleet in order to help California achieve a reduction of GHG emissions from the transportation sector equaling 80 percent less than 1990 levels by 2050. In furtherance of that statewide target for the transportation sector, the EO also calls upon CARB, the CEC and the California Public Utilities Commission to establish benchmarks that will: (1) allow over 1.5 million ZEVs to be on California roadways by 2025, and (2) provide the State's residents with easy access to ZEV infrastructure. EO B-16-2012 specifically directed California to "encourage the development and success of zero-emission vehicles to protect the environment, stimulate economic growth, and improve the quality of life in the State."[53]

In 2018, Governor Brown also issued EO B-48-18, which launched an eight-year initiative to accelerate the sales of ZEVs through a mix of rebate programs and infrastructure improvements. The EO also sets a new target of five million ZEVs in California by 2030 and includes funding for multiple state agencies to increase electric vehicle (EV) charging infrastructure and provide purchase rebates/incentives.

In June 2020, CARB approved the Advanced Clean Trucks regulation, which has requirements for manufacturer ZEV sales.[54] The Advanced Clean Truck Regulation is part of a holistic

52 CARB. 2021a. *Advanced Clean Cars II Program.*

53 State of California. *Executive Order B-16-2012.*

54 CARB. 2020. *Advanced Clean Trucks.*

approach to accelerate a large-scale transition of zero-emission medium-and heavy-duty vehicles from Class 2b to Class 8. Manufacturers who certify Class 2b-8 chassis or complete vehicles with combustion engines are required to sell zero-emission trucks as an increasing percentage of their annual California sales from 2024 to 2035. By 2035, zero-emission truck/chassis sales need to be 55% of Class 2b – 3 truck sales, 75% of Class 4 – 8 straight truck sales, and 40% of truck tractor sales.

On September 23, 2020, California Governor Gavin Newsom issued Executive Order N-79-20, which entails the following actions:

- All new passenger vehicles sold in California be zero-emission by 2035
- All medium- and heavy-duty vehicles be zero-emission where feasible by 2045
- All off-road vehicles and equipment be zero-emission where feasible by 2035

Governor Newsom ordered extensive inter-agency efforts to support the Executive Order, including evaluations of technological feasibility and cost effectiveness, expansion of EV charging options and affordable fueling, as well as identification of near-term strategies to increase zero-emission public transportation options.

The Executive Order was generally aimed at transitioning away from fossil fuel dependence in the State, with emphasis on transportation initiatives. However, Governor Newsom addressed efforts to repurpose oil production facilities and extraction sites while continuing the State's existing goals to reduce the carbon intensity of fuels.[55]

4.1.3. National and State Ambient Air Quality Standards

As required by the Clean Air Act Amendments of 1970[56] and the Clean Air Act Amendment of 1977,[57] USEPA has established NAAQS for the following air pollutants: CO, ozone (O_3), nitrogen dioxide (NO_2), particulate matter (PM_{10} and $PM_{2.5}$), oxides of sulfur (SO_X), and lead. CARB has also established standards for these pollutants for California.[58] The federal and state (California) governments have both adopted health-based standards for pollutants. For some pollutants, the national and state standards are very similar; for other pollutants, the California state standards are more stringent. The differences in the standards are generally the result of the different health effect studies considered during the standard-setting process and how these studies were interpreted. Per the CAA, the USEPA periodically (every five years) reviews the science upon which the NAAQS are based and if needed undertakes a process for revising the standards.[59]

Table 2-1 lists the federal (NAAQS) and California (CAAQS) standards. The federal primary standards are intended to protect the public health with an adequate margin of safety. The federal secondary standards are intended to protect the nation's welfare and account for air pollutant impacts on soil, water, visibility, vegetation, and other aspects of the general welfare.

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55 State of California. 2020. *Executive Order N-79-20.*

56 PL 91-064.1970

57 PL 95-95.1977.

58 CARB. n.d. *California Ambient Air Quality Standards.*

59 USEPA. n.d. *Process of Reviewing the National Ambient Air Quality Standards.*

Areas that violate these standards are designated nonattainment areas. Areas that once violated the standards but now meet the standards are classified as maintenance areas. Classification of each area under the federal standards is done by USEPA based on state recommendations and after an extensive review of monitored data.

4.1.4. Urban Air Toxics

In addition to NAAQS for criteria pollutants, the CAA has established a list of 188 hazardous air pollutants (HAPs) or air toxics.[60,61] Most air toxics originate from human-generated sources, including road mobile sources (e.g., cars, trucks, buses), non-road mobile sources (e.g., airplanes, locomotives), stationary sources (e.g., factories, refineries, power plants) and indoor sources (e.g., building materials). Some are also released from natural sources such as volcanic eruptions and forest fires. Air toxics are referred to as TACs by CARB. Human health risks caused by exposure to air toxics at sufficiently high concentrations or extended durations include increased risk for cancer or other serious health effects, including damage to the immune system; and neurological, reproductive, developmental and respiratory problems. To address HAPs in urban areas, section 112(k) of the Clean Air Act directs USEPA to identify a subset of 30 HAPs that present the greatest threat to public health in the largest number of urban areas. These 30 HAPs are known as the 30 urban air toxics[62].

In February 2007, USEPA identified a group of twenty-one compounds as mobile-source air toxics (MSAT) from the abovementioned list of 188 HAPs in its *Control of Emissions of Hazardous Air Pollutants from Mobile Sources* rule.[63] From this list of 21 MSATs, USEPA identified the following nine MSATs that are among the regional-scale contributors to cancer risk and non-cancer hazard in its 2011 National Air Toxics Assessment:[64] 1,3-butadiene,acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. The FHWA considers these nine compounds as priority MSATs.[65]

To address emissions of MSATs, USEPA has issued a number of regulations that are intended to significantly decrease MSATs through cleaner fuels and cleaner engines. These include the following national mobile source control programs:

- The reformulated gasoline program[66];
- A new threshold for the toxic content of gasoline[67];
- The national low-emission vehicle standards[68];

60 USEPA. 1990. *Clean Air Act Amendment Summary: Title III Air Toxics.*

61 USEPA. n.d. *Initial List of Hazardous Air Pollutants with Modifications.*

62 USEPA. n.d. *Urban Air Toxic Pollutants.*

63 Federal Register. 2001. *Control of Emissions of Hazardous Air Pollutants from Mobile Sources.*

64 USEPA. 2011. *NATA: Assessment Results.*

65 FHWA. 2016. *Updated Interim Guidance on Mobile Source Air Toxics Analysis in NEPA Documents.*

66 USEPA. n.d. *Gasoline Standards – Reformulated Gasoline.*

67 USEPA, n.d. *Regulations to Reduce Mobile Source Pollutions.*

68 USEPA, n.d. U*SEPA Emission Standards for Light-Duty Vehicles and Trucks and Motorcycles.*

- The Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements[69];
- The Tier 3 motor vehicle emission and fuel standards[70];
- The heavy-duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements[71]; and
- Voluntary programs such as Clean Diesel, Clean School Bus USA, Ports Initiative, and SmartWay. [72]

The USEPA has not yet released guidance on how to evaluate the effect of future rail lines on ambient concentrations of urban air toxics in the context of the National Environmental Policy Act (NEPA). Furthermore, no Federal or California ambient standards exist for mobile source air toxics. Tools that can determine the significance of localized concentrations on health, or of increases or decreases in emissions are lacking. Specifically, USEPA has not established NAAQS or provided other project-level standards for HAPs.

