Ontario International Airport Connector Project

APPENDIX I

ENERGY TECHNICAL REPORT

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ABBREVIATIONS AND ACRONYMS

%	percent
AB	Assembly Bill
ADA	Americans with Disabilities Act
AFV	alternative fuel vehicles
BAU	Business as usual
BTUs	British thermal units
CAFÉ	Corporate Average Fuel Economy
CalEEMod	California Emission Estimator Model
CALGreen Code	California Green Building Standards Code
CalRecycle	California Department of Resources Recycling and Recovery
Caltrans	California Department of Transportation
CAP	Climate Action Plan
CARB	California Air Resources Board
CBC	California Building Code
CBSC	California Building Standards Commission
CCAP	Community Climate Action Plan
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CNG	compressed natural gas
CO_2	carbon dioxide
DOE	United States Department of Energy
E85	Ethanol, 85 Percent
EIA	Energy Information Administration
EIR	Environmental Impact Report
EMFAC	Emission Factors Model
EO	Executive Order

EPCA	Energy Policy and Conservation Act of 1975
FTA	Federal Transit Administration
FTIP	Federal Transportation Improvement Program
GHG	greenhouse gas
IEPR	Integrated Energy Policy Report
I-10	Interstate 10
I-15	Interstate 15
kBTU	Thousand British thermal units
kWh	kilowatt-hours
kWh/yr	kilowatt-hours per year
LADWP	Los Angeles Department of Water and Power
LEED	Leadership in Energy and Environmental Design
LNG	liquefied natural gas
LPG	liquefied petroleum gas
MM	Mitigation Measure
MMBtu	million British thermal units
MSF	Maintenance and storage facility
MTBE	methyl tertiary butyl-ether
$MTCO_2e$	Metric tons of carbon dioxide equivalent
NEPA	National Environmental Policy Act
NHTSA	National Highway Traffic Safety Administration
OCS	Outer Continental Shelf
OIAA	Ontario International Airport Authority
ONT	Ontario International Airport
Project	Ontario International Airport Connector Project
PV	photovoltaic
ROW	Right-of-way
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy

SANBAG	San Bernardino Associated Governments
SB	Senate Bill
SBCOG	San Bernardino Council of Governments
SBCTA	San Bernardino County Transportation Authority
SCAG	Southern California Association of Governments
SCRRA	Southern California Regional Rail Authority
TDM	Transportation Demand Management
therm	unit of heat containing 100,000 British thermal units
UPRR	Union Pacific Railroad
USC	United States Code
USEPA	United States Environmental Protection Agency
Vent shaft	Ventilation shaft
VMT	vehicle miles traveled
ZE	zero emission

1 INTRODUCTION

San Bernardino County Transportation Authority (SBCTA), in cooperation with the Federal Transit Administration (FTA), proposes to construct a 4.2-mile-long transit service tunnel directly connecting the Southern California Regional Rail Authority (SCRRA) Cucamonga Metrolink Station to the Ontario International Airport (ONT). The proposed ONT Connector Project (Project) is to expand access options to ONT by providing a direct transportation connection from Cucamonga Metrolink Station to ONT. The proposed Project is subject to federal and state environmental review requirements pursuant to National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA). FTA is the lead agency for NEPA, while SBCTA is the lead agency under CEQA. Partner agencies include the Ontario International Airport Authority (OIAA), Omnitrans, the City of Ontario and the City of Rancho Cucamonga.

ONT is located approximately two miles east of downtown Ontario in San Bernardino County. The airport services more than 25 major cities via 10 commercial carriers. ONT is owned and operated under a joint powers agreement between the City of Ontario and San Bernardino County. OIAA provides overall direction, management, operations, and marketing for ONT. In 2014, the San Bernardino Associated Governments (SANBAG), now SBCTA, prepared the Ontario Airport Rail Access Study (SANBAG 2014), which identified the need for a direct rail-to-airport connection to ONT to support its projected growth. ONT is one of the fastest growing commercial airports, forecasted to serve 14 million annual passengers by 2045 (OIAA 2019).

The purpose of this technical report is to evaluate potential environmental impacts/effects of energy resources that the Project may have within the Project area. This technical report describes existing setting, applicable regulatory settings, methodology, and potential impacts from construction and operation of the proposed Project and the No Project Alternative. The information contained in this technical report will be used to prepare the required environmental documents under CEQA.

2 PROJECT DESCRIPTION

2.1 PROJECT PURPOSE AND OBJECTIVES

The purpose of the proposed Project is to expand access options to ONT by providing a direct transportation connection from Cucamonga Metrolink Station to ONT. This new connection would increase mobility and connectivity for transit patrons, improve access to existing transportation services, provide a connection to future Brightline West service to/from ONT, and support the use of clean, emerging technology for transit opportunities between Cucamonga Metrolink Station and ONT. More specifically, the proposed Project's objectives are as follows:

- Expand access options to ONT by providing a convenient and direct connection between ONT and the Metrolink network, and other transportation services at the Cucamonga Station.
- Reduce roadway congestion by encouraging a mode shift to transit from single-occupancy vehicles and provide reliable trips to and from ONT.
- Support autonomous electric vehicle technology usage for transit projects.

2.2 PROJECT NEED

The proposed Project need includes:

- Lack of direct transit connection coinciding with Metrolink trains and peak airport arrival and departure schedules. The lack of a direct transit connection between Cucamonga Metrolink Station and ONT creates mobility challenges for air passengers accessing ONT. In many cases, the lack of a last-mile connection between the Metrolink system and ONT forces airport passengers to use rideshare services or private single-occupancy vehicles, adding congestion to the local roads between the Cucamonga Metrolink Station and ONT. This congestion results in delays for the public to reach their destination, community services, and facilities.
- Roadway congestion affecting trip reliability and causing traffic delays. ONT travelers using rideshare services or private single-occupancy vehicles adds traffic volumes and increasing congestion on the local roads between Cucamonga Metrolink Station and ONT. Increases in future traffic volumes and roadway congestion affects trip reliability for travelers and commuters to and from ONT.
- Increasing Vehicle Miles Traveled (VMT) resulting from ONT travelers and lack of a direct transit connection.
- Increased greenhouse gas emissions within communities surrounding ONT from single-occupancy vehicle travel to and from ONT.

2.3 ALTERNATIVES EVALUATED

2.3.1 No Project Alternative

CEQA requires that existing conditions and the proposed Project be evaluated against a No Project Alternative in an Environmental Impact Report (EIR). The No Project Alternative represents the Project area if the proposed Project is not constructed, and additional municipal projects would still be developed in the area. The No Project Alternative is used for comparison purposes to assess the relative benefits and impacts of constructing a new transit project versus only constructing projects which are already funded and planned for in local and regional plans.

The No Project Alternative would result in no new direct electrically powered, on-demand fixed transit guideway connection from the Cucamonga Metrolink Station to ONT. Omnitrans currently operates a limited-service bus route to ONT, known as ONT Connect or Route 380, which would remain operational under the No Project Alternative. ONT Connect currently operates Monday through Sunday, with bidirectional (northbound and southbound) service frequencies ranging from 35-60 minutes. However, ONT Connect travels with general/mixed traffic on existing roadways. The No Project Alternative assumes that the existing roadway system near ONT (such as the Interstate 10 [I-10] and Interstate 15 [I-15]) will implement some planned expansion and improvement projects and undergo routine maintenance activities. The SBCTA and California Department of Transportation (Caltrans) propose to construct Express Lanes, including tolled facilities, in both directions of I-15. In addition, Caltrans is proposing to improve I-10 by constructing freeway lane(s) and other improvements through all or a portion of the 33-mile-long segment of I-10 from the Los Angeles/San Bernardino County line to Ford Street in San Bernardino County.

A detailed list of the planned projects included in the No Project Alternative is found in the Cumulative Impacts Technical Report (SBCTA 2024a).

2.3.2 Proposed Project

The proposed Project includes a 4.2-mile tunnel alignment, three passenger stations, a maintenance and storage facility (MSF), and an access and ventilation shaft (vent shaft) in the cities of Rancho Cucamonga and Ontario within San Bernardino County (see Figure 2-1). The proposed Project would include autonomous electric vehicles that would be grouped and queued at their origin station and depart toward the destination station once boarded with passengers. The following sections provide additional details on the proposed Project location and land uses, and on the proposed design, construction, and operation, as applicable, for these project elements.

2.3.2.1 Project Location

The proposed Project is located in the City of Rancho Cucamonga and in the City of Ontario within San Bernardino County. Figure 2-1 illustrates the proposed Project site's regional location and vicinity. The proposed Project alignment is a reversed L-shaped alignment consisting of the Cucamonga Metrolink Station, Milliken Avenue, East Airport Drive, and ONT. Figure 2-2 illustrates the proposed Project area.

Cucamonga Metrolink Station is located at 11208 Azusa Court in the City of Rancho Cucamonga and serves the Metrolink San Bernardino Line commuter rail. ONT is located at 1923 East Aviation in the City of Ontario and provides international airport service with over 10 different airline partners. Information related to the proposed Project Design is found in Section 2.3.2.3.

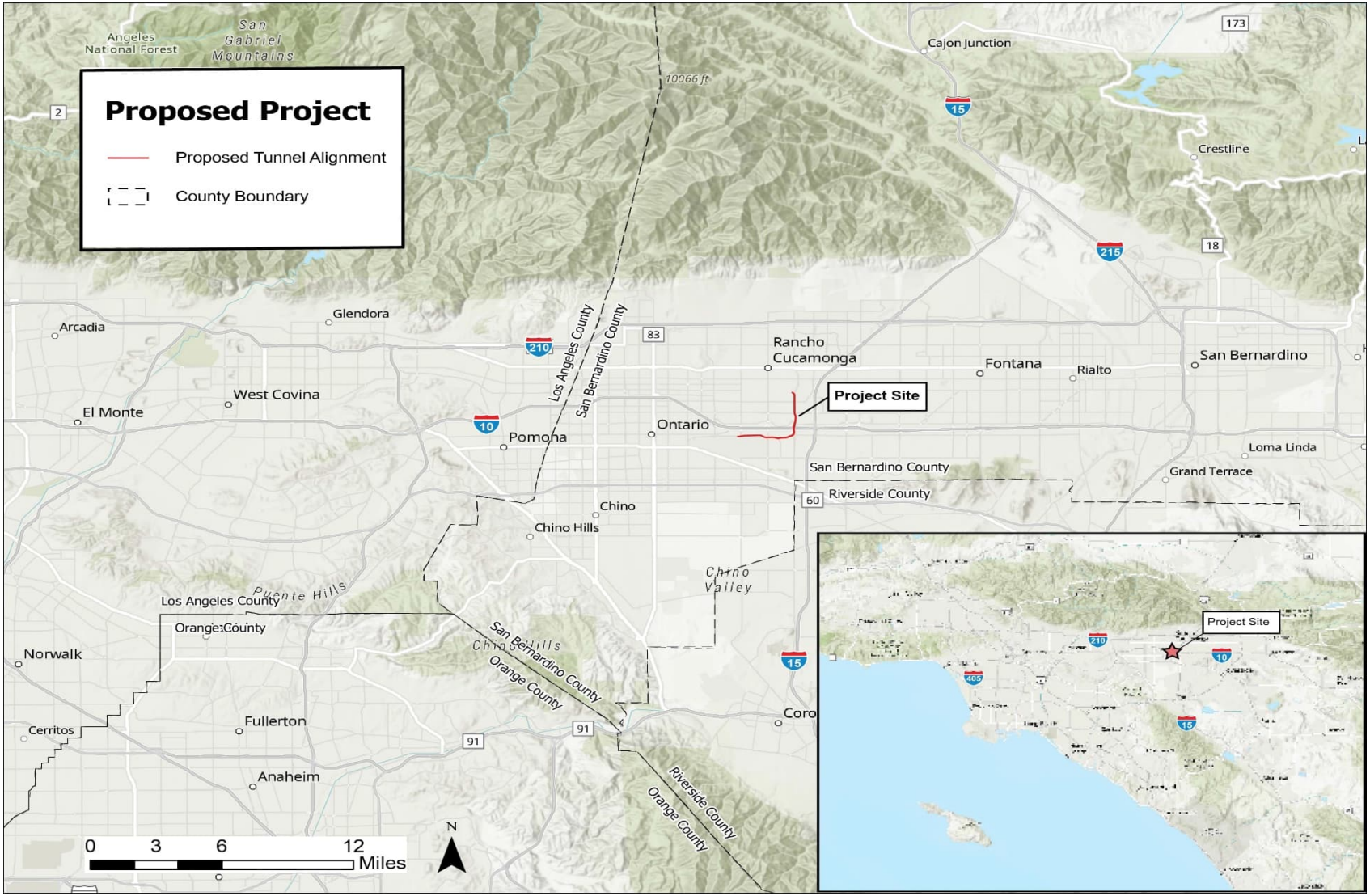
2.3.2.2 Existing Land Uses

The northwestern portion of the proposed Project alignment includes the Cucamonga Metrolink Station. There are 980 standard parking stalls and 24 Americans with Disabilities Act (ADA) compliant stalls at the Cucamonga Metrolink Station (Metrolink 2022).

From the northwestern portion of the proposed Project site, the tunnel alignment travels under Milliken Avenue, which is a major north-south arterial roadway. Milliken Avenue consists of three travel lanes north of Inland Empire Boulevard and four travel lanes south of Inland Empire Boulevard. From Milliken Avenue, the alignment travels south crossing under the existing I-10. I-10 is an east-west cross-country highway and has six lanes in each direction at the proposed Project site. The alignment eventually connects to East Airport Drive, which is an east-west arterial roadway with three travel lanes in each direction.

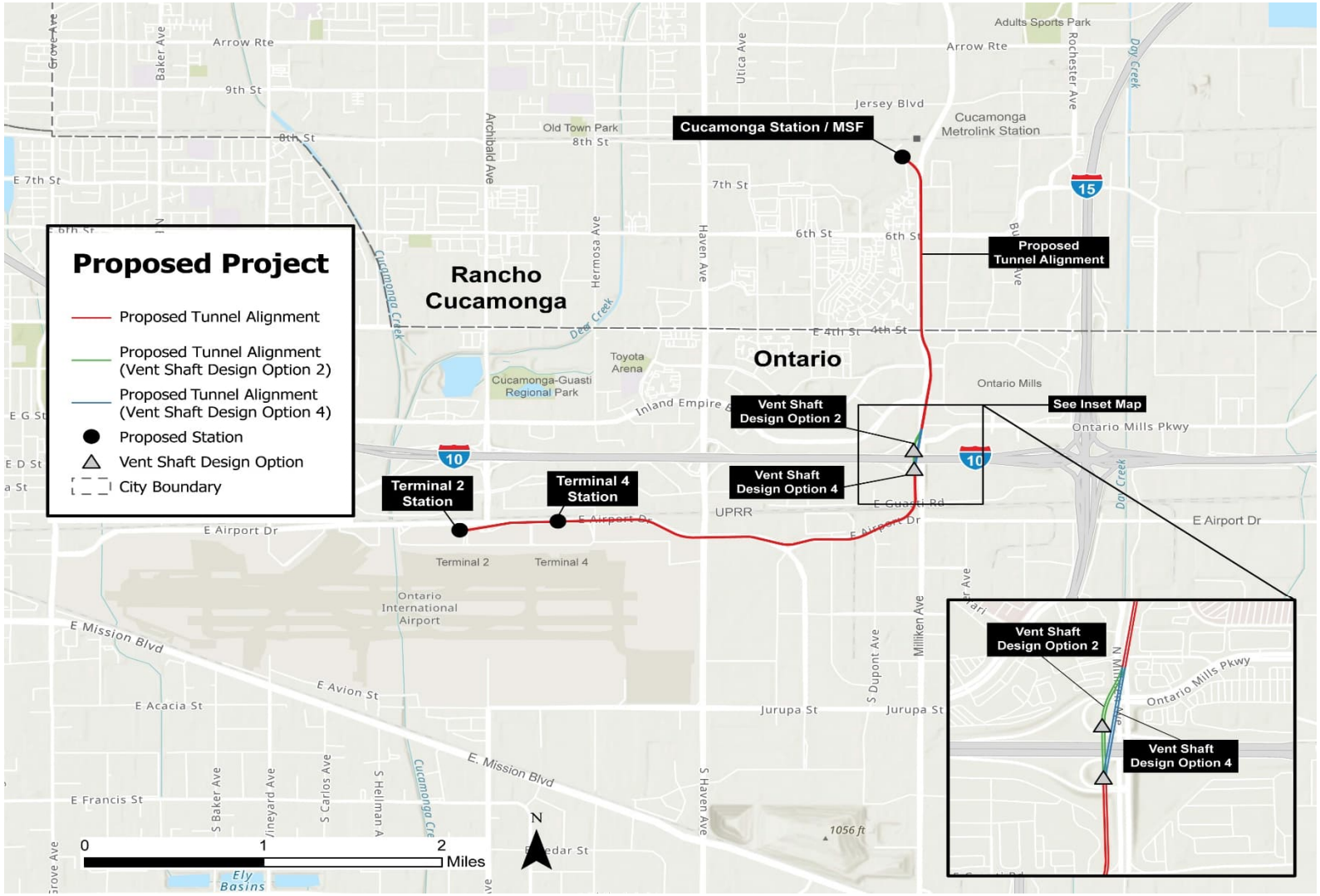
The southwestern portion of the proposed Project tunnel alignment terminates at ONT. Parking Lots 2 through 5 are located on the northern side of ONT. Parking Lots 2, 3, and 4 are surface lots that provide general parking and are a short walk away from the terminals at ONT. Parking Lot 5 is a surface economy lot at which a shuttle service is available.

Figure 2-1: Regional Location Map



Source: AECOM 2024

Figure 2-2: Proposed Project Site



Source: AECOM 2024

2.3.2.2.1 Surrounding Land Uses

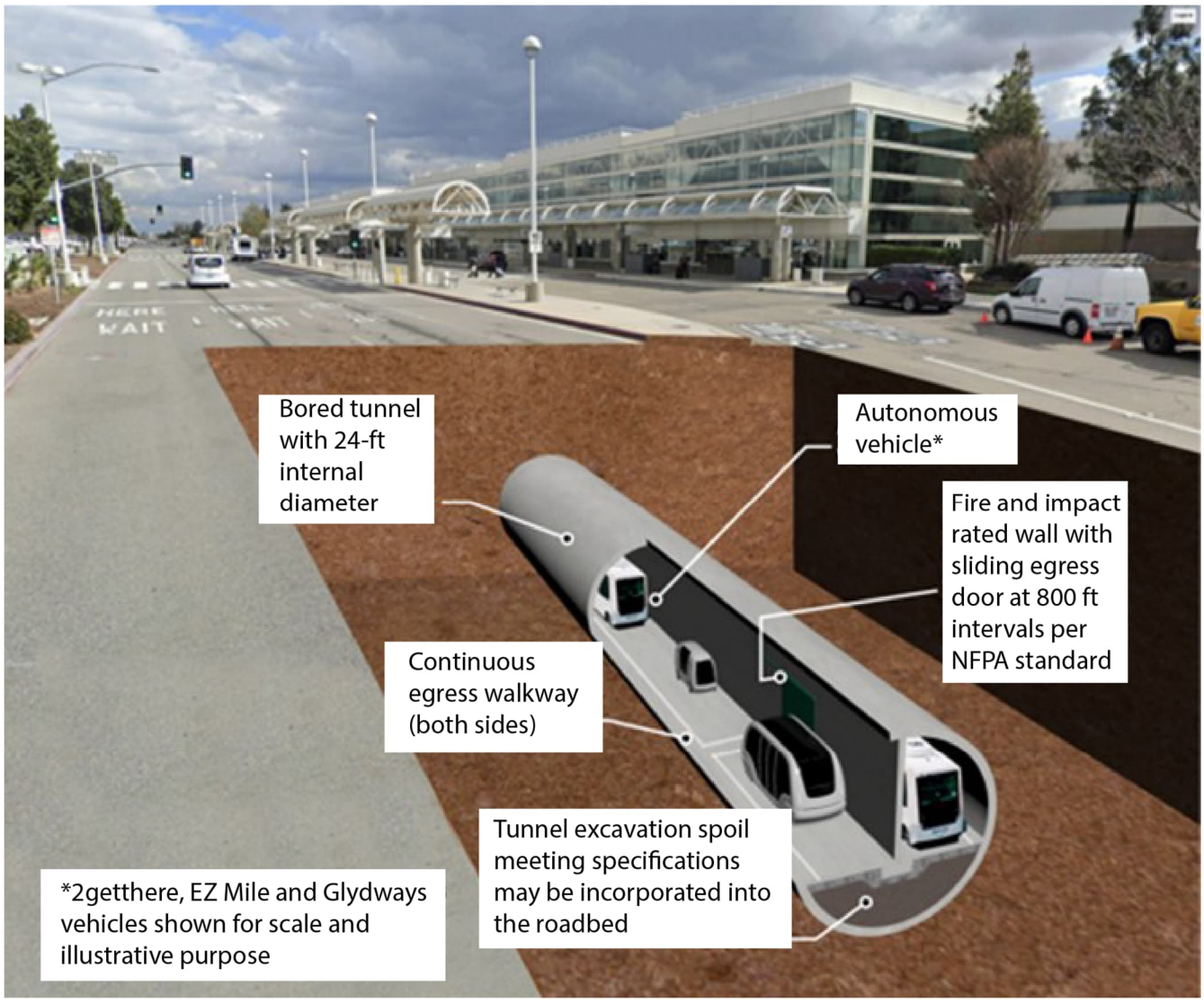
Development in the immediate vicinity of the proposed Project site includes a mix of industrial, commercial, manufacturing, transportation, office, multi-family residential, hotel, and airport related land uses. The proposed Project site's surrounding land uses are located within the City of Rancho Cucamonga and City of Ontario. Immediately adjacent uses include the following:

- North: Railroad tracks, industrial and manufacturing uses, trucking facilities, surface parking lots, Rancho Cucamonga Fire Station Number 174, and All Risk Training Center for the Rancho Cucamonga Fire Protection District.
- South: Industrial and manufacturing uses, along with trucking facilities, rental car facilities, parking lots, hotel uses, and other airport related uses. ONT includes two passenger terminals, general aviation facilities, air freight buildings, parking lots, and numerous airport and aircraft maintenance and support services.
- East: The eastern side of Milliken Avenue from 5th Street south to 4th Street consists primarily of hotel uses. Concentrated areas of commercial uses and restaurants are located along Milliken Avenue from 4th Street south to I-10, including Ontario Mills, which is a regional shopping mall complex. Hotel uses are also located adjacent to the Ontario Mills shopping mall.
- West: The western side of Milliken Avenue from approximately 7th Street south to 4th Street consists primarily of multi-family residential uses. Concentrated areas of large retail, commercial uses, restaurants, hotels, and the Toyota Arena are located along Milliken Avenue from 4th Street south to I-10.

2.3.2.3 Proposed Project Design

The proposed Project includes construction of transit facilities, including three at-grade passenger stations, one MSF, and one emergency access and vent shaft. The proposed alignment would run primarily within a 4.2-mile single underground tunnel (24-foot inner diameter bidirectional tunnel) alignment that begins at the Cucamonga Metrolink Station and travels south along Milliken Avenue and crosses beneath 6th Street and 4th Street, I-10, and the Union Pacific Railroad (UPRR), before traveling west beneath East Airport Drive to connect to Terminals 2 and 4 at ONT. A tunnel configuration has been identified as the proposed Project based on technical analysis, evaluation, and stakeholder input. Figure 2-3 depicts a typical transit tunnel section. Please see the Alternatives Considered Report for additional background on the development and refinement of the proposed Project design.

Figure 2-3: Typical Transit Tunnel Section View



Source: HNTB 2024

The three proposed at-grade stations would be constructed to serve Cucamonga Metrolink Station, ONT Terminal 2, and ONT Terminal 4. The MSF would be located adjacent to Cucamonga Metrolink Station and would support operations for the proposed Project by storing, maintaining, and cleaning autonomous electric transit vehicles, and it would also include employee amenities and parking. The access and vent shaft would be constructed to provide a means of emergency passenger egress and first responder access.

The proposed Project would include autonomous electric vehicles that would transport passengers on demand between Cucamonga Metrolink Station and ONT. The autonomous electric vehicles would run on rubber tires, and the vehicles are proposed to travel on a dedicated asphalt guideway within the proposed tunnel. The tunnel will include access ramps for the transit vehicles to surface to grade and provide access to the three proposed at-grade stations for passenger boarding and alighting.

2.3.2.3.1 Stations

The proposed Project includes three passenger stations. One station would be located in the northwestern corner of the existing Cucamonga Metrolink Station parking lot, which is owned and maintained by the City of Rancho Cucamonga. The other two proposed stations would be located within two of the existing parking lots at ONT, specifically Parking Lot 2 and Parking Lot 4, which are located across from Terminals 2 and 4. These proposed stations would be located at-grade and would connect to their associated tunnel portals along Terminal Way at ONT. Stations are proposed to be one to two stories and up to approximately 40 feet in height. All three stations would be connected to the bored tunnel via a cut-and-cover structure and an at-grade guideway. The guideway would be enclosed by fencing, and the walls would be buffered with landscaping. A pedestrian walkway would be provided bordering the outside of the guideway. Error! Reference source not found. and Figure 2-5 illustrate the overview of the proposed station footprint.

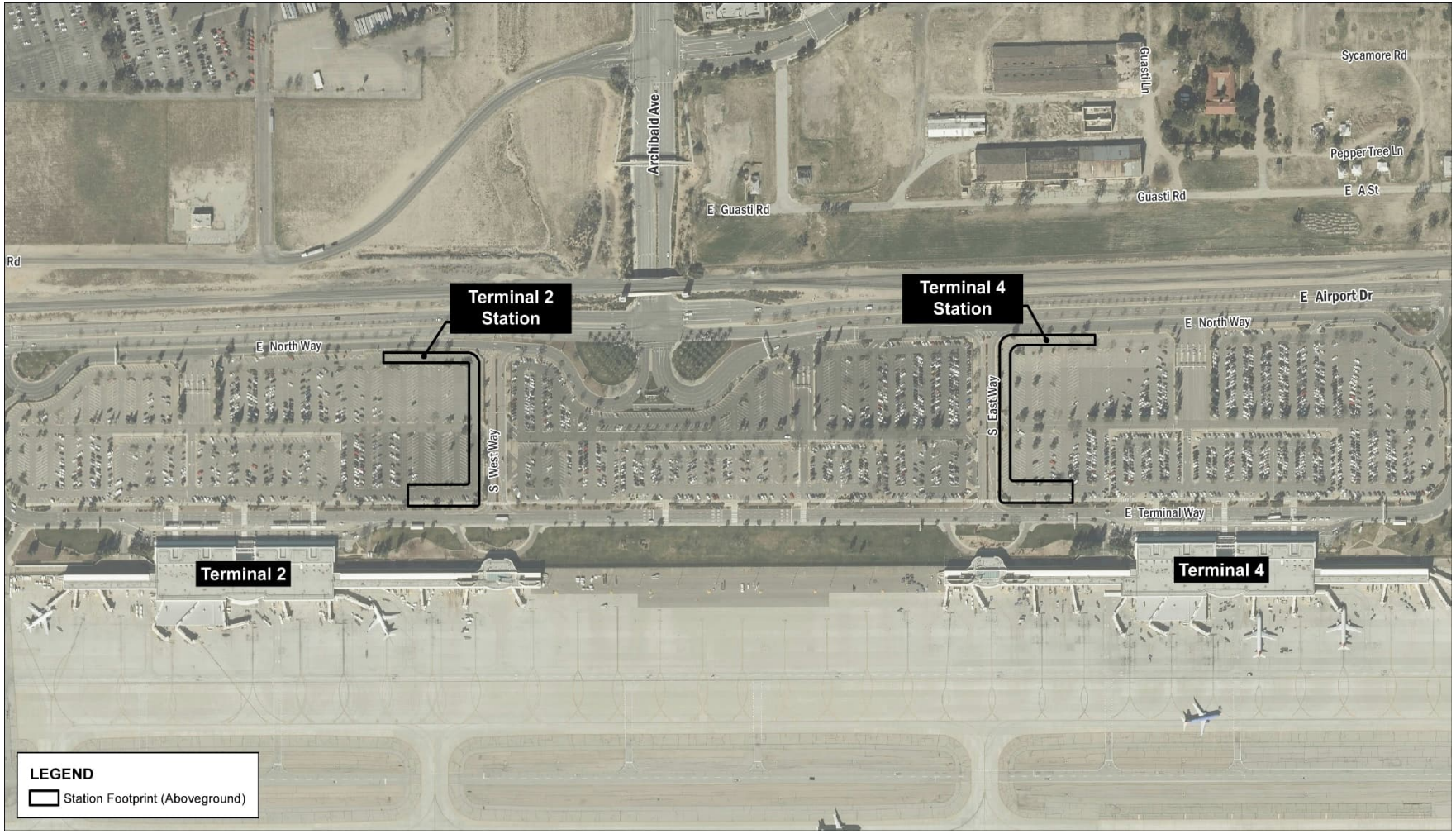
The proposed at-grade station Cucamonga Station would be approximately 8,000 square-feet and would be located at the northwest corner of the existing Cucamonga Metrolink Station parking lot. The existing Cucamonga Metrolink Station parking lot is owned and maintained by the City of Rancho Cucamonga. Approximately 180 parking stalls would be permanently removed from the existing Cucamonga Metrolink Station parking lot to accommodate the proposed Cucamonga Station. Two other stations, each approximately 10,000 square-feet, would be located at-grade within two of the existing parking lots at ONT Terminal 2 and Terminal 4. The Cucamonga Station also includes the proposed Project's MSF.