4.2. Scope of the Air Quality and Greenhouse Gas Assessment

The technical assessments to be performed for Air Quality (AQ) and GHG evaluation can be categorized as follows:

- Quantification of emissions of criteria air pollutants and GHG during construction
- Analysis to show that the potential net emissions of CAPs and TACs resulting from the Project's operational activities would be lower than the No Build Alternative
- Analysis to show that the potential cumulative net emissions of GHGs resulting from the Project's operational activities would be lower than the No Build Alternative
- General Conformity Determination comparing annual Project emissions to SCAQMD and MDAQMD de minimis emissions thresholds for their respective ozone and $PM_{2.5}$ non-attainment designations[73]
- CO Hotspot Analysis using CO hotspot screening analysis.

Information on the planned approaches for these analyses are presented in Section 5.

4.3. Pollutants of Potential Concern

The pollutants of potential concern are criteria pollutants (including, but not limited to, ozone and small airborne particulate matter and their precursors[74] and greenhouse gases. The following list describes these pollutants of potential concern and their precursors:

- Particulate matter less than 2.5 microns and particulate matter less than 10 microns

69 USEPA, 2000, *Tier 2 Motor Vehicle Emission Standards and Gasoline Sulfur Control Requirements: Response to Comments.*

70 USEPA, 2014. *Final Rule for Control of Air Pollution from Motor Vehicles: Tier 3 Motor Vehicle Emission and Fuel Standards.*

71 USEPA, 2000.

72 USEPA. n.d. *Voluntary Programs to Reduce Mobile Source Pollution.*

73 USEPA. 2022. *California Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants.*

74 Precursors interact in the atmosphere under specific conditions to form secondary criteria pollutants such as ozone and aerosol $PM_{2.5}$/PM_{10}.

- Ozone
- Carbon Monoxide
- Sulfur dioxide (SO_2) (in addition to being a primary pollutant, this is also a precursor of $PM_{2.5}$ and PM_{10})
- Nitrogen dioxide
- Oxides of nitrogen (NOx) (precursor of ozone, $PM_{2.5}$, and PM_{10})
- Volatile organic compounds (VOCs) (precursor of ozone, $PM_{2.5}$, and PM_{10})
- GHGs: CO_2, CH_4, and NO_x

4.4. Study Area

The Project would be located within two air quality district jurisdictions: the MDAQMD and the SCAQMD in California. This analysis will be structured to estimate the potential impacts on the two air basins directly affected by the Build Alternative. The rail alignment for the Build Alternative is described in further detail in Section 3.2 Build Alternative.[75]

4.5. Assessments Performed

The technical assessments performed for AQ evaluation were as follows:

- Quantifications of emissions for criteria pollutants and GHGs during construction under the Build Alternative
- Analysis to show that the potential net emissions of CAPs and TACs resulting from the Project's operational activities under the Build Alternative are lower than the No Build Alternative
- Analysis to show that the potential cumulative net emissions of GHGs resulting from the Project's operational activities under the Build Alternative are lower than the No Build Alternative
- General Conformity Determination comparing emissions to appropriate SCAQMD and MDAQMD de minimis emissions thresholds for ozone and $PM_{2.5}$ (and precursors)
- CO Hotspot Analysis using CO hotspot screening analysis

Table 5-1 summarizes the technical analysis performed, including what activities, sources, and pollutants were assessed, as well as what assessments were performed for each group of pollutants.

[75] Since this report was prepared, the Project alignment has been refined such that the northern portion of the Project would run entirely within the I-15 median. This change was considered but determined not to affect the results of the air quality modeling.

4.6. Methods Used

4.6.1. Quantification of Construction Emissions

Emissions quantification forms the basis for all air quality and GHG assessments. This section provides a description of the methodology for estimating criteria air pollutant and GHG emissions from Project construction.

The primary sources of construction-related criteria air pollutant emissions are off-road construction equipment, fugitive dust from material movement, construction-related truck trips, vendor vehicles, and worker commute vehicles. Emissions of CAPs and GHGs associated with each of these activities during all phases of construction were estimated.

To estimate the Project related air emissions emission estimation software was used. Details of the methodology used for construction emissions estimates are discussed in the following sub-sections.

4.6.1.1. Criteria Air Pollutant Emissions

The criteria pollutants and precursors that were evaluated in this analysis include NO_X, CO, SO_2, PM_{10}, $PM_{2.5}$, and VOCs. Since there are no large sources of lead (Pb) emissions associated with the construction of the Project, lead emissions were not evaluated.

Quantification of emissions from construction can be broadly divided in three steps:

- Step 1: Compiling the following construction activity data:
  - a construction schedule which may establish different phases of construction
  - number, type, and hours of operations of off-road construction equipment used in each construction phase
  - acreage disturbed and quantity of material handled (tons or cubic yards) during each construction phase
  - the number of construction-related truck trips, vendor deliveries, and worker commute trips associated with each construction phase
  - area (square feet) of surfaces with architectural coatings applied
- Step 2: Estimating emission factors for the various off-road construction equipment, material handling activities, and on-road construction-related vehicles. California Emissions Estimator Model (CalEEMod®) Version 2020.4.0 (hereafter referred to as "CalEEMod®") was used for estimating construction emissions. CalEEMod® is a statewide program tool designed to calculate both criteria pollutant and GHG emissions from development projects in California. The default emission factors in CalEEMod® are from sources including USEPA AP-42 emission factors, CARB's on-road and off-road equipment emission models such as the Emission FACtor model (EMFAC) and the Emissions Inventory Program model (OFFROAD), and studies commissioned by California agencies such as the CEC and CalRecycle. The current version of CalEEMod uses emission factors from EMFAC2017 and OFFROAD2011. A newer version of EMFAC,

EMFAC2021,[76] was released in January 2021, but it has not yet been approved by USEPA. A newer version of the OFFROAD model[77] has been released, however, as noted below, the Project is committing to Tier 4 Final construction equipment, so USEPA emission factors for Tier 4 equipment were selected in CalEEMod directly.