The two airport-serving stations would connect to their associated tunnel portals along Terminal Way via an at-grade connection. The proposed stations would be entirely located within the ONT right-of-way (ROW). Approximately 80 parking stalls would be permanently removed to accommodate the ONT Terminal 2 station, and approximately 115 spaces would be permanently removed to accommodate the ONT Terminal 4 station.

Figure 2-4: Cucamonga Station

Source: HNTB 2024

Figure 2-5: Ontario International Airport - Terminal 2 Station and Terminal 4 Station



Source: HNTB 2024

2.3.2.3.1 Maintenance and Storage Facility

The proposed Cucamonga Station would include an adjacent maintenance and storage facility with enclosed bays to store, clean, and maintain vehicles. The MSF would be approximately 11,000 square feet, with an additional 5,000 square feet second story and would contain an operations control center with lockers, breakrooms, and restrooms. Employee parking for the facility would be provided at the existing parking lot owned by SBCTA, in the southeastern quadrant of the Milliken Avenue/Azusa Court intersection.

2.3.2.3.2 Description of Vent Shaft Design Options

A vent shaft would be constructed to provide a means of emergency passenger egress and first responder access to and from the tunnel. Two locations are being considered west of Milliken Avenue on the north and south sides of I-10, as shown in Figure 2-6. A final decision about the location of the vent shaft would be made after the completion of the CEQA and NEPA environmental processes, and consideration of operational needs, environmental impacts, and stakeholder coordination.

The location option on the north side of I-10 would be in the ROW for the westbound off-ramp and would provide surface ground access from the Milliken Avenue/I-10 westbound off ramp intersection or from the westbound off ramp right lane near the ramp termini or directly from Milliken Avenue. The location option on the south side of I-10 would be in the ROW for the eastbound on-ramp and would provide surface ground access from Milliken Avenue near the eastbound on-ramp.

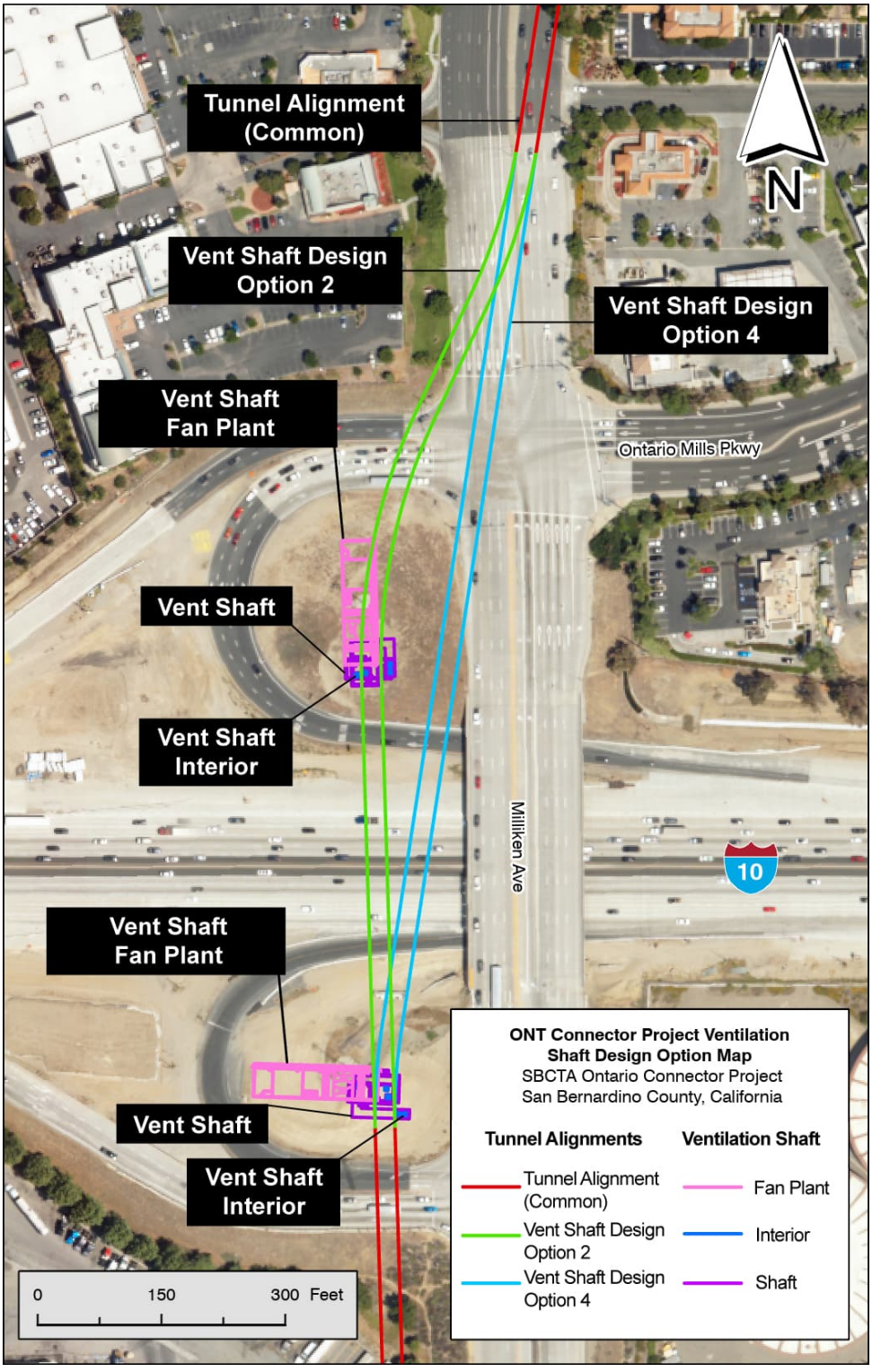
The vent shaft would consist of both underground and above ground structures. The underground shaft would extend to the tunnel level and the surface structures would consist of a one-(1) story structure above ground.

Access points would include underground, surface, and road access for emergencies to and from the tunnel. The proposed vent shaft would include associated electrical and ventilation equipment, and access would be controlled via a lock and key.

2.3.2.4 Proposed Operations

The proposed Project includes operation of autonomous electric vehicles to transport passengers to and from the proposed stations. The autonomous electric vehicles would be grouped and queued at their origin station and would depart toward the destination station once boarded with passengers. After the group of vehicles arrives at the destination station and passengers deboard, new passengers would board, and the group of vehicles would return to its origin station. If no new passengers are present, empty vehicles would be returned to the origin station to pick up new passengers. The proposed Project would provide a peak one-way passenger throughput of approximately a minimum of 100 per hour. Operations would be managed by Omnitrans, with on-demand service provided daily from 4:00 a.m. to 11:30 p.m., including weekends and holidays.

Figure 2-6: Vent Shaft Design Option 2 and Vent Shaft Design Option 4



Source: HNTB 2024

Fleet size and capacity of the vehicles will be up to the Operating System Provider and Design-Builder to determine to provide an initial operating system capable of transporting a minimum of 100 passengers per hour per direction and scalable to meet ridership demand. Based on the initial operating requirements and preliminary vehicle capacities, SBCTA is anticipating initial fleet sizes of between 7 and 60 vehicles to be required. Vehicles are rubber-tired electric autonomous vehicles.

2.3.2.5 Proposed Construction

This section describes the construction approach for the proposed Project. Overall construction of the proposed Project would last approximately 56 months, with project elements varying in their specific construction duration, as discussed subsequently. Construction is projected to start in 2025 and is anticipated to be completed in 2031. The Construction Methods Technical Report provides additional details regarding the construction approach and process for the key project elements (stations, MSF, tunnel construction, and vent shaft) associated with the proposed Project (SBCTA 2024b).

2.3.2.5.1 Stations and Maintenance and Storage Facility Construction

A construction staging area would be required at each of the three proposed Project stations, which includes the MSF at Cucamonga Station, and at the vent shaft location. Construction staging areas would be used to store building materials and construction equipment, assemble the tunnel boring machine (TBM), temporarily store excavated materials, and serve as temporary field offices for the contractor. Heavy-duty, steel, track-out grates (i.e., rumble plates) would be staged at the entrance of the construction staging areas to capture dirt and soil debris from the wheels of trucks and construction equipment. Best management practices would minimize a public nuisance that can result from soil and mud tracks on the public roadway. For security purposes, construction staging areas would be equipped with fences, lighting, security cameras, and guards to prevent vandalism and theft.

Cut-and-cover sites would occur at each proposed station location. Cut-and-cover activities involve the excavation of a shallow underground guideway from the existing street surface. During the construction phase, the cut-and-cover sites at Cucamonga Metrolink Station and Terminal 2 at ONT would be used as the TBM launching and receiving pits. Ultimately, the station cut-and-cover sites would serve as the vehicle ramps for the proposed Project's operations where the underground guideway would transition to at-grade.

Following the mass excavation and grading, the stations would require the installation of the waterproof membrane around the station box. The construction sequence for the station structures would typically commence with construction of the foundation base slab, followed by installation of exterior walls any interior column elements, and pouring of the station roof. Once station structure work is complete, the station excavation would be backfilled, and the permanent roadway would be constructed. Decking removal and surface restoration would then occur. Stations are proposed to be 1 to 2 stories, up to approximately 40 feet in height.

Generally, stations would be built simultaneously with or following guideway construction. However, construction of the Cucamonga Station may need to occur after the completion of all excavation and in-tunnel work. Truck haul routes, described in Table 2-1, would be designated for each staging site to transport excavated material from the staging sites. Additional construction details for the proposed stations and MSF are described subsequently, in Table 2-1, and in the Construction Methods Technical Report. Table 2-2 provides an overview of the typical sequencing for transit construction activities (SBCTA 2024b).

2.3.2.5.1.1.1 Construction Details for Cucamonga Station and Maintenance and Storage Facility

Construction at the proposed Cucamonga Station would require a mass excavation and the TBM would be launched from the invert of the Cucamonga Station and retrieved from the ONT Terminal 2 Station construction site. Construction at the proposed Cucamonga Station would require approximately 3.2 acres. Approximately 170 parking stalls would be temporarily unavailable at the Cucamonga Metrolink Station parking lot. Construction at the Cucamonga Station would occur for up to 37 months. No road closures are anticipated for staging at the Cucamonga Station. Equipment needs would include the following: excavators, backhoes, a vertical conveyor system, a gantry crane, a crawler crane, concrete trucks, haul trucks, a wheel loader, Foamplant, cooling towers, a tunnel fan grout plant, segment cars, and flatcars.

Additionally, construction would not interrupt Metrolink service at the Cucamonga Metrolink Station, as construction activities and staging would occur within the existing Cucamonga Station parking lot. SBCTA will coordinate construction at Cucamonga Station with SCRRA, prior to the start of construction and throughout the construction period, to maintain station access and to coordinate station parking, as needed.

The proposed Cucamonga Station includes an MSF to store, clean, and maintain vehicles. The MSF would be approximately 11,000 square feet, with an additional 5,000 square feet second story and would contain an operations control center with lockers, breakrooms, and restrooms. The MSF would be constructed adjacent to the Cucamonga Station and would include enclosed bays.

2.3.2.5.1.1.2 Construction Details for ONT Terminal 2 Station

Construction staging at the proposed ONT Terminal 2 station would require approximately 3.4 acres within the existing ONT Terminal 2 parking lot. Approximately 300 parking stalls would be temporarily unavailable at the ONT Terminal 2 parking lot. Construction at the ONT Terminal 2 Station would occur for up to 27 months. No road closures are anticipated for staging at the ONT Terminal 2 Station. Equipment needs would include the following: a piling rig, a gantry crane, a crawler crane, excavators, concrete trucks, muck trucks, a wheel loader, Foamplant, cooling towers, a tunnel fan, a grout plant, segment cares, and flatcars.

Table 2-1: Stations, Maintenance and Storage Facility Construction Details

Proposed	Construction Area	Duration	Haul Route
Cucamonga Station and MSF	Would require approximately 3.2 acres within the existing Cucamonga Metrolink Station parking lot. Approximately 170 parking stalls would be temporarily unavailable from the existing Metrolink parking lot.	Construction at the Cucamonga Station would occur for up to 37 months.	Haul trucks are needed to support removal and transport of materials from the mass excavation for each construction site (for the stations and vent shaft) and from tunnel boring activities. Haul trucks would collect excavated material from the construction sites and transport it away from the sites, utilizing designated haul routes. Haul trucks would exit the staging area, travel north along Milliken Avenue, and turn right on Foothill Boulevard to access I-15. No road closures are anticipated for staging at the Cucamonga Station.
ONT Terminal 2 Station	Would require approximately 3.4 acres within the existing ONT Terminal 2 parking lot. Approximately 300 parking stalls would be temporarily unavailable from the ONT parking lot.	Construction at ONT Terminal 2 would occur for up to 27 months.	Haul trucks are needed to support removal and transport of materials from the mass excavation for each construction site (for the stations and vent shaft) and from tunnel boring activities. Haul trucks would collect excavated material from the construction sites and transport it away from the sites, utilizing designated haul routes. Haul trucks would exit the staging area, travel east along Terminal Way, and turn left on Haven Avenue to access I-10. No road closures are anticipated for staging at the Terminal 2 Station.
ONT Terminal 4 Station	Would require approximately 3.2 acres within the existing ONT Terminal 4 parking lot. Approximately 300 parking stalls would be temporarily unavailable from the ONT parking lot.	Construction at ONT Terminal 4 would occur for up to 15 months.	Haul trucks are needed to support removal and transport of materials from the mass excavation for each construction site (for the stations and vent shaft) and from tunnel boring activities. Haul trucks would collect excavated material from the construction sites and transport it away from the sites, utilizing designated haul routes. Haul trucks would exit the staging area, travel east along Terminal Way, and turn left on Haven Avenue to access I-10. No road closures are anticipated for staging at the Terminal 4 Station.