- Step 3: Inputting the construction activity assumptions (from Step 1) and the emission factors (from Step 2) into an emissions model to generate emission estimates for each construction phase. As noted under Step 2, CalEEMod® was used for this purpose. Details of the model are discussed below.

CalEEMod® splits construction activities into on-road, off-road, and fugitive dust emissions. Listed below are the construction activity-related inputs accepted by CalEEMod®:

- Construction start date.
- Construction schedule (including start/end dates for each phase).
- Construction off-road equipment by phase (including number of pieces of each equipment, hours/day, horsepower, and load factor).
- Construction material import/export quantities (tons of debris or cubic yards).
- Estimated number of acres disturbed per day.
- Demolition material (building square footage or tons of debris).
- Estimated worker, vendor, and hauling trip counts and lengths (miles).
- Areas for architectural coating and VOC content of coatings (g/L).

As shown in Figure 4-1, the Project construction is expected to occur in seven construction segments spanning two air basins (SCAB and MDAB). These include:

- Segment 1 – Apple Valley to Mojave River (MDAB)
- Segment 2 – Mojave River to Bear Valley Road (MDAB)
- Segment 3 – Bear Valley Road to Oak Hill (MDAB)
- Segment 4 – Oak Hill to Kenwood (MDAB and SCAB)
- Segment 5 – Kenwood to Glen Helen Pkwy (SCAB)
- Segment 6 – Glen Helen Pkwy to Baseline (SCAB)
- Segment 7 – Baseline to Rancho Cucamonga (SCAB)

A separate CalEEMod® model run was performed to estimate the construction related emissions from each construction segment. The following project-specific construction activity-related inputs were used to override the default assumptions in the CalEEMod® model runs:

- construction schedule[78] as detailed in Table 5-2,

[76] CARB. 2021b. *EMFAC2021.*

[77] CARB. n.d. *Off-Road Emissions.*

[78] The Project construction is based on the construction schedule dated November 3, 2021.

- construction equipment mix and activity presented in Table 5-3,
- material movement volumes shown in Table 5-4,
- demolition material quantities summarized in Table 5-5,
- worker, vendor, and hauling trips activity data provided in Table 5-6, and
- construction mitigation measures described below.

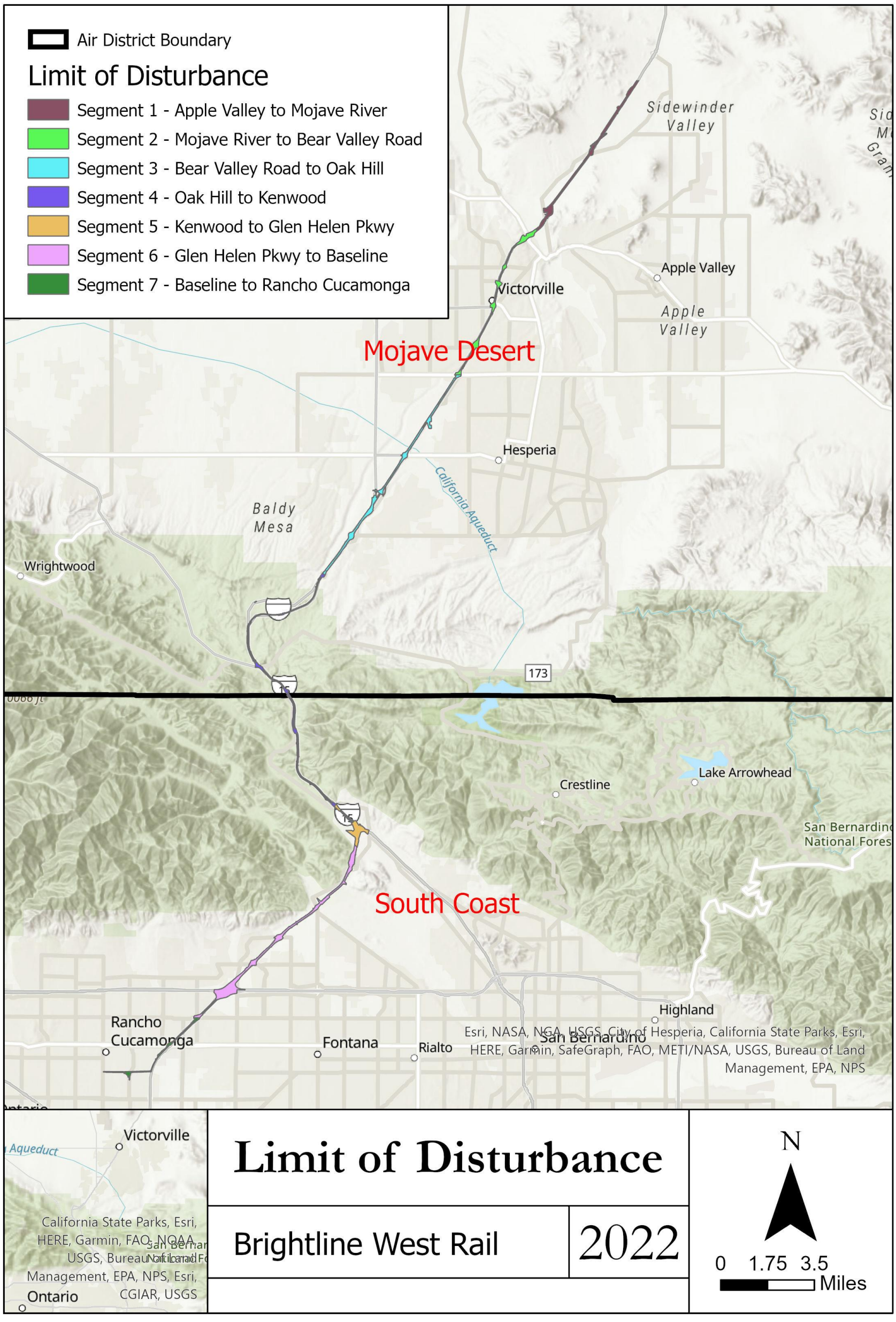

Figure 4-1 Limit of Disturbance

VOC emissions associated with paving activities and the use of architectural coatings during the construction of parking areas in the vicinity of the passenger stations located in Construction Segments 3 and 7 were estimated outside the CalEEMod® model runs. A brief description of the methodologies used for these emission estimates are provided.

The annual CAP mass emissions from construction activities for the Project were estimated using the CalEEMod® output data (Appendix A) and performed additional calculations for VOC emissions from paving activities (Table B-1 in Appendix B) and architectural coatings (Table B-2 in Appendix B). For a high-level summary of CalEEMod outputs, refer to Appendix B.

Construction Mitigation Measures

The Project is committed to using Tier 4 construction equipment. As such, EPA emission factors for Tier 4 equipment was incorporated into the CalEEMod model. The following mitigation measures were incorporated into the Project air quality analysis:

- Mitigation Measure 1: Fugitive Dust Control Plan during Construction to Meet MDAQMD Rule 403[79] Requirements.
  - Consistent with the MDAQMD Rule 403 (Fugitive Dust Control), the following control measures shall be implemented:
    - Use periodic watering (two times daily) for short-term stabilization of disturbed surface area to minimize visible fugitive dust emissions. Use of a water truck to maintain moist disturbed surfaces and actively spread water during visible dusting episodes shall be considered sufficient to maintain compliance.
    - Take actions sufficient to prevent Project-related trackout onto paved surfaces. Actions may include the use of:
      - Gravel or aggregate vehicle tracking pads at temporary site entrances and exits
      - Wash racks that use pressurized water to clean tires as they pass through. Wash racks introduce water to the trackout control system which must be contained within the jobsite.
      - Rumble plates, rumble strips, cattle guards that use vibration to shake off debris from vehicle tires.
    - Cover loaded haul vehicles while operating on publicly maintained paved surfaces.
    - Stabilize graded site surfaces upon completion of grading when subsequent development is delayed or expected to be delayed more than 30 days, except when such a delay is due to precipitation that dampens the disturbed surface sufficiently to eliminate visible fugitive dust emissions.

79 MDAQMD. 2020.

        - Clean up Project-related trackout or spills on publicly maintained paved surfaces within 24 hours.
        - Reduce nonessential earth-moving activity under high wind conditions. A reduction in earth-moving activity when visible dusting occurs from moist and dry surfaces due to wind erosion shall be considered sufficient to maintain compliance.
            - Alternatively, Brightline West can elect to apply for and obtain an MDAQMD-approved Alternative PM_{10} Control Plan that incorporates emission reducing measures other than those defined above, as long as it generates equivalent emission reductions and is obtained pursuant to the requirements outlined in MDAQMD Rule 403.

- Mitigation Measure 2: Fugitive Dust Control Plan during Construction to Meet SCAQMD Rule 403[80] Requirements.
    - Follow Best Available Control Measures in Table 1 of Rule 403.
- Mitigation Measure 3: Utilize additional means to reduce construction period emissions of air pollutants.
    - Brightline West shall demonstrate that construction-period emissions of criteria air pollutants would not exceed General Conformity de minimis thresholds by integrating control measures into approved design-build plans. Examples of control measures include the following:
        - All off-road internal-combustion engine construction equipment shall be USEPA Tier-4 Final certified.
        - All signal boards shall be solar-powered.
        - All architectural coatings products shall contain no more than 250 grams of VOC per liter of coating (2.08 pounds per gallon).

For quantification of mitigated emissions, the following mitigation measures were assumed:

- Watering twice daily.
- Tier 4 Final certified off-road construction equipment.

VOC Emissions from Paving Parking Lots

CalEEMod® methodology was used to estimate the VOC off-gassing emissions associated with asphalt paving of the parking lot at the Hesperia passenger station in Construction Segment 3 using the following equation:

$$E_{AP} \equiv EF_{AP} \times A_{paving}$$

Where:

E_{AP} = VOC emissions from paving in pounds (lb)

80 SCAQMD. 2005.

EF_{AP} = VOC off-gassing emission factor for asphalt paving in lb of VOC per acre of paved area. The CalEEMod® default emission factor is 2.62 lb/acre.

A_{paving} = area paved in acres

These emissions were evenly distributed across the paving construction phase for Construction Segment 3. Refer to Table B-1 in Appendix B for further details.

VOC Emissions from Architectural Coatings Use in Parking Areas

VOC off-gassing emissions result from evaporation of solvents contained in surface coatings. For parking areas, this includes the painting of stripes, handicap symbols, directional arrows, and car space descriptions in parking areas. CalEEMod® methodology was used to estimate VOC evaporative emissions from application of surface coatings on the parking lot near the Hesperia passenger station in Construction Segment 3 and the parking structure near the Rancho Cucamonga passenger station in Construction Segment 7 using the following equation:

$$E_{AC} = EF_{AC} \times P \times A_{PA}$$

Where:

E_{AC} = emissions in lb of VOC

EF_{AC} = emission factor in lb of VOC per square feet (sqft) of parking area

A_{PA} = parking area in sqft based on Project-specific information

P = percent of parking area that is painted, the CalEEMod® default value is 6%

The emission factor (EF_{AC}) is based on the VOC content of the surface coatings and is calculated using the equation below:

$$EF_{AC} = \frac{C_{VOC}}{454\ g/lb} \times \frac{3.785\ L/gal}{180\ sqft/gal}$$

Where:

EF_{AC} = emission factor in lb of VOC per square feet (sqft) of parking area

C_{VOC} = VOC content of paint in grams per liter (g/L), this value is determined using local air district rule limits

$454\ g/lb$ = conversion factor for lb to grams (g)

$3.785\ L/gal$ = conversion factor for gallons (gal) to liters (L)

$180\ sqft/gal$ = CalEEMod® default value for sqft of parking area painted using one gal of paint

These emissions associated with architectural coating use on parking areas were evenly distributed across the building construction phase for the respective construction segments. Refer to Table B-2 for further details.

Greenhouse Gas Emissions

Sources of GHG emissions from construction activities include off-road construction equipment, construction-related truck trips, vendor deliveries, and worker commute trips. CalEEMod®

estimates GHG emissions using emission factors from EMFAC and OFFROAD to estimate emissions. The methodology used to estimate these emissions is described in Section 4.6.1.1. Refer to Appendix A, and Table B-3 and Table B-4 in Appendix B for CalEEMod® output data and post-processing details.

4.6.2. Operational Emission Evaluation

The operational emissions evaluation includes the following:

- Operational CAP and TAC emissions from the electric-powered rail line would be near zero. On-road VMT under the No Build and Build Alternatives were compared in the traffic analysis prepared for the Project. The reduction in VMT caused by the Project would result in a net decrease in emissions of all CAP and TAC pollutants.
- The predominant source of GHG emissions during Project operation are emissions associated with electricity production (provided by SCE) used to power the rail line. These GHG emissions were estimated using the projected electricity use (in Megawatt hours, or MWh) and electricity carbon intensity factors estimated from data published in SCE sustainability reports (Table 5-7). The reductions in the on-road VMT result in reductions in GHG emissions. Therefore, the net GHG impacts were estimated as a difference in the GHGs associated with electricity and reductions from on-road VMT. GHG emission factors for passenger cars were derived based on EMFAC2017 output for San Bernardino - South Coast and San Bernardino - Mojave Desert in 2025, the first year of full Project operation, and 2045, the Project horizon year. These emission factors are presented in Table 5-8.