Table 2-2: Typical Sequencing of Transit Construction Activities

At Grade or Underground	Activity	Typical Duration (Total Months)	Description
At Grade Construction Activities	Utility Relocation	7-14	Relocate utilities from temporary and permanent elements related to the construction and/or operation of the Project.
At Grade Construction Activities	Construction Staging Laydown Yard	3-6	Prepare existing lots to store construction equipment and materials, including the TBM, office space.
At Grade Construction Activities	Roadway	6-18	Reconfigure roadway, demolition of existing roadway installation of curb and gutter and other public ROW improvements.
At Grade Construction Activities	At-grade Guideway	6-18	Install asphalt and striping for guideway.
At Grade Construction Activities	Station Construction (overall)	24-48	Install mechanical, electrical, and plumbing (MEP), canopies, faregates, ticketing, finishes, stairs, and walkways.
At Grade Construction Activities	Parking	3-6	Restoring existing parking stalls temporarily unavailable due to construction, as applicable.
At Grade Construction Activities	MSF	8-12	Install MEP, fencing, enclosed bays, specialized washing equipment, and rebar installation, and concrete pours.
Underground Construction Activities	Utility Relocation	7-14	Relocate and hang underground utilities from temporary and permanent elements related to the construction and operation of the Project.
Underground Construction Activities	Open Cut and Cut and Cover Construction	18-24	Supports the construction of the TBM launching and receiving pit, and of the access ramps connecting the tunnel with the at-grade stations. Install soldier piles for beam and lag support of excavation and excavation. Cover excavation with temporary decking.
Underground Construction Activities	Bored Tunnel	16-24	Underground guideway construction.
Underground Construction Activities	Ventilation and Emergency Access Shaft	6-8	Install ventilation and emergency access shaft.
Underground Construction Activities	Underground Guideway	12-18	Install asphalt and striping for guideway.

2.3.2.5.1.1.3 Construction Details for ONT Terminal 4 Station

Construction staging at the proposed ONT Terminal 4 station would require approximately 3.2 acres within the existing ONT Terminal 4 parking lot. Approximately 300 parking stalls would be temporarily unavailable at the ONT Terminal 4 parking lot. Construction at the ONT Terminal 4 Station would occur for up to 15 months. No road closures are anticipated for staging at the ONT Terminal 4 Station. Equipment needs would include the following: a piling rig, a crawler crane, concrete trucks, muck trucks, a compressor, a generator, a water treatment plant, a wheel wash, a wheel loader, backhoes, and excavators.

2.3.2.5.2 Tunnel Construction

The proposed Project will travel in a below grade tunnel configuration for most of its proposed alignment. A TBM will be utilized in the construction of the tunnel. TBMs are typically used in the construction of infrastructure projects to build deep underground tunnels by boring, or excavating, through soil, rocks, and/or other subsurface materials. The TBM would be launched from the Cucamonga Metrolink Station to construct the tunnel. Additional details regarding the underground construction process for the proposed Project are included in the Construction Methods Technical Report (SBCTA 2024b).

The TBM would be launched from the invert of the Cucamonga Station and retrieved from the ONT Terminal 2 Station construction site. A large crane would be used to assemble and disassemble the TBM from the excavation and receiving pits. OIAA height limits at ONT and Rancho Cucamonga, 135 feet and 160 feet, respectively, would restrict crane heights. The TBM would operate six days a week, with maintenance occurring each Sunday. Construction of the entire tunnel would take approximately 22 months. Both ends of the tunnel would need to be constructed via direct excavation (cut and cover) to launch or retrieve the TBM. After mining is completed and TBM logistics are demobilized, both ends of the tunnel would be utilized to build the invert roadway, walkways, center wall and MEP systems, etc.

Vehicle ramps connecting to the tunnel would be constructed via direct excavation, as well. Equipment at the TBM launch site would include trucks, a crane, excavators, a grout plant, a compressor plant, a tunnel fan, and cooling towers. The launch area would also store tunnel construction materials (rail, pipe, ducts, etc.) and stockpile excavated material.

Truck haul routes at the proposed launch site at Cucamonga Station and the proposed retrieval site at ONT Terminal 2 Station are described in Table 2-1. The Construction Methods Technical Report includes additional details on the overall construction approach for the proposed tunnel (SBCTA 2024b).

2.3.2.5.3 Vent Shaft Construction

Two vent shaft design options with different access points are being considered for the proposed Project. vent shaft design option 2 would be located west of Milliken Avenue on the westbound off-ramp of the I-10. Vent shaft design option 4 would be located west of Milliken Avenue on the eastbound on-ramp of the I-10. The vent shaft will consist of both underground and above ground structures. The underground

shaft will extend to the tunnel level and the surface structure will consist of a one-(1) story structure above ground. One vent shaft would be constructed along the tunnel alignment.

The vent shaft could be constructed before or after the construction of the tunnel and would be installed using a similar construction methodology to that of the tunnel and take approximately 6 months to complete. A drill rig would install up to 5 piles deep per day, each 70 feet deep. Piles would be drilled (i.e., no impact driving). The access shaft would then be excavated. The excavation would be supported by an internal bracing system. The vent shaft would require a construction staging area approximately 0.62-acres (27,000 square feet). Anticipated equipment at the location would include haul trucks, a drill rig, a crane, an excavator, a wheel loader, a compressor, and a ventilation fan. The staging area would include material storage, stockpiles of excavated material, water treatment, a workshop, a construction office, and an employee parking. Additional details regarding the construction process for the vent shaft are included in the Construction Methods Technical Report (SBCTA 2024b).

2.3.2.5.4 Utilities

Utility relocations are anticipated at the launch and retrieval locations at the Cucamonga Metrolink Station site, ONT, and ventilation/emergency access shaft. Multiple utilities would be relocated to allow for the construction of the access shaft, including potential electric underground distribution cables owned and operated by Southern California Edison; landscape irrigation line owned and operated by the City of Ontario; and Caltrans fiber optic duct bank. In a future project phase, coordination with the existing utility service providers prior to utility relocation would be conducted to reduce potential impacts to utility service and minimize disruptions. Relocations of existing utilities would be coordinated with utility service providers and would be in previously disturbed areas or established ROW close to their existing locations and would stay within the evaluated Project footprint.

2.3.2.6 Proposed Project Easements

The proposed Project would require easements from 19 properties. This includes the need for 12 permanent subsurface easements, two permanent surface easements, and five parcel acquisitions for both subsurface and surface easements. Seven of the easements would be for the three stations and would total approximately 2 acres. SBCTA would require these easements for construction and/or operation of the proposed Project. There are two locations that are options for the location of the vent shaft, both belonging to Caltrans. This document evaluates the impacts for both options without selection of a preferred site. The decision of the preferred site will depend in part on the CEQA and NEPA processes, including any potential input from the public. The final decision as to which option is preferred may occur after the completion of the CEQA/NEPA process. Land uses for the parcels where these easements would be required include industrial, transportation facilities, utilities, and commercial. The owners of these parcels include SBCTA and City of Rancho Cucamonga (Cucamonga Metrolink Station west and east parking lots), OIAA, a utility service provider, and some private owners. No relocations of businesses and residences would be required to construct the proposed Project.

3 REGULATORY SETTING

3.1 FEDERAL

The following sections describe energy-related federal regulations that are applicable to the proposed Project.

3.1.1 National Environmental Policy Act

NEPA (42 United States Code [USC] Part 4332) requires the identification of all potentially substantial impacts to the environment, including energy impacts.

3.1.2 Energy Policy and Conservation Act of 1975 and Corporate Average Fuel Standards

The Energy Policy and Conservation Act of 1975 (EPCA) was enacted to increase energy production and supply, reduce energy demand, and provide energy efficiency. EPCA also assigned the executive branch additional powers to respond to disruptions in energy supply and established the Strategic Petroleum Reserve, the Energy Conservation Program for Consumer Products, and Corporate Average Fuel Economy regulations. The EPCA also established fuel economy standards for on-road motor vehicles sold in the United States. Compliance with federal fuel economy standards is determined through the Corporate Average Fuel Economy (CAFE) program on the basis of each manufacturer's average fuel economy for the portion of its vehicles produced for sale in the United States.

3.1.3 Infrastructure Investment and Jobs Act

The Infrastructure Investment and Jobs Act, also known as the Bipartisan Infrastructure Law, (H.R. 3684) was signed into law on November 15, 2021. The law includes $73 billion to overhaul the energy policy of the United States, $105 billion for public transport, $110 billion for fixing roads and bridges and includes measures for climate change mitigation and improving access for cyclists and pedestrians. The law also includes $21 billion for environmental projects, $15 billion for electric vehicles, and $4.7 billion to cap orphan wells abandoned by oil and gas companies.

3.1.4 Energy Independence and Security Act of 2007

The Energy Independence and Security Act of 2007 aims to move the United States toward greater energy independence and security; increase the production of clean renewable fuels; protect consumers; increase the efficiency of products, buildings and vehicles; promote greenhouse gas (GHG) research; improve the energy efficiency of the federal government; and improve vehicle fuel economy.

3.1.5 Energy Policy Act of 2005

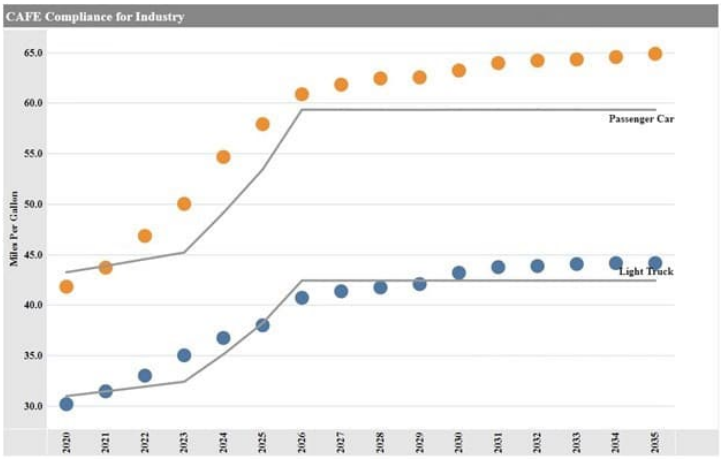
The Energy Policy Act of 2005 seeks to reduce reliance on nonrenewable energy resources and provide incentives to reduce current demand on these resources. For example, under this Act, consumers and businesses can obtain federal tax credits for purchasing fuel-efficient appliances and products (including

hybrid vehicles), building energy-efficient buildings, and improving the energy efficiency of commercial buildings. Additionally, tax credits are available for the installation of qualified fuel cells, stationary microturbine power plants, and solar power equipment.

3.1.6 Corporate Average Fuel Economy

CAFE standards are federal regulations that are set to reduce energy consumed by on-road motor vehicles. The National Highway Traffic Safety Administration (NHTSA) regulates the standards and the United States Environmental Protection Agency (USEPA) measures vehicle fuel efficiency. The standards specify minimum fuel consumption efficiency standards for new automobiles sold in the United States. On March 31, 2022, the NHTSA finalized CAFE standards for model years 2024–2026 that require an industry-wide fleet average of approximately 49 miles per gallon for passenger cars and light trucks in model year 2026, by increasing fuel efficiency by 8 percent (%) annually for model years 2024 and 2025, and 10% annually for model year 2026. Figure 3-1 shows the CAFE standards from 2020 through 2035. NHTSA is proposing new CAFE standards for passenger cars and light trucks built in model years 2027-2032, and new fuel efficiency standards for heavy-duty pickup trucks and vans built in model years 2030-2035. If finalized, the proposal would require an industry fleet-wide average of approximately 58 miles per gallon for passenger cars and light trucks in model year 2032, by increasing fuel economy by 2% year over year for passenger cars and by 4% year over year for light trucks. For heavy-duty pickup trucks and vans, the proposal would increase fuel efficiency by 10% year over year.

Figure 3-1: NHTSA CAFE Standards Over Time



Source: NHTSA Corporate Average Fuel Economy. Website: www.nhtsa.gov/laws-regulations/corporate-average-fuel-economy.

3.2 STATE

The following sections describe energy-related State regulations that are applicable to the proposed Project.

3.2.1 California Environmental Quality Act (Sections 21000 et seq.) and California Environmental Quality Act Guidelines (Sections 15000 et seq.)

CEQA (California Public Resources Code Sections 21000 et seq.) and the CEQA Guidelines (California Code of Regulations [CCR] Sections 15000 et seq.) require State and local agencies to identify the significant environmental impacts of their actions, including potential significant energy impacts, and to avoid or mitigate those impacts when feasible. ca

The *CEQA Guidelines*, Appendix F, Energy Conservation, state that Environmental Impact Reports (EIRs) are required to include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy.

3.2.2 California Energy Commission

The California Energy Commission (CEC) is the State's primary energy policy and planning agency, and it plays a critical role creating a clean and modern energy system. Senate Bill (SB) 1389 (Chapter 568, Statutes of 2002) requires the CEC to prepare an Integrated Energy Policy Report biennially at a minimum. The report should include a description of the international energy market prospects and an evaluation of its export promotion activities.

3.2.3 Executive Order S-3-05

Executive Order (EO) S-3-05, enacted in June 2005, sets a target to reduce 2050 GHG emissions to 80% below 1990 levels. Reducing GHG emissions would have an associated reduction in energy use.