4.6.3. General Conformity De Minimis Comparison

The General Conformity regulations dictate the process federal agencies use to demonstrate that their actions will not interfere with a state or tribe's plans to attain and maintain NAAQS. In accordance with General Conformity regulations, the maximum annual Project potential emissions were compared against de minimis thresholds for each air basin (the South Coast Air Basin and the Mojave Desert Air Basin) and each nonattainment pollutant of interest (Table 5-9).[81]

4.6.4. Localized Carbon Monoxide Impacts

Mobile-source impacts occur on two basic scales of motion. Locally, proposed Project traffic will be added to the City's roadway system. There is a potential for the formation of microscale CO "hotspots" in the area immediately around points of congested traffic.

Projects contributing to adverse traffic impacts may result in the formation of CO hotspots. To verify that the proposed Project would not cause or contribute to a violation of the CO standard, a screening evaluation of the potential for CO hotspots was conducted. The Project Transportation Impact Analysis included an evaluation of the LOS (i.e., increased congestion) impacts at intersections affected by the Project. The Project includes eleven intersections that

81 USEPA. 2021. *General Conformity.*

are classified as LOS D, E, or F in the Project opening year (2025) and/or the horizon year (2045) and, as such, require a CO hot-spot analysis.

The California Line Source Dispersion Model (CALINE4) procedure developed by the Bay Area Air Quality Management District (BAAQMD)[82] was used to calculate 1-hour and 8-hour localized CO concentrations for the eleven identified intersections. The BAAQMD methodology assumes worst-case meteorological conditions and provides a screening tool to identify if further analysis is required. The inputs to this simplified CALINE4 procedure include background CO concentrations in the vicinity of the intersection, AM and PM peak hour traffic volumes at the intersections, and CO emission factors for vehicles at the intersection. Traffic volumes from the traffic analysis for the Project and CO emissions factors from CARB's mobile source inventory model EMFAC2017 were used to perform these analyses.[83] Appendix C includes details of this CALINE4 modeling analysis.

To determine if there is an exceedance of the CO NAAQS, the screening 1-hour and 8-hour CO concentrations obtained from these analyses at each intersection were compared against the 1-hour and 8-hour CO NAAQS, 35 ppm and 9 ppm, respectively, as well as the corresponding CAAQS of 20 ppm and 9 ppm, respectively.

5. Affected Environment

5.1. General Discussion of Air Quality Pollutants

5.1.1. Criteria Air Pollutants

Criteria air pollutants are defined as pollutants for which the federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. The federal and state standards have been set, with an adequate margin of safety, at levels above which concentrations could be harmful to human health and welfare. These standards are designed to protect the most sensitive people from illness or discomfort. Pollutants of concern include O_3, NO_2, CO, SO_2, PM_{10}, and $PM_{2.5}$. As noted previously, there are no large sources of Pb emissions associated with the construction or operation of the Project; hence Pb emissions were not evaluated. In California, sulfates, vinyl chloride, hydrogen sulfide, and visibility-reducing particles are also regulated as criteria air pollutants. These pollutants are discussed in the following paragraphs.

5.1.1.1. Ozone

Ozone is a colorless gas that is formed in the atmosphere when VOCs, sometimes referred to as reactive organic gases (ROG), and NO_X react in the presence of ultraviolet sunlight. O_3 is not a primary pollutant; it is a secondary pollutant formed by complex interactions of two pollutants directly emitted into the atmosphere. The primary sources of VOCs and NO_X, the precursors of O_3, are automobile exhaust and industrial sources. Meteorology and terrain play major roles in

82 BAAQMD CEQA Guidelines.

83 As noted previously, a newer version of EMFAC, EMFAC2021, was released in January 2021, however it has not been approved by USEPA.

O_3 formation, and ideal conditions occur during summer and early autumn on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies. Short-term exposures (lasting for a few hours) to O_3 at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes.

5.1.1.2. Nitrogen Dioxide

Most NO_2, like O_3, is not directly emitted into the atmosphere but is formed by a chemical reaction between nitric oxide (NO) and atmospheric oxygen. NO and NO_2 are collectively referred to as NO_X and are major contributors to O_3 formation. The primary sources of NO, the precursor to NO_2, include automobile exhaust and industrial sources. High concentrations of NO_2 can cause breathing difficulties and result in a brownish-red cast to the atmosphere, causing reduced visibility. There is some indication of a relationship between NO_2 and chronic pulmonary fibrosis, and some increase in bronchitis in children (2 and 3 years old) has also been observed at concentrations below 0.3 parts per million by volume (ppm).[84]

5.1.1.3. Carbon Monoxide

Carbon monoxide is a colorless and odorless gas formed by the incomplete combustion of fossil fuels. CO is emitted almost exclusively from motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains. In urban areas, such as the Project location, automobile exhaust accounts for the majority of CO emissions. CO is a non-reactive air pollutant that dissipates relatively quickly; therefore, ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions, primarily wind speed, topography, and atmospheric stability. CO from motor vehicle exhaust can become locally concentrated when surface-based temperature inversions are combined with calm atmospheric conditions, a typical situation at dusk in urban areas between November and February. The highest levels of CO typically occur during the colder months of the year when inversion conditions, where a layer of warm air sits atop cool air, are more frequent and can trap pollutants close to the ground. In terms of health, CO competes with oxygen, often replacing it in the blood, thus reducing the blood's ability to transport oxygen to vital organs. The results of excess CO exposure can be dizziness, fatigue, and impairment of central nervous system functions.

5.1.1.4. Sulfur Dioxide

Sulfur dioxide is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. The main sources of SO_2 are coal and oil used in power plants and industries; as such, the highest levels of SO_2 are generally found near large industrial complexes. In recent years, SO_2 concentrations have been reduced by the increasingly stringent controls placed on stationary source emissions of SO_2 and limits placed on the sulfur content of fuels. SO_2 is an irritant gas that attacks the throat and lungs, and can cause acute respiratory

[84] American Lung Association. 2020. *Nitrogen Dioxide.* Available at: https://www.lung.org/clean-air/outdoors/what-makes-air-unhealthy/nitrogen-dioxide. Accessed: June 2022.

symptoms and diminished ventilator function in children. SO_2 can also yellow plant leaves and erode iron and steel.