3.2.4 AB 32: Global Warming Solutions Act

Assembly Bill (AB) 32 (the California Global Warming Solutions Act of 2006) requires the California Air Resources Board (CARB) to adopt limits for the statewide GHG emissions to be equivalent to the statewide GHG emissions levels in 1990 by 2020. The Scoping Plan was first approved by CARB in 2008 and is updated at least every 5 years. The 2022 Scoping Plan identified how the State can reach the 2030 climate target to reduce GHG emissions by 40% from 1990 levels, reduce anthropogenic GHG emissions by 85% below 1990 levels no later than 2045, and also plans to advance toward the 2050 climate goal to reduce GHG emissions by 80% below 1990 levels.

3.2.5 AB 2076, Reducing Dependence on Petroleum

AB 2076 (passed in 2000, Shelley, Chapter 936, Statutes of 2000) directs CARB and the CEC to develop and adopt recommendations for the Governor and the Legislature on a strategy to reduce California's dependence on petroleum.

3.2.6 State of California Integrated Energy Policy

In 2002, the Legislature passed SB 1389, which required the CEC to develop an integrated energy plan every 2 years for electricity, natural gas, and transportation fuels for the California Energy Policy Report.

The plan calls for the State to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the plan identifies a number of strategies, including assistance to public agencies and fleet operators in implementing incentive programs for zero emission (ZE) vehicles and their infrastructure needs, and encouragement of urban designs that reduce VMT and accommodate pedestrian and bicycle access.

The CEC adopted the 2023 Integrated Energy Policy Report (IEPR) on February 14, 2024. The 2023 IEPR addresses the following four major topics and includes an analysis of the benefits of transitioning to a clean transportation system:

1. Energy reliability over the next 5 years;
2. Natural gas outlook and assessments;
3. Building decarbonization and energy efficiency; and
4. Energy demand.

To this end, the 2023 IEPR has four volumes and an appendix consisting of: (1) a report on actions needed to reduce the GHGs related to buildings in which Californians live and work, with an emphasis on energy efficiency, and reducing GHGs from the industrial and agricultural sectors; (2) a report on actions needed to increase the reliability and resiliency of California's energy system; (3) an assessment of the evolving role of gas in California's energy system (both the importance of near-term reliability and the need for the system to evolve as California works to achieve carbon neutrality by 2045); (4) an assessment of California's energy demand outlook, including a forecast to 2035 and long-term energy demand scenarios to 2050; and (5) an evaluation of the benefits of California's Clean Transportation Program (CEC 2024).

3.2.7 Executive Order B-16-12

EO B-16-12 (March 2012) orders State entities under the direction of the Governor, including CARB, the CEC, and the California Public Utilities Commission, to support the rapid commercialization of ZE vehicles. It directs these entities to achieve various benchmarks related to ZE vehicles.

3.3 REGIONAL REGULATIONS

3.3.1 Southern California Association of Governments

The Southern California Association of Governments (SCAG) is a metropolitan planning organization representing six counties (including San Bernardino County) and 191 cities (including Rancho Cucamonga and Ontario). SCAG's regional council adopted Connect SoCal (the 2020–2045 Regional Transportation Plan/Sustainable Communities Strategy [RTP/SCS]), and the addendum to the Connect SoCal Program EIR on September 3, 2020. The 2020 RTP/SCS is a state- and federally-required long-range plan for regional transportation and land use that aims to achieve a more sustainable growth pattern and includes Transportation Demand Management (TDM) strategies throughout the region to reduce the number of drive-alone trips and overall VMT. Amendment #1 to the 2020 RTP/SCS was approved by the SCAG

Regional Council on November 4, 2021, and Amendment #2 was approved by the SCAG Regional Council on October 6, 2022. Amendment #1 included the 2021 Federal Transportation Improvement Program Consistency Amendment #21-05. Amendment #2 serves as a concurrent amendment to the 2023 Federal Transportation Improvement Program (FTIP), allowing for changes to major state and transit projects in the 2020 RTP/SCS and in the FTIP that will be carried forward as part of the 2023 FTIP.

3.4 LOCAL REGULATIONS

The following sections describe local energy-related regulations that are applicable to the proposed Project.

3.4.1 San Bernardino Regional GHG Reduction Plan

As part of San Bernardino County Regional Greenhouse Gas Reduction Plan, the San Bernardino Council of Governments (SBCOG) compiled an evaluation of GHG emissions reduction measures that could be adopted by the 25 Partnership Cities of San Bernardino County. The City of Rancho Cucamonga and the City of Ontario are part of the Partnership Cities.

The City of Rancho Cucamonga set a goal to reduce its community GHG emissions to a level that is 40% below its 2016 GHG emissions level by 2030. The City of Rancho Cucamonga will meet and exceed this goal subject to reduction measures that are technologically feasible and cost-effective through a combination of State (approximately 75%) and local (approximately 25%) efforts. The Pavley vehicle standards, the state's low carbon fuel standard, the Renewable Portfolio Standards, and other state measures will reduce GHG emissions in the City of Rancho Cucamonga's on-road and building energy sectors in 2030. An additional reduction of 156,417 metric tons of carbon dioxide equivalent ($MTCO_2e$) will be achieved primarily through the following local measures, in order of reductions achieved: Solar Installation for Existing Commercial/Industrial (Energy-8); Waste Diversion and Reduction (Waste-2); and Encouraged Use of Mass Transit (OnRoad-2). The City of Rancho Cucamonga's reduction plan has the greatest impacts on GHG emissions in the building energy, waste, and on-road transportation sectors. These measures, which are identified in Table 3-1, would reduce not only GHG emissions, but also energy consumption.

Table 3-1: Greenhouse Gas Reduction Measures and Estimated 2030 Reductions for the City of Rancho Cucamonga

Measure Number	Measure Description	Reductions ($MTCO_2e$)
State Measures		
State-SB 100	SB 100	183,819
State-SB 350	SB 350	63,893
State-T24	Title 24 (Energy Efficiency Standards)	10,893
State-Solar Water Heater	Solar Water Heaters (Residential)	123
State-Increased CHP	Increased Combined Heat and Power (Commercial)	593
State-On Road	State Fuel Efficiency Measures	224,830
State-SB 1383	Methane Capture	37,235
Total State Reductions		521,386
Local Measures		
Building Energy		
Energy-1	Building Energy Efficiency	0
Energy-2	Lighting Efficiency	0
Energy-3	All Electric Buildings	0
Energy-5	Renewable Energy – New Commercial/Industrial	0
Energy-6	Solar Energy for Warehouse Space	16,774
Energy-7	Solar Installation for Existing Housing	10,191
Energy-8	Solar Installation for Existing Commercial/Industrial	47,545
Energy-9	Rooftop Gardens	0
Energy-10	Urban Tree Planting for Shading and Energy Savings	3
On-Road Transportation		
OnRoad-1	Alternative Fueled Transit Fleets	1,319
OnRoad-2	Encourage Use of Mass Transit	22,116
OnRoad-3	Transportation Demand Management and Synchronization	4,912
OnRoad-4	Expand Bike Routes	7,491
OnRoad-5	Community Fleet Electrification	6,162
Off-Road Equipment		
OffRoad-1	Electric-Powered Construction Equipment	0
OffRoad-2	Idling Ordinance	0
OffRoad-3	Electric Landscaping Equipment	0
Waste		
Waste-1	Methane Capture - Local	0
Waste-2	Waste Diversion and Reduction	35,356
Agriculture		
Agriculture-3	Methane Capture at Large Dairies	-
Wastewater		
Wastewater-1	Methane Recovery at Wastewater Treatment Plants	163
Wastewater-2	Equipment Upgrades and Wastewater Treatment Plants	265
Water Conveyance		
Water-1	Require Tier 1 Voluntary California Green Building Standards Code (CALGreen) Standards for New Construction	0
Water-2	ca	2,330

Table 3-1: Greenhouse Gas Reduction Measures and Estimated 2030 Reductions for the City of Rancho Cucamonga

Measure Number	Measure Description	Reductions ($MTCO_2e$)
Water-3	Water-Efficient Landscaping Practices	1,791
GHG Performance Standard for New Development		
PS-1	GHG Performance Standard for New Development (29% below projected business as usual (BAU) emissions for the Project)	0
Total Local Reductions		156,417
Total Reductions		677,803

Source: San Bernardino Regional GHG Reduction Plan (2021)

Using the reduction tools in San Bernardino County Regional Greenhouse Gas Reduction Plan, the City of Ontario identified similar measures to those that form the Climate Action Plan (CAP). The reductions identified in Table 3-2 are considered to be representative of the likely reductions that the City of Ontario will be able to achieve with its CAP. Table 3-2 presents each reduction measure evaluated for City of Ontario. For each measure, the short title and estimated GHG reductions in 2030 are listed. Measures are organized by state control and local control and are listed by sector. These measures would reduce not only GHG emissions but also energy consumption.

Table 3-2: Greenhouse Gas Reduction Measures and Estimated 2030 Reductions for the City of Ontario

Measure Number	Measure Description	Reductions ($MTCO_2e$)
State Measures		
State-SB 100	SB 100	254,537
State-SB 350	SB 350	47,410
State-T24	Title 24 (Energy Efficiency Standards)	31,820
State-Solar Water Heater	Solar Water Heaters (Residential)	111
State-Increased CHP	Increased Combined Heat and Power (Commercial)	3,025
State-OnRoad	State Fuel Efficiency Measures	311,081
State-SB 1383	Methane Capture	79,210
Total State Reductions		727,194
Local Measures		
Building Energy		
Energy-1	Building Energy Efficiency	1,040
Energy-2	Lighting Efficiency	1,340
Energy-3	All Electric Buildings	0
Energy-5	Renewable Energy – New Commercial/Industrial	0
Energy-6	Solar Energy for Warehouse Space	99,865
Energy-7	Solar Installation for Existing Housing	10,036
Energy-8	Solar Installation for Existing Commercial/Industrial	21,735

Measure Number	Measure Description	Reductions ($MTCO_2e$)
Energy-9	Rooftop Gardens	1
Energy-10	Urban Tree Planting for Shading and Energy Savings	5
On-Road Transportation		
OnRoad-1	Alternative Fueled Transit Fleets	288
OnRoad-2	Encourage Use of Mass Transit	15,300
OnRoad-3	Transportation Demand Management and Synchronization	6,796
OnRoad-4	Expand Bike Routes	10,365
OnRoad-5	Community Fleet Electrification	3,385
Off-Road Equipment		
OffRoad-1	Electric-Powered Construction Equipment	442
OffRoad-2	Idling Ordinance	308
OffRoad-3	Electric Landscaping Equipment	483
Waste		
Waste-1	Methane Capture - Local	0
Waste-2	Waste Diversion and Reduction	52,841
Agriculture		
Agriculture-3	Methane Capture at Large Dairies	32,647
Wastewater		
Wastewater-1	Methane Recovery at Wastewater Treatment Plants	24
Wastewater-2	Equipment Upgrades and Wastewater Treatment Plants	329
Water Conveyance		
Water-1	Require Tier 1 Voluntary CALGreen Standards for New Construction	0
Water-2	Renovate Existing Buildings to Achieve Higher Levels of Water Efficiency	6,952
Water-3	Water-Efficient Landscaping Practices	1,620
GHG Performance Standard for New Development		
PS-1	GHG Performance Standard for New Development (29% below projected BAU emissions for the Project)	46,375
Total Local Reductions		312,180
Total Reductions		1,039,373

Source: San Bernardino Regional GHG Reduction Plan (2021)

3.4.2 City of Rancho Cucamonga General Plan

The City of Rancho Cucamonga General Plan, Resource Conservation Element, sets forth goals and policies that provide direction regarding preserving, protecting, conserving, reusing, replenishing, and efficiently using the City of Rancho Cucamonga's limited natural resources (City of Rancho Cucamonga 2021). The following goals and policies are applicable to the proposed Project:

- Goal RC-7: An energy-efficient community that relies primarily on renewable and nonpolluting energy sources.
- Policy RC-7.2: Require new multifamily residential, commercial, office, and industrial development to include charging stations or include the wiring for them.

- Policy RC-7.7: Encourage sustainable building and site design that meets the standards of Leadership in Energy and Environmental Design (LEED), Sustainable Sites, Living Building Challenge, or similar certification.
- Policy RC-7.9: Require new buildings to incorporate energy-efficient building and site design strategies for the arid environment that include appropriate solar orientation, thermal mass, use of natural daylight and ventilation, and shading.
- Policy RC-7.10: Continue to promote the incorporation of alternative energy generation (e.g., solar, wind, biomass) in public and private development.
- Policy RC-7.12: Prohibit new development and renovations that impair adjacent buildings' solar access, unless it can be demonstrated that the shading benefits substantially offset the impacts of solar energy generation potential.
- Policy RC-7.15: Public and private development within the City, including multipurpose trails, shall not interfere with safe and reliable transmission, storage, and generation of electricity. With the exception of utility infrastructure and other public improvements that do not interfere with such infrastructure, permanent structures are not allowed within utility corridors.

3.4.3 City of Ontario General Plan

The City of Ontario's General Plan, Environmental Resources Element, includes Goal ER-3 that focuses on creating a cost-effective and reliable energy system sustained through low-impact construction, site and neighborhood energy conservation, and diverse sources of energy generation that collectively help to minimize the region's carbon footprint (City of Ontario 2022). The following goal and policies are applicable to the proposed Project:

- Goal ER-3: Cost-effective and reliable energy system sustained through a combination of low impact buildings, site and neighborhood energy conservation, and diverse sources of energy generation that collectively helps to minimize the region's carbon footprint.
- Policy ER3-1: We require conservation as the first strategy to be employed to meet applicable energy-saving standards.
- Policy ER3-3: We require new construction to incorporate energy efficient building and site design strategies, which could include appropriate solar orientation, maximum use of natural daylight, passive solar and natural ventilation.
- Policy ER3-5: Purchase and use vehicles and equipment that are fuel efficient and meet or surpass state emissions requirements and/or use renewable sources of energy.
- Policy ER3-6: We promote the use of renewable energy sources to serve public and private sector development.

4 METHODOLOGY

The energy impacts analysis considers both direct and indirect energy consumption. Direct energy consumption includes the consumption from operation and construction; indirect energy consumption includes the consumption from maintenance associated with the proposed Project.

The estimate of construction-related energy use was calculated by applying the USEPA-derived carbon dioxide (CO_2) emissions per gallon of fuel to the total CO_2 emissions estimated using the OFFROAD 2021 and EMFAC 2021 data documented in the Air Quality Technical Report (SBCTA 2024c), which includes details on construction equipment and activity assumptions. CO_2 emissions were then converted to million British thermal units (MMBtu) using energy unit conversion factors.