5.1.1.5. Particulate Matter

Particulate matter (PM) pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter can form when gases emitted from industrial activity and motor vehicles undergo chemical reactions in the atmosphere. $PM_{2.5}$ and PM_{10} represent fractions of particulate matter. Fine particulate matter, or $PM_{2.5}$, is roughly 1/28 the diameter of a human hair. $PM_{2.5}$ results from fuel combustion (e.g., motor vehicles, power generation, and industrial facilities), residential fireplaces, and woodstoves. In addition, $PM_{2.5}$ can form in the atmosphere from gases such as SO_X, NO_X, and VOCs. Inhalable or coarse particulate matter, or PM_{10}, is about 1/7 the thickness of a human hair. Major sources of PM_{10} include crushing or grinding operations; dust stirred up by vehicles traveling on roads; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions.

$PM_{2.5}$ and PM_{10} pose a greater health risk than larger-size particles. When inhaled, these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. $PM_{2.5}$ and PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Very small particles of substances such as lead, sulfates, and nitrates can cause lung damage directly or be absorbed into the bloodstream, causing damage elsewhere in the body. Additionally, these substances can transport absorbed gases, such as chlorides or ammonium, into the lungs, also causing injury. Whereas PM_{10} tends to collect in the upper portion of the respiratory system, $PM_{2.5}$ is so tiny that it can penetrate deeper into the lungs and damage lung tissues. Suspended particulates also damage and discolor surfaces on which they settle, as well as produce regional haze and reduce visibility.

5.1.2. Greenhouse Gases

There is a general scientific consensus that global climate change is occurring, caused in whole or in part by increased emissions of GHGs that keep the Earth's surface warm by trapping heat in the Earth's atmosphere, in much the same way that glass traps heat in a greenhouse.[85] The Earth's climate is changing because human activities, primarily the combustion of fossil fuels, are altering the chemical composition of the atmosphere through the buildup of GHGs.

GHGs allow the sun's radiation to penetrate the atmosphere and warm the Earth's surface, but do not let the infrared radiation emitted from the Earth escape back into outer space. As a result, global temperatures are predicted to increase over the century. In particular, if climate change remains unabated, surface temperatures in California are expected to increase anywhere from 4.1 to 8.6 degrees Fahrenheit by the end of the century, compared to 2021

85 Intergovernmental Panel on Climate Change (IPCC). *2021: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*

levels.[86] Not only would higher temperatures directly affect the health of individuals through greater risk of dehydration, heat stroke, and respiratory distress, the higher temperatures may increase ozone formation, thereby worsening air quality. Rising temperatures could also reduce the snowpack, which would increase the risk of water shortages. Higher temperatures along with reduced water supplies could reduce the quantity and quality of agricultural products. In addition, there could be an increase in wildfires and a shift in distribution of natural vegetation throughout the State. Global warming could also increase sea levels and coastal storms resulting in greater risk of flooding.

Emissions of carbon dioxide are the leading cause of global warming, with other pollutants such as methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride also contributing. The magnitude of each GHG's impact on global warming differs because each GHG has a different global warming potential (GWP), which indicates, on a pound for pound basis, how much the pollutant will contribute to global warming relative to how much warming would be caused by the same mass of CO_2. CH_4 and N_2O, for example, are substantially more potent than CO_2, with GWPs of 25 and 298, respectively.[87]

5.2. Air Resources by Basin

The air quality attainment designations for the South Coast and Mojave Desert air basins are provided in Table 6-1. As shown in the table, both areas are designated as non-attainment for certain pollutants which are regulated under the Federal Clean Air Act. Refer to Table 2-1 for a complete list of NAAQS and CAAQS.

5.2.1. South Coast Air Basin

The South Coast Air Basin is comprised of Orange County and portions of Los Angeles, San Bernardino, and Riverside counties.

[86] California Natural Resources Agency. 2021. Draft California Climate Adaptation Strategy. Available at: https://resources.ca.gov/-/media/CNRA-Website/Files/Initiatives/Climate-Resilience/SAS-Workshops/Draft-CA-Climate-Adaptation-Strategy-ada.pdf.

[87] Intergovernmental Panel on Climate Change (IPCC). 2021: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Available at: https://www.ipcc.ch/report/ar6/wg1/#SPM.

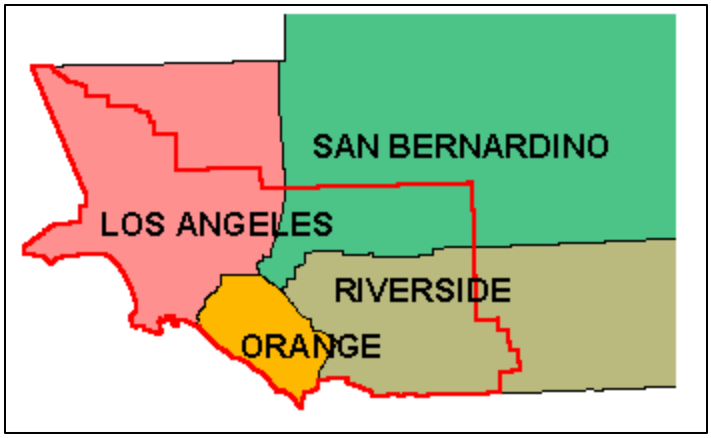

Figure 5-1. South Coast Air Basin

Under the Federal Clean Air Act, the USEPA and CARB have designated portions of SCAQMD nonattainment for ozone and $PM_{2.5}$.

On October 1, 2015, the USEPA strengthened the NAAQS for ground-level ozone, lowering the primary and secondary ozone standard levels to 70 parts per billion (ppb). The SCAB is classified as an "extreme" non-attainment area and the Coachella Valley is classified as a "severe-15" non-attainment area for the 2015 Ozone NAAQS. The 2022 Air Quality Management Plan (AQMP) is being developed by SCAQMD to address the requirements for meeting this standard.[88] The 2022 AQMP is meant to include a comprehensive analysis of emissions, meteorology, regional air quality modeling, regional growth projections, and the impact of existing and proposed control measures. At the time of this writing, there have been numerous working group meetings to address the various source categories of emissions (i.e., aircraft, construction and industrial equipment, heavy-duty trucks, ocean-going vessels) and control measures and strategies are being developed/considered for the 2022 AQMP.

The SCAQMD has recently prepared the Final 2021 Redesignation Request and Maintenance Plan for the 2006 and 1997 24-Hour $PM_{2.5}$ Standards for South Coast Air Basin in October 2021.[89] This document was prepared to revise the $PM_{2.5}$ SIP to request redesignation of the Basin to attainment for both the 2006 24-hour average $PM_{2.5}$ standard and the 1997 24-hour average $PM_{2.5}$ standard, and to submit the maintenance plan and other required actions to qualify for such redesignation.