The proposed Project provides transit ridership and would not increase roadway capacity. The operations of the electrically powered shuttles, stations, vent shaft, tunnel, and the MSF would consume energy (both electricity and natural gas). Energy consumption estimates for the Build Alternative have been estimated using the California Emissions Estimator Model (CalEEMod), equipment specifications, and Project plans.

4.1 CEQA SIGNIFICANCE THRESHOLDS

In accordance with Appendix G of the 2024 *State CEQA Guidelines,* the Project would have a significant impact related to energy if it would:

- Result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation.
- Conflict with or obstruct a State or local plan for renewable energy or energy efficiency.

5 AFFECTED ENVIRONMENT

Energy is currently consumed in the proposed Project for the construction of public and private projects; operation of automobiles, trucks, and marine vessels; and operation of existing land uses. Automobile and truck fueling stations are located throughout the proposed Project area. See Section 2 for a description of the proposed Project area.

5.1 IDENTIFICATION OF THE STUDY AREA

The proposed Project would include an underground bidirectional tunnel for direct connection between the Cucamonga Metrolink Station and ONT. As such, the proposed Project is estimated to have no adverse effect on adjacent surface transportation and roadway systems, excluding the two termini of the proposed Project. Therefore, the study area for this energy report extends north from Airport Drive to Arrow Route and east from Grove Avenue to I-15.

The goal of conserving energy implies the wise and efficient use of energy. The means of achieving this goal include:

- Decreasing overall per-capita energy consumption
- Decreasing reliance on natural gas and oil
- Increasing reliance on renewable energy sources

5.1.1 Energy Resources and Consumption

California is rich in conventional and renewable energy resources. It has large crude oil and substantial natural gas deposits in six geological basins located in the Central Valley and along the Pacific Coast. Most of those reserves are concentrated in the southern San Joaquin Basin. More than a dozen of the nation's 100 largest oil fields are in California, including the Belridge South oil field, the second-largest oil field in the contiguous United States. In addition, federal assessments indicate that large undiscovered deposits of recoverable oil and gas lie offshore in the federally administered Outer Continental Shelf (OCS), although federal law currently prohibits oil and gas leasing in that area. California's renewable energy potential is extensive. The State's hydroelectric power potential ranks second in the nation (behind Washington State), and substantial geothermal and wind power resources are found along the coastal mountain ranges and the eastern border with Nevada. High solar energy potential is found in southeastern California's sunny deserts.

California is the most populous state in the nation, and its total energy demand is second only to Texas. Although California is a leader in the energy-intensive chemical, forest products, glass, and petroleum industries, the State has one of the lowest per-capita energy consumption rates in the country (EIA 2022). The California government's energy-efficiency programs have contributed to low per-capita energy consumption. Driven by high demand from California's many motorists, major airports, and military bases, the transportation sector is the State's largest energy consumer. More motor vehicles are registered in California than in any other state, and worker commute times are among the longest in the country.

5.1.2 Petroleum

California is one of the top producers of crude oil in the nation, with output accounting for more than one-tenth of total United States production. Drilling operations are concentrated primarily in Kern County and the Los Angeles Basin, although substantial production also takes place offshore in both State and federal waters. Concerns regarding the cumulative impacts of offshore oil and gas development, combined with a number of major marine oil spills throughout the world in recent years, have led to a permanent moratorium on offshore oil and gas leasing in California waters and a deferral of leasing in federal waters. However, development on existing State and federal leases is unaffected and may still occur within offshore areas leased prior to the effective date of the moratorium.

A network of crude oil pipelines connects production areas to refining centers in the Los Angeles area, the San Francisco Bay area, and the Central Valley. California refiners also process large volumes of Alaskan and foreign crude oil received at ports in Los Angeles, Long Beach, and the Bay Area. Crude oil production in California and Alaska is in decline, and California refineries have become increasingly dependent on foreign imports. Led by Saudi Arabia and Ecuador, foreign suppliers now provide more than two-fifths of

the crude oil refined in California; however, California's dependence on foreign oil remains less than the national average.

California ranks third in the United States in petroleum refining capacity and accounts for more than one-tenth of total United States capacity. California's largest refineries are highly sophisticated; they are capable of processing a wide variety of crude oil types and are designed to yield a high percentage of light products like motor gasoline. To meet strict federal and State environmental regulations, California refineries are configured to produce cleaner fuels, including reformulated motor gasoline and low-sulfur diesel. Most California motorists are required to use a special motor gasoline blend called California Clean Burning Gasoline. In the ozone non-attainment areas of Imperial County and the Los Angeles metropolitan area, motorists are required to use California Oxygenated Clean Burning Gasoline, and the Los Angeles area is also required to use oxygenated motor gasoline during the winter months. By 2004, California completed a transition from methyl tertiary butyl-ether (MTBE) to ethanol as a gasoline oxygenate additive, making California the largest ethanol fuel market in the United States. Four ethanol production plants are located in central and southern California, but most of California's ethanol supply is transported by rail from corn-based producers in the Midwest. Some supply is also imported from abroad.

5.1.3 Natural Gas

California natural gas production typically accounts for less than 2% of total annual United States production and satisfies less than one-fifth of State demand. Production takes place in basins located in northern and southern California, as well as offshore in the Pacific Ocean. California receives most of its natural gas by pipeline from production regions in the Rocky Mountains, the Southwest, and western Canada. As with crude oil production, California natural gas production is in decline. However, State supply has remained relatively stable due to increasing amounts of natural gas shipped from the Rocky Mountains. California markets are served by two key natural gas trading centers—the Golden Gate Center in northern California and the California Energy Hub in southern California—and the State has nearly a dozen natural gas storage facilities that help stabilize supply. In part to help meet California's demand for natural gas, several companies have proposed building liquefied natural gas (LNG) import terminals in southern California.

5.1.4 Coal, Electricity, and Renewables

Natural gas-fired power plants typically account for more than one-half of the State's electricity generation. California is one of the largest hydroelectric power producers in the United States, and with adequate rainfall, hydroelectric power typically accounts for close to one-fifth of State electricity generation. California's two nuclear power plants account for almost one-fifth of total generation. Due to strict emission laws, only a few small coal-fired power plants operate in California.

California leads the nation in electricity generation from nonhydroelectric renewable energy sources. California generates electricity using wind, geothermal, solar, fuel wood, and municipal solid waste/ landfill gas resources. A facility known as "The Geysers," located in the Mayacamas Mountains north of

San Francisco, is the largest complex of geothermal power plants in the world, with more than 750 megawatts of installed capacity. California has numerous wind farms in five major wind resource areas, and several new projects are currently under construction. The world's largest solar power facility operates in California's Mojave Desert. Two southern California utilities are planning to build new solar farms, a 500-megawatt facility in the Mojave Desert and a 300-megawatt plant in the Imperial Valley. These proposed plants would dwarf existing United States solar generation capacity. To further boost renewable energy use, California's Energy Action Plan includes incentives that encourage Californians to install solar power systems on their rooftops.

Due to high electricity demand, California imports more electricity than any other state. States in the Pacific Northwest deliver power to California markets primarily from hydroelectric sources, while states in the Desert Southwest deliver power primarily from coal- and natural gas-fired sources. Hydroelectric power comes to California primarily through the Western USA interconnection, which runs from northern Oregon to southern California. The system, also known as the Pacific Intertie, is the largest single electricity transmission program in the United States. Although the system was originally designed to transmit electricity south during California's peak summer demand season, flow is sometimes reversed overnight and has occasionally been reversed during periods of reduced hydroelectric generation in the Northwest. California restricts the use of coal-fired generation within its boundaries; however, the Los Angeles Department of Water and Power (LADWP) operates the coal-fired Intermountain power plant in Utah, which delivers three-fourths of its output to LADWP and other California municipal utilities. A recent California law forbids utilities from entering into long-term contracts with conventional coal-fired power producers. Intermountain's existing contracts with southern California cities are set to expire in 2027.

In 2000 and 2001, California suffered an energy crisis characterized by electricity price instability and four major blackouts that was caused by a supply-and-demand imbalance. Multiple factors contributed to this imbalance, including: a heavy dependence on out-of-State electricity providers, drought conditions in the Pacific Northwest that reduced hydroelectric power generation, a rupture on a major natural gas pipeline supplying California power plants, strong economic growth leading to increased electricity demand in western states, an increase in unplanned power plant outages, and unusually high temperatures that increased electricity demand for air conditioning and other cooling uses. Following the energy crisis, the California State government created an Energy Action Plan designed to eliminate outages and excessive price spikes. To achieve these goals, the plan calls for optimizing energy conservation, building sufficient new generation facilities, upgrading and expanding the electricity transmission and distribution infrastructure, and ensuring that generation facilities can quickly come online when needed.

5.2 ENERGY CONSUMPTION IN CALIFORNIA/SAN BERNARDINO COUNTY

The following statistics have been provided by the CEC. Statistics are current through 2021.

5.2.1 Electricity

Fueled by population growth, the demand for electricity in California is increasing. At the same time, the mandate to decrease GHG emissions is looming. California's electricity mix is generated by natural gas (50.3%); coal (0.2%); large hydro (6.2%); nuclear (8.5%); and renewable (33.4%). San Bernardino County's electrical usage in 2021 is shown in Table 5-1.

Table 5-1: Annual Electric Consumption in San Bernardino County (2021)

Type of Consumer	Millions of kilowatt-hours (kWh)
Residential	5,800
Nonresidential	10,381
Total	16,181

Source: California Energy Commission. Energy Consumption Database (2022). Website: www.ecdms.energy.ca.gov (accessed December 2022)
Kwh = Unit of power equal to 1,000 watts of electricity consumed in 1 hour.

California is the fourth-largest electricity producer in the nation and accounted for about 5% of United States utility-scale (1-megawatt and larger) electricity net generation in 2021. Renewable resources, including hydropower and small-scale (less than 1-megawatt), customer-sited solar photovoltaic (PV) systems supplied nearly half of California's total in-state electricity generation despite a decline in hydroelectric generation caused by drought. Natural gas-fired power plants provided more than two-fifths of the State's total net generation and about half of California's utility-scale generation (EIA 2022).

5.2.2 Natural Gas Consumption in California/San Bernardino County

Electricity generation is the largest user of natural gas, using about half of all natural gas in the State. The residential sector uses 50% of the natural gas (Table 5-2) consumption in San Bernardino County.

Table 5-2: Natural Gas Consumption in San Bernardino County (2021) in Millions of Therms

Land Use	Millions of Therms
Residential	257
Nonresidential	305
Total	562

Source: California Energy Commission. Energy Consumption Database (2022). Website: www.ecdms.energy.ca.gov (accessed December 2022)
Therm = Unit of heat containing 100,000 British thermal units (Btu)

5.2.3 Liquid Petroleum Gas (Propane)

Liquefied petroleum gas (LPG) is a mixture of gaseous hydrocarbons (mainly propane and butane) that change into liquid form under moderate pressure. LPG (usually called propane) is commonly used as a

fuel for rural homes for space and water heating, as a fuel for barbecues and recreational vehicles, and as a transportation fuel. It is normally created as a byproduct of petroleum refining and from natural gas production.

LPG is generally an unregulated fuel in California (except for storage and safety issues, which are regulated). Because it is an unregulated commodity, the State does not collect data on LPG sales or usage. As such, statistics are unavailable for LPG as a fuel for rural homes, for space and water heating, or for barbecues, and none are contained in the body of this technical report.

5.2.4 Traditional Transportation Fuels (Fossil Fuels)

Fossil fuels are energy resources that come from the remains of plants and animals that are millions of years old. The three fossil fuels—petroleum oil, natural gas, and coal—are overwhelmingly responsible for providing the energy that powers our lifestyles and economy, and fuels our transportation system. They are the bedrock we base our energy mix on, but they are a limited resource. Once they are gone, they can no longer be part of our energy mix.

Fossil fuels' issue, in addition to their unsustainability, is their negative environmental impact. The burning of fossil fuels is responsible for emissions that contribute to global climate change, acid rain, ozone problems, and unhealthy air. As such, the development of alternatives to traditional transportation fuels is a priority.

5.2.5 Alternatives to Traditional Transportation Fuels

Alternatives to traditional transportation fuels are being developed and introduced into the consumer marketplace. Alternative fuels currently in use in the United States are:

- Compressed natural gas (CNG)
- Electricity
- Ethanol, 85 Percent (E85)
- Hydrogen
- LNG
- LPG

Information on alternatively fueled transportation was prepared by the Energy Information Administration (EIA), the independent statistical and analytical agency within the Department of Energy (DOE). Each year, the EIA collects data on the number of alternative fuel vehicles (AFVs) supplied, and for a limited set of fleet user groups, the number of AFVs in use and the amount of alternative transportation fuel consumed. The user groups surveyed are federal and State governments, alternative fuel providers, and transit companies. An estimated 436,921 and 42,460 AFVs were in use in the United States and California, respectively, in 2017 (see Table 5-3).

Table 5-3: Alternative Fuel Vehicles in Use by Fuel Type in 2017

Fuel Type	United States	California
Compressed Natural Gas (CNG)	25,969	8,474
Electricity	10,574	3,014
Ethanol, 85% (E85)	393,553	29,705
Hydrogen	59	52
Liquefied Natural Gas (LNG)	383	252
Liquefied Petroleum Gas (LPG)	6,383	963
Total	436,921	42,460

Source: United States Energy Information Administration, Alternative Fuels Data Center (www.eia.gov/renewable/afv/users.php, accessed December 2022).

The estimated consumption of alternative fuels (in thousand gasoline-equivalent gallons) in California during 2017 (the most recent data available) is shown in Table 5-4.

Table 5-4: Estimated Consumption of Alternative Fuels in California by Fuel Type, 2017 (thousand gasoline-equivalent gallons)

CNG	Electricity	E85	Hydrogen	LNG	LPG	Total
73,354	266	1,485	123	2,152	1,233	78,613

Source: United States Energy Information Administration, Alternative Fuels Data Center (www.eia.gov/renewable/afv/users.php, accessed December 2022).