5.2.2. Mojave Desert Air Basin

The Mojave Desert Air Basin consists of portions of San Bernardino, Kern, Los Angeles, and Riverside counties.

88 SCAQMD. 2022. *Air Quality Management Plan (AQMP).*

89 Ibid.

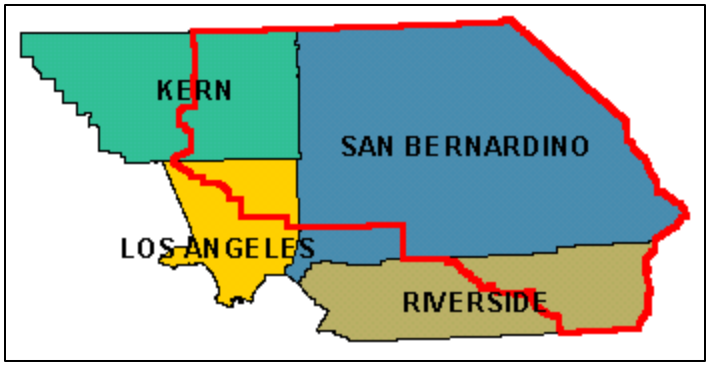

Figure 5-2. Mojave Desert Air Basin

The Mojave Desert Air Basin is comprised of four air districts, the Kern County Air Pollution Control District, the Antelope Valley Air Quality Management District (AVAQMD), the MDAQMD, and the eastern portion of the South Coast AQMD. The MDAQMD has jurisdiction over the desert portion of San Bernardino County and the far eastern end of Riverside County. This region includes the incorporated communities of Adelanto, Apple Valley, Barstow, Blythe, Hesperia, Needles, Twentynine Palms, Victorville, and Yucca Valley; as well as the National Training Center at Fort Irwin, the Marine Corps Air Ground Combat Center, the Marine Corps Logistics Base, the eastern portion of Edwards Air Force Base, and a portion of the China Lake Naval Air Weapons Station.

Under the Federal CAA, the USEPA and CARB have designated portions of MDAQMD nonattainment for ozone and PM_{10}. The MDAQMD has adopted state (California) and Federal attainment plans for the region within its jurisdiction. In 1995, the MDAQMD submitted a Federal Particulate Matter (PM_{10}) Attainment Plan[90], which demonstrates how attainment of the Federal PM_{10} standard will be achieved by the earliest practicable date. The PM_{10} Attainment Plan outlines selected control measures that would be imposed to limit the amount of PM_{10} released into the atmosphere. Part of this plan requires Dust Control Plans for construction projects disturbing 100 or more acres. The USEPA approved the first MDAQMD Ozone Attainment Plan in 2004, followed by an 8-hour ozone attainment plan for the Western Mojave Desert Non-Attainment Area in 2008.[91] This document addressed all existing and forecast O_3 precursor producing activities within the MDAQMD through the year 2020. The plan mainly targeted reduction of NOx and VOC emissions. MDAQMD also prepared a 70 ppb Ozone Standard Implementation Evaluation Reasonably Available Control Technology State Implementation Plan Analysis more recently in October 2019.

The MDAQMD has adopted rules and regulations to implement portions of the above-mentioned attainment plans. Several of these rules would apply to construction or operation of the Project. For example, MDAQMD Rule 403[92] requires suppression of fugitive dust emissions from construction activity such that no visible dust extends beyond the property line of the

90 MDAQMD. 1995. *Mojave Desert Planning Area Federal Particulate Matter (PM_{10}) Attainment Plan.*

91 MDAQMD. 2008. *MDAQMD Federal 8-hour Ozone Attainment Plan (Western Mojave Desert Non-attainment Area).*

92 MDAQMD. 2020.

emissions source. A Dust Control Plan for construction projects disturbing 100 or more acres is required by the MDAQMD Federal PM_{10} Plan.[93]

5.3. Air Quality Setting

5.3.1. Existing Emissions

Under existing conditions (Year 2020), on-road motor vehicles contribute mobile emissions to the South Coast and Mojave Desert air basins. Table 6-2 demonstrates the level of emissions in 2020 from on-road motor vehicles based on EMFAC2017[94] emissions data.

5.3.2. Ambient Air Monitoring Data

5.3.2.1. Rancho Cucamonga

Monitoring data summarized in Table 6-3 show the 1-hour and 8-hour ozone concentrations, 1-hour and 8-hour CO concentrations, 1-hour and annual NO_2, 1-hour and 24-hour SO_2 concentrations, and 24-hour and annual PM_{10} and $PM_{2.5}$ concentrations at the nearest representative monitoring station to the proposed Rancho Cucamonga passenger station.

5.3.2.2. Hesperia

Similarly, monitoring data summarized in Table 6-4 shows the same pollutants with concentrations presented from the nearest representative monitoring station to the proposed Hesperia passenger station.

5.3.3. Climate Data

5.3.3.1. Rancho Cucamonga

Rancho Cucamonga climate data was used to characterize Project vicinity climate conditions at the Rancho Cucamonga passenger station. The average Project area summer (July) and winter (December) temperatures are 76.6 °F and 50.0 °F, respectively. The annual average rainfall is 18.7 inches.[95]

5.3.3.2. Hesperia

Hesperia climate data was used to characterize Project vicinity climate conditions at the Hesperia passenger station. The average Project area summer (July) and winter (December) temperatures are 78.6 °F and 44.6 °F, respectively. The annual average rainfall is 8.5 inches.[96]

93 MDAQMD. 1995.

94 As noted previously, a newer version of EMFAC, EMFAC2021, was released in January 2021, however it has not been approved by USEPA.

95 Climate Data. n.d. *Rancho Cucamonga temperature and precipitation data is for the period from 1999 – 2019.*

96 Climate Data. n.d. *Hesperia temperature and precipitation data is for the period from 1999 – 2019*.

6. Environmental Consequences and Mitigation

6.1. Build Alternative

6.1.1. Construction Effects

Construction of the Build Alternative would temporarily generate emissions between 2022 and 2025. Mitigated emissions for each criteria air pollutant during each year of construction were compared to the de minimis thresholds for the two air basins.

South Coast Air Basin Construction Emissions: The criteria air pollutant emissions in the SCAB that would result from construction of the Project are displayed in Table 7-1. The annual criteria air pollutant emissions from construction would not exceed General Conformity de minimis thresholds. The greenhouse emissions from Project construction are summarized in Table B-4 in Appendix B. These are temporary emissions that would be offset by the reductions in the annual operational GHG emissions over the Project lifetime as the HSR ridership increases. There are no federal de minimis thresholds for GHG emissions.