6 IMPACT EVALUATION

6.1 ENERGY CONSUMPTION

6.1.1 No Project Alternative

6.1.1.1 Construction Impacts

The No Project Alternative includes planned expansion, improvement projects, and routine maintenance activities for the existing roadway system and transit facilities. These projects under the No Project Alternative are not anticipated to have potentially significant environmental impacts due to wasteful, inefficient, or unnecessary consumption of energy resources. With compliance with applicable design guidelines and policies, San Bernardino Regional Greenhouse Gas Plan, and the City of Rancho Cucamonga's and the City of Ontario's General Plans, the No Project Alternative during construction would not result in wasteful, inefficient, or necessary consumption of energy resources.

6.1.1.2 Operational Impacts

The No Project Alternative includes planned expansion, improvement projects, and routine maintenance activities for the existing roadway system and transit facilities. These projects under the No Project Alternative are not anticipated to have potentially significant environmental impacts due to wasteful, inefficient, or unnecessary consumption of energy resources. With compliance with applicable design guidelines and policies, San Bernardino Regional Greenhouse Gas Plan, and the City of Rancho Cucamonga's and the City of Ontario's General Plans, the No Project Alternative during operation would not result in the wasteful, inefficient, or necessary consumption of energy resources.

6.1.2 Proposed Project

6.1.2.1 Construction Impacts

The proposed Project consists of four key components: stations, tunnel, MSF, and emergency access and vent shaft. The proposed Project includes the Cucamonga Metrolink Station, ONT, and the 4.2-mile-long footprint for the underground tunnel that generally travels south along Milliken Avenue and crosses beneath 6th Street in the City of Rancho Cucamonga, as well as 4th Street, I-10, and the UPRR in the City of Ontario, before traveling west beneath East Airport Drive to connect the Cucamonga Metrolink Station to ONT.

Construction would require energy for the manufacture and transportation of building materials, preparation of the site for grading and tunnel boring activities, tunnel boring, utility installation, paving, and building construction and architectural coating. Petroleum fuels (e.g., diesel and gasoline) would be the primary sources of energy for these activities other than the tunnel boring, which would be electrically powered.

At the proposed MSF at the Cucamonga Metrolink Station, overhead Southern California Edison lines would need to be relocated underground and horizontally. The remainder of the utility relocations would be associated with the emergency access shafts and would include underground electric distribution cables, water lines, light pulls, fiber-optic lines, gas lines, and landscape irrigation lines.

Tunnel boring energy represents the greatest use of energy during construction. The proposed Project would construct a single tunnel (24-foot inner diameter bidirectional tunnel) between the Cucamonga Metrolink Station and ONT. Tunnel boring would occur up to 70 feet below the ground surface. Tunnel walls would be lined with precast concrete. Utilities within the tunnel would include drainage, electrical, and fire/life safety. Electrical power would be sourced through a local substation.

A TBM would be launched from either the existing ONT parking lot near Terminal 2 or the Cucamonga Metrolink Station to construct the tunnel. The TBM planned would use 10 kWh per linear foot of the planned 22,500-foot tunnel, thus requiring 225,000 kWh for the entire proposed Project. It would operate 6 days per week, with maintenance occurring each Sunday. A large crane would be used to deploy and recover the TBM. OIAA height limits at ONT and the Cucamonga Metrolink Station (135 feet and 160 feet, respectively) would restrict crane heights. Construction of the entire tunnel would take approximately 14 months. Both ends of the tunnel would need to be constructed via direct excavation (cut and cover) to launch or retrieve the TBM. Vehicle ramps connecting to the tunnel would be constructed via direct excavation as well.

Equipment at the TBM launch site would include trucks, a crane(s), excavators, a grout plant, a compressor plant, a tunnel fan, and cooling towers. The launch area would also store tunnel construction materials (e.g., rail for materials transport, pipe, ducts) and stockpile excavated material. Haul trucks would remove excavated material from the launch site at ONT.

Transportation energy would also occur from the transport and use of construction equipment, delivery vehicles and haul trucks, and construction worker vehicles that would use petroleum fuels (e.g., diesel fuel and/or gasoline). Construction trucks and vendor trucks hauling materials to and from the proposed Project site would be anticipated to use diesel fuel, whereas construction workers traveling to and from the proposed Project site would be anticipated to use a mix of gasoline-powered and diesel-powered vehicles. Fuel consumption from transportation uses depends on the type and number of trips, VMT, the fuel efficiency of the vehicles, and the travel mode.

Estimates of fuel consumption (diesel fuel and gasoline) from construction equipment, construction trucks, and construction worker vehicles were based on default construction equipment assumptions and trip estimates from CalEEMod and fuel efficiencies from EMFAC2021 and OFFROAD2021. Fuel consumption estimates are documented in Appendix A, Energy Calculations, and presented in Table 6-1.

Table 6-1: Proposed Project Energy Consumption Estimates During Construction

Energy Type	Total Energy Consumption	Annual Percentage Increase Countywide
Electricity (kWh)	225,000	<0.01%
Gasoline Fuel (total gallons)	208,307	0.01%
Diesel (total gallons)	2,601,770	0.20%

Source: AECOM 2024

As indicated in Table 6-1, over the entire 4-year construction process, the proposed Project would use approximately 225,000 kWh of electricity and consume approximately 2,601,770 gallons of diesel fuel and approximately 208,307 gallons of gasoline. As reported previously, approximately 16,767,235,877 kWh were consumed in San Bernardino County in 2021. Therefore, construction of the proposed Project would increase the annual electricity consumption in San Bernardino County by less than 0.01%. As such, proposed Project construction would have a no impact on local, regional, and State electricity production.

Based on fuel consumption obtained from EMFAC2021, approximately 915.5 million gallons of gasoline and approximately 321.6 million gallons of diesel fuel were consumed from vehicles operating in San Bernardino County in 2022. Therefore, construction of the proposed Project would increase the annual fuel use in San Bernardino County by approximately 0.81% for diesel fuel usage and by approximately 0.02% for gasoline fuel usage. As such, the proposed Project construction would have a no effect on local, regional, and State energy supplies. The proposed Project would be required to comply with CARB's Airborne Toxics Control Measure, which restricts heavy-duty diesel vehicle idling time to 5 minutes; CARB's Truck and Bus Regulation; and federal fuel efficiency requirements, which would minimize fuel consumption. Therefore, because petroleum use during construction would be temporary and relatively minimal in comparison to overall usage, it would not be wasteful or inefficient.

In addition, the CalEEMod output for energy consumption incorporates proposed Project compliance with CCR Title 13, Section 2449, and with California Department of Resources Recycling and Recovery (CalRecycle) Sustainable (Green) Building Program regulations, which include implementation of standard control measures and Best Available Control Measures for equipment emissions and materials recycling.

Best Available Control Measures include, but are not limited to, requirements that the proposed Project construction contractors utilize only low-sulfur fuel with a sulfur content of 15 parts per million by weight or less; ensure off-road vehicles (i.e., self-propelled diesel-fueled vehicles 25 horsepower and up that were not designed to be driven on the road) limit vehicle idling to 5 minutes or less; register and label vehicles in accordance with the CARB Diesel Off-Road Online Reporting System; restrict the inclusion of older vehicles into fleets; and retire, replace, or repower older engines or install Verified Diesel Emission Control Strategies (i.e., exhaust retrofits). Additionally, the construction contractor is required to recycle/reuse at least 65% of the nonhazardous construction and demolition waste and would comply with mandatory

provisions of Part 6 of the Title 24 Building Energy Efficiency Standards and Part 11 referred to as California Green Building Standards Code, or CALGreen.

In addition, construction activities are not anticipated to result in an inefficient use of energy as gasoline and diesel fuel would be supplied by construction contractors who would conserve the use of their supplies to minimize their costs on the proposed Project. The proposed Project would not cause or result in the need for additional energy facilities or an additional or expanded delivery system. In addition, no unusual characteristics related to the build of the proposed Project would necessitate the use of construction equipment that would be less energy-efficient than at comparable construction sites in the region or the State. For these reasons, fuel consumption during construction would not be inefficient, wasteful, or unnecessary.

6.1.2.2 Construction of the three passenger stations, tunnel, one of the vent shafts (vent shaft design option 2 or vent shaft design option 4), and MSF Operational Impacts

Operational energy use is typically associated with natural gas use, electricity consumption, and fuel used for vehicle trips associated with a project. The proposed Project would result in a reduction in vehicle use, as the proposed Project would encourage mode shift from automobiles to transit. Thus, the energy usage associated with gasoline and diesel fuel consumed would also be reduced with implementation of the proposed Project. However, as reported in the Transportation Technical Report (SBCTA 2024d), the reduction would be less than 0.01% of the regional VMT.

Operational energy consumption for the proposed Project would primarily be from the MSF operations, shuttle station operations, and electric shuttle charging. Energy use from MSF operations was estimated using default energy intensities by land use type in CalEEMod. Electrical consumption for shuttle station operations was estimated from design parameters supplied by the design engineers at 15 kWh per year per square foot. Each station is approximately 10,000 square feet, thus total electrical consumption for shuttle station operations would be 450,000 kWh per year. Electrical consumption for electric shuttle charging was estimated at 2.5 kWh per mile from design parameters supplied by the design engineers. Proposed Project plans indicate each shuttle would average 50 miles per day and there would be up to 80 shuttles operating. Thus, assuming 20 hours per day and 365 days per year, total electrical consumption for electric shuttle charging would be 73,584,000 kWh per year.

Electricity and natural gas estimates associated with the proposed Project are shown in Table 6-2.

Table 6-2: Proposed Project Annual Energy Consumption During Operations

Energy Type	Annual Electricity Consumption (kWh/yr)	Annual Percentage Increase Countywide	Annual Natural Gas Consumption (kBTU/yr)	Annual Percentage Increase Countywide
Maintenance Energy	95,377	0.46%	428,861	<0.01%
Shuttle Charging	73,584,000		0	
Shuttle Station Operations	450,000		0	
Total	74,129,377		428,861	

Source: AECOM 2024
kBTU = thousand British thermal units
kWh/yr = kilowatt-hours per year

As identified in Table 6-2, uses on the proposed Project site would demand a total of 74,129,377 kWh of electricity per year and 428,861 kBTU of natural gas per year. Based on electricity consumption obtained from the CEC, approximately 16,180,811,158 kWh were consumed in San Bernardino County in 2021. Therefore, operation of the proposed Project would increase the annual electricity consumption in San Bernardino County by less than 0.46%. Based on natural gas consumption obtained from the CEC, approximately 561,360,617 therms were consumed in San Bernardino County in 2021. One therm equals approximately 100,000 BTU. Therefore, operation of the proposed Project would increase annual natural gas consumption in San Bernardino County by less than 0.01%.

The State of California provides a minimum standard for building design and construction standards through Title 24 of the CCR, known as the California Building Code (CBC). The CBC is updated every 3 years, and the current 2022 CBC went into effect in January 2023 and is applicable to the proposed Project. The California Building Standards Commission (CBSC) adopted Part 6 of the Title 24 Building Energy Efficiency Standards and adopted Part 11 (also referred to as the California Green Building Standards Code, or CALGreen Code) in 2010 as part of the State's efforts to reduce GHG emissions and energy consumption from residential and nonresidential buildings. CALGreen covers the following five categories: (1) planning and design; (2) energy efficiency; (3) water efficiency and conservation; (4) material conservation and resource efficiency; and (5) indoor environmental quality. The proposed Project would comply with the current 2022 CALGreen Code requirements and Title 24 efficiency standards, which would further improve energy efficiency during operation. Compliance with applicable Title 24 standards would ensure that operational Project energy demands would not be inefficient, wasteful, or otherwise unnecessary.

Energy use associated with operation of the three passenger stations, tunnel, one of the vent shaft design options (2 or 4), and MSF have been analyzed as part of the proposed Project as described previously. As previously discussed, operation of the proposed Project would increase the annual electricity consumption in San Bernardino County by less than 0.46% and annual natural gas consumption in San

Bernardino County by less than 0.01%. Further, compliance with applicable Title 24 standards would ensure that operational proposed Project energy demands would not be inefficient, wasteful, or otherwise unnecessary.

6.2 CONSISTENCY WITH APPLICABLE STATE AND LOCAL PLANS RELATED TO RENEWABLE ENERGY OR ENERGY EFFICIENCY

6.2.1 No Project Alternative

6.2.1.1 Construction Impacts

The No Project Alternative includes planned expansion, improvement projects, and routine maintenance activities for the existing roadway system and transit facilities. These projects under the No Project Alternative are not anticipated to conflict with or obstruct a state or local plan for renewable energy or energy efficiency. With compliance with applicable design guidelines and policies, San Bernardino Regional Greenhouse Gas Plan, and the City of Rancho Cucamonga's and the City of Ontario's General Plans, the No Project Alternative during construction would not conflict with or obstruct a State or local plan for renewable energy or energy efficiency.

6.2.1.2 Operational Impacts

The No Project Alternative includes planned expansion, improvement projects, and routine maintenance activities for the existing roadway system and transit facilities. These projects under the No Project Alternative are not anticipated to conflict with or obstruct a state or local plan for renewable energy or energy efficiency. With compliance with applicable design guidelines and policies, San Bernardino Regional Greenhouse Gas Plan, and the City of Rancho Cucamonga's and the City of Ontario's General Plans, the No Project Alternative during operation would not conflict with or obstruct a State or local plan for renewable energy or energy efficiency.

6.2.2 Proposed Project

The proposed Project's consistency with the applicable State and local plans is discussed subsequently.

6.2.2.1 Consistency with the Infrastructure Investment and Jobs Act

Transportation and access to the proposed Project site is provided by the local and regional roadway systems. The purpose of the proposed Project is to reduce VMT by providing a transit system alternative and is an investment in infrastructure. The proposed Project is therefore consistent with, and would not otherwise interfere with or obstruct, implementation of the Infrastructure Investment and Jobs Act.

6.2.2.2 Consistency with Title 24, California Building Code, Part 6

The California Energy Code is a building code for Building Energy Efficiency Standards for Residential and Nonresidential Buildings that imposes building standards to reduce energy consumption through efficient

lighting and heating standards among other requirements. Energy-efficient buildings require less electricity and reduce fossil fuel consumption. Buildings whose permit applications are submitted after January 1, 2023, must comply with the 2022 California Energy Code. Revisions to this code would result in greater energy efficiency. The building efficiency standards are enforced through the local building permit process. The proposed Project would therefore be consistent with the energy-efficiency provisions of Title 24, California Building Code, Part 6.