Mojave Desert Air Basin Construction Emissions: The criteria air pollutant emissions in the MDAB that would be generated from construction of the Project are detailed in Table 7-2. The annual criteria air pollutant emissions from construction are below the de minimis levels for all criteria air pollutants. The greenhouse emissions from Project construction are summarized in Table B-4 in Appendix B. These are temporary emissions that would be offset by the reductions in the annual operational GHG emissions over the Project lifetime with increase in HSR ridership. There are no federal de minimis thresholds for GHG emissions.

6.1.2. Operational Effects

The potential emissions of CAPs, TACs, and GHGs resulting from the Project's operational activities under the Build Alternative are lower than the No Build Alternative operational emissions due to the large reduction in on-road VMT expected as a result of the proposed rail line.

Operational CAP and TAC Emissions Evaluation: As noted previously in Section 4.6.2, operational CAP and TAC emissions from the electric-powered rail line would be near zero. Reduction in on-road VMT under the Build Alternative as compared to the No Build Alternative resulting from the avoided passenger car travel would generate a decrease in emissions of all CAPs and TACs. Hence, the Project is expected to generate a net decrease in CAP and TAC emissions.

South Coast Air Basin Operational GHG Emissions Evaluation: The GHG emissions associated with the SCAB that would result from implementation of the Project at opening year 2025 and horizon year 2045 are provided in Table 7-3. This includes the GHG emissions associated with operating the HSR and the GHG emissions reductions from avoided on-road passenger car travel. The net annual GHG emissions due to the Project in the opening year is 338 MT CO_2e, which is well below the SCAQMD's proposed screening level of 3,000 MT CO_2e/year for

residential and commercial projects.[97] Further, as noted in Table 7-3, the Project results in a net decrease in GHG emissions of 13,608 MT CO_2e in the horizon year 2045 as the ridership on the HSR increases. Hence, the Project would result in a net reduction in GHG emissions in the SCAB over its lifetime.

Mojave Desert Air Basin Operational GHG Emissions Evaluation: The GHG emissions associated with the MDAB that would result from implementation of the Project at opening year 2025 and horizon year 2045 are provided in Table 7-4. The net annual GHG emissions due to the Project in the opening year is 9,612 MT CO_2e. As noted in Table 7-3, the Project results in a net decrease in GHG emissions of 20,861 MT CO_2e in the horizon year 2045 as the ridership on the HSR increases. Hence, the Project would generate a net reduction in GHG emissions in the MDAB over its lifetime.

Evaluation of CO Hotspots: Based on CO Hotspot analysis of the most congested Project intersection locations requiring evaluation in the opening year 2025, the concentrations of CO at these intersections would not violate CAAQS and NAAQS thresholds (i.e., result in a CO hot spot) at any intersection. Table 7-5 shows the CO concentrations at each intersection in the opening year and demonstrates that these concentrations are below the CAAQS and NAAQS thresholds. In the horizon year 2045, as seen in Table 7-6, the CO concentrations at all evaluated intersections are also lower than the CAAQS and NAAQS threshold concentrations.

6.2. General Conformity De Minimis Summary

The Project construction emissions were compared against the de minimis thresholds (Table 7-1 and Table 7-2) and the annual emissions from maximum Project emissions over the Project lifetime were less than the thresholds for all criteria air pollutants.

6.3. No Build Alternative

6.3.1. Construction Effects

The No Build Alternative does not include any construction and, therefore, would result in no impacts related to construction.

6.3.2. Operational Effects

In the No Build Alternative, there would be no HSR connecting between Victor Valley, California, and Rancho Cucamonga, California. Hence travelers would continue to use passenger cars for their commute. As noted under Section 6.1.2., the CAP, TAC, and GHG emissions from these passenger cars would be greater than those from the HSR that is proposed under the Project.

6.4. Avoidance, Minimization, and/or Mitigation Measures

The following mitigation measures were incorporated into the Project air quality analysis:

97 SCAQMD. 2008. *Interim CEQA GHG Significance Threshold for Stationary Sources, Rules, and Plan.*

- Mitigation Measure 1: Fugitive Dust Control Plan during Construction to Meet MDAQMD Rule 403[98] Requirements.
  - Consistent with the MDAQMD Rule 403 (Fugitive Dust Control), the following control measures shall be implemented:
    - Use periodic watering (two times daily) for short-term stabilization of disturbed surface area to minimize visible fugitive dust emissions. Use of a water truck to maintain moist disturbed surfaces and actively spread water during visible dusting episodes shall be considered sufficient to maintain compliance.
    - Take actions sufficient to prevent Project-related trackout onto paved surfaces. Actions may include the use of:
      - Gravel or aggregate vehicle tracking pads at temporary site entrances and exits
      - Wash racks that use pressurized water to clean tires as they pass through. Wash racks introduce water to the trackout control system which must be contained within the jobsite.
      - Rumble plates, rumble strips, cattle guards that use vibration to shake off debris from vehicle tires.
    - Cover loaded haul vehicles while operating on publicly maintained paved surfaces.
    - Stabilize graded site surfaces upon completion of grading when subsequent development is delayed or expected to be delayed more than 30 days, except when such a delay is due to precipitation that dampens the disturbed surface sufficiently to eliminate visible fugitive dust emissions.
    - Clean up Project-related trackout or spills on publicly maintained paved surfaces within 24 hours.
    - Reduce nonessential earth-moving activity under high wind conditions. A reduction in earth-moving activity when visible dusting occurs from moist and dry surfaces due to wind erosion shall be considered sufficient to maintain compliance.
      - Alternatively, Brightline West can elect to apply for and obtain an MDAQMD-approved Alternative PM_{10} Control Plan that incorporates emission reducing measures other than those defined above, as long as it generates equivalent emission reductions and is obtained pursuant to the requirements outlined in MDAQMD Rule 403.
- Mitigation Measure 2: Fugitive Dust Control Plan during Construction to Meet SCAQMD Rule 403[99] Requirements.

98 MDAQMD, 2020.

99 SCAQMD. 2005.

  - Follow Best Available Control Measures in Table 1 of Rule 403.

- Mitigation Measure 3: Utilize additional means to reduce construction period emissions of air pollutants.
  - Brightline West shall demonstrate that construction-period emissions of criteria air pollutants would not exceed General Conformity de minimis thresholds by integrating control measures into approved design-build plans. Examples of control measures include the following:
    - All off-road internal-combustion engine construction equipment shall be USEPA Tier-4 Final certified.
    - All signal boards shall be solar-powered.
    - All architectural coatings products shall contain no more than 250 grams of VOC per liter of coating (2.08 pounds per gallon).

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