6.2.2.3 Consistency with Title 24, California Building Code, Part 11, California Green Building Standards Code

The CALGreen Code establishes mandatory measures for residential and nonresidential building construction and encourages sustainable construction and operations practices in the following five categories, which lessen GHGs and increase energy efficiency: (1) planning and design, (2) energy efficiency, (3) water efficiency and conservation, (4) material conservation and resource efficiency, and (5) indoor environmental quality. Although the CALGreen Code was adopted as part of the State's efforts to reduce GHG emissions, the CALGreen Code standards have co-benefits of reducing energy consumption from residential and nonresidential buildings. The most recent update consisting of 2022 CALGreen Code standards became effective on January 1, 2023. The Cities of Ontario and Rancho Cucamonga have both adopted both the CBC and CALGreen Code standards pertaining to energy conservation as part of their municipal codes. Therefore, the proposed Project stations and MSF would comply with the CBC and CALGreen Code standards pertaining to energy conservation and efficiency in effect at the time of construction, and the proposed Project would be consistent with applicable plans related to renewable energy and energy efficiency.

6.2.2.4 Consistency with SCAG RTP/SCS

SCAG's 2020–2045 RTP/SCS (Connect SoCal) establishes GHG emissions goals for automobiles and light-duty trucks and implements an overall VMT reduction target for the region consistent with the statewide VMT reduction targets under SB 375. By furthering the goal of reducing VMT, the RTS/SCS has the effect of reducing energy consumption. The proposed Project involves the development of an autonomous electric vehicle shuttle system to reduce vehicle traffic. The proposed Project would therefore be consistent with, and would not otherwise interfere with or obstruct, implementation of the RTP/SCS.

6.2.2.5 Consistency Climate Action Plans

As discussed in the *Greenhouse Gas Emissions Technical Report* (SBCTA 2024e), to demonstrate compliance with the Ontario 2022 Community Climate Action Plan (CCAP) (City of Ontario 2022) and the Rancho Cucamonga Climate Action Plan (CAP) (City of Rancho Cucamonga 2021), the proposed Project would implement various measures associated with waste reduction and energy and water demand reduction. The energy reduction measures the proposed Project has committed to are provided in Table 6-3 and Table 6-4. As shown, the proposed Project would be consistent with the Ontario 2022 CCAP and the Rancho Cucamonga CAP, resulting in a more energy-efficient proposed Project.

Table 6-3: Ontario Community Climate Action Plan GHG Reduction Strategies

Strategy Number	Strategy Name	Strategy Language	Project Consistency
10	Increase Transportation Ridership	Ensure a reliable and responsive transit system with dedicated and secure funding and resources to support increased ridership.	Consistent: The Project is a transit system with adequate funding and resources.
12	Community Vehicle Electrification	Promote and incentivize the adoption of electric vehicles citywide, including light-duty and heavy-duty vehicles, for municipal, commercial, and residential uses.	Consistent: The Project consists of electric shuttles.
13	Active Transportation Networks	Work with transit agencies, school districts, and employers to facilitate an interconnected transportation system that allows a shift in travel from private passenger vehicles to alternative modes, including public transit, ride sharing, car sharing, bicycling, and walking.	Consistent: The Project's purpose is to provide an alternative to private passenger vehicles.
15	Parking Policy and Event Parking	Adopt a comprehensive parking policy that encourages carpooling and the use of alternative transportation, including providing parking stalls for car-share vehicles at convenient locations with access to public transportation.	Consistent: The Project's purpose is to provide alternative transportation to private passenger vehicles.
22	Water Efficient Landscapes and Water Recycling	Promote drought-tolerant and fire-wise landscaping. Encourage increased use of reclaimed water for landscape irrigation, agricultural, and industrial use.	Consistent: The Project would include drought-resistant landscaping.

Source: Ontario Community Climate Action Plan (August 2022).

6.2.2.6 Consistency with Cities of Ontario and Rancho Cucamonga General Plans

As discussed previously, the Cities of Ontario and Rancho Cucamonga have General Plan policies that help reduce energy consumption. The proposed Project would not interfere with either City's goals to reduce energy, as shown in Table 6-4.

6.2.2.7 Summary

The proposed Project would be required to adhere to, and would be consistent with, all federal, State, and local requirements for energy efficiency, including the Title 24 standards. The Title 24 building energy-efficiency standards establish minimum efficiency standards related to various building features, including appliances, water and space heating and cooling equipment, building insulation and roofing, and lighting, which would reduce energy usage. As such, fuel, electricity, and natural gas demand associated with proposed Project operations would not be considered inefficient, wasteful, or unnecessary in comparison to other similar developments in the region.

Table 6-4: Rancho Cucamonga's CAP GHG Reduction Strategies

Goals and Strategies	Project Consistency
Goal 1: Zero Emissions and Clean Fuels. A community that uses zero-emission vehicles and clean vehicles to move people and goods.	Consistent: The proposed Project is a transit system that uses zero-emissions shuttles.
Goal 8: Water Conservation. A community that conserves and recycles water.	Consistent: The proposed Project would include drought-resistant landscaping.
Goal 11: Regional Mobility Hub. A multimodal transportation hub that connects regional and local destinations through a symbiotic relationship with regional partners.	Consistent: The proposed Project is a transit system that connects local destinations.
Goal 12: Active Transportation. A first-class pedestrian and bicycle network that fosters safe and connected access to non-motorized travel and recreation.	Consistent: The proposed Project consists of nonmotorized electric shuttles.
Goal 13: Sustainable Transportation. A transportation network that adapts to changing mobility needs while preserving sustainable community values.	Consistent: The proposed Project t is a transit system that is to adapt to changing mobility needs.

Source: Rancho Cucamonga Climate Action Plan (December 2021).

The proposed Project, including the three passenger stations, tunnel, one of the vent shaft design options (2 or 4), and MSF, have been evaluated for consistency with applicable State and local plans. As discussed in Section 6.2.2, the proposed Project would be required to adhere to, and would be consistent with, all federal, State, and local requirements for energy efficiency, including the Title 24 standards. Therefore, construction and operation of the proposed Project would not conflict with or obstruct a State or local plan for renewable energy or energy efficiency.

7 MITIGATION MEASURES AND IMPACTS AFTER MITIGATION

7.1 MITIGATION MEASURES FOR ENERGY

No mitigation measure would be required for the implementation of the No Project Alternative or the proposed Project.

7.2 CEQA SIGNIFICANCE CONCLUSION

7.2.1 Would the Project Result in a Potentially Significant Environmental Impact Due to Wasteful, Inefficient, or Unnecessary Consumption of Energy Resources During Project Construction or Operation?

7.2.1.1 No Project Alternative

Compliance with applicable design guidelines and policies, San Bernardino Regional Greenhouse Gas Plan, and the City of Rancho Cucamonga's and the City of Ontario's General Plans would ensure that implementation of the No Project Alternative would result in less than significant impact.

7.2.1.2 Proposed Project

7.2.1.2.1 Construction Impacts

As discussed in Section 6.1.2.1 and shown in Table 6-1, construction of the proposed Project, including boring the 4.2-mile tunnel, and constructing one of the vent shaft design options (2 or 4), three passenger stations and MSF, would have a negligible effect on local, regional, and State energy supplies. In addition, construction activities would be required to comply with California Air Resources Board 's Airborne Toxics Control Measure, which restricts heavy-duty diesel vehicle idling time to 5 minutes; California Air Resources Board 's Truck and Bus Regulation; federal fuel efficiency requirements, which would minimize fuel consumption; and California Code of Regulations Title 13, Section 2449, and with California Department of Resources Recycling and Recovery (CalRecycle) Sustainable (Green) Building Program regulations, which include implementation of standard control measures and Best Available Control Measures for equipment emissions and materials recycling. Additionally, the construction contractor is required to recycle/reuse at least 65% of the nonhazardous construction and demolition waste and will comply with mandatory provisions of Part 6 of the Title 24 Building Energy Efficiency Standards and Part 11 referred to as California Green Building Standards Code, or CALGreen. Overall, the proposed Project would not cause or result in the need for additional energy facilities or an additional or expanded delivery system. In addition, no unusual characteristics related to the build of the proposed Project would necessitate the use of construction equipment that would be less energy-efficient than at comparable construction sites in the region or the State. Therefore, the proposed Project energy demands during construction would not be inefficient, wasteful, or otherwise unnecessary and energy impacts from construction would be less than significant.

7.2.1.2.2 Operational Impacts

Operation of the proposed Project, including the tunnel, one of the vent shaft design options (2 or 4), three passenger stations and MSF, would increase the annual electricity consumption in San Bernardino County by less than 0.46% and annual natural gas consumption in San Bernardino County by less than 0.01%. In addition, the proposed Project would comply with the current 2022 CALGreen Code requirements and Title 24 efficiency standards, which would further improve energy efficiency during operation. Compliance with applicable Title 24 standards would ensure that operational energy demands resulting from the proposed Project would not be inefficient, wasteful, or otherwise unnecessary. Therefore, energy impacts from operation of the proposed Project would be less than significant.

7.2.2 Would the Project Conflict with or Obstruct a State or Local Plan for Renewable Energy or Energy Efficiency?

7.2.2.1 No Project Alternative

With compliance with applicable design guidelines and policies, San Bernardino Regional Greenhouse Gas Plan, and the City of Rancho Cucamonga's and the City of Ontario's General Plans, the No Project Alternative would have a less than significant impact.

7.2.2.2 Proposed Project

The proposed Project, including the tunnel, one of the vent shaft design options (2 or 4), three passenger stations and MSF, would be required to adhere to, and would be consistent with, all federal, State, and local requirements for energy efficiency during construction and operation, including the Intermodal Surface Transportation Efficiency Act of 1991, Transportation Equity Act for the 21st Century, Title 24 standards, Southern California Association of Governments' 2020–2045 Regional Transportation Plan/Sustainable Communities Strategy, Climate Action Plans, and the General Plans for the Cities of Ontario and Rancho Cucamonga. Therefore, construction and operation of the proposed Project would not conflict with or obstruct a State or local plan for renewable energy or energy efficiency. Impacts would be less than significant.

8 REFERENCES

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Ontario International Airport Connector Project

ONTCONNECTOR

APPENDIX I: ENERGY TECHNICAL REPORT (APPENDIX A)

October 2024

sbcta

Prepared for:

San Bernardino County Transportation Authority
1170 West Third Street, Second Floor
San Bernardino, California 92410-1715

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RC Tunnel Boring Machine - Off Road Equipment

Equipment Emissions Factors https://goo.gl/maps/BSVtDazZVQfuJxWk9

Equipment	Equipment Description	HP[1.]	Fuel Consumption (gal/hp-hr)	Load Factor	Usage Factor	Factor (g/hp-hr) CO_2
Bobcat T650	Tractors/Loaders/Backhoes	74.3	0.019	0.37	0.70	194.4212
CAT 200	Excavator	118	0.020	0.38	0.70	201.5985
CAT 308 Excavator	Excavator	69.5	0.020	0.38	0.70	203.8905
CAT 320	Excavator	172	0.020	0.38	0.70	201.5985
CAT 350	Excavator	414	0.020	0.38	0.70	201.3185
CAT 963D	Tractors/Loaders/Backhoes	189	0.019	0.37	0.70	194.4147
CAT CS44B 1[2.]	Roller	100.6	0.019	0.38	0.70	198.1089
CAT D4	Rubber Tired Dozer	130	0.019	0.40	0.70	190.4557
CAT M322F Wheel Excavator	Excavator	169	0.020	0.38	0.70	201.5985
Concrete Trucks[3.]	Off-Highway Trucks	400	0.020	0.38	0.70	202.0881
Doosan XP825-HP750	Air Compressor	266	0.016	0.48	0.70	164.9749
Generac MLT4060MV-STD 6kW[4.]	Generator Sets	12.2	0.042	0.74	0.70	420.5477
Genie GTH-1056 Telehandler	Forklift	121	0.010	0.20	0.70	106.0205
Genie GTH-5519 Telehandler	Forklift	74	0.010	0.20	0.70	104.6385
Liebherr LB36	Bore/Drill Rig	523	0.026	0.50	0.70	261.8643
Linkbelt LS248H	Crane	270	0.015	0.29	0.70	151.9901
MQ Power Whisperwatt	Generator Sets	300	0.016	0.74	1	164.9749
Muck Trucks[4.]	Other Construction Equipment	5.5	0.024	0.42	0.70	244.8642
Skyjack SJ86T Manlift	Aerial Lift	74	0.016	0.31	0.70	162.6890
Takeuchi TB235-2	Excavator	24.4	0.022	0.38	0.70	223.8902
Trucks for material[3.]	Off-Highway Trucks	400	0.020	0.38	0.70	202.0881
Volvo L50 Wheel Loader	Tractors/Loaders/Backhoes	90	0.019	0.37	0.70	195.1959
Yanmar ViO55	Excavator	48.4	0.022	0.38	0.70	224.1851

Cells with this contain equipment in a double shift. [accounted for in count]

Notes:

1. Horsepowers are gathered through an internet search as well as emails with clients
2. Even though it does go over the speed bin, the horsepower is so close to 100 we assume it is 100.
3. Assumed to be one vehicle
4. Lower hp bin unavailable since no hourly data, went with closest available bin

Equipment Schedule (daily counts per month of construction)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29
Bobcat T650																							0.5	1	1	1	1	0.5	
CAT 200																													
CAT 308 Excavator																									0.5	1	1	0.5	
CAT 320																											1.5	3	3
CAT 350																													
CAT 963D																											0.5	1	1
CAT CS44B 1																													
CAT D4																													
CAT M322F Wheel Excavator																							0.5	1	1	1	1	0.5	
Concrete Trucks																													
Doosan XP825-HP750																													
Generac MLT4060MV-STD 6kW																													
GenieGTH-1056 Telehandler																							0.5	1	0.5				
Genie GTH-5519 Telehandler																													
Liebherr LB36																									0.5	1	1	0.5	
Linkbelt LS248H																											0.5	1	1
MQ Power Whisperwatt																													
Muck Trucks																													
Skyjack SJ86T Manlift																									0.5	1	1	0.5	
Takeuchi TB235-2																											1	2	2
Trucks for material																							0.5	1	1	1	1.5	1.5	1
Volvo L50 Wheel Loader																							0.5	1	0.5				
Yanmar ViO55																							0.5	1	0.5				

Pollution based on Schedule (tons/month)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29
CO_2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.2	12.4	18.8	25.2	35.1	32.5	19.9

Pollution based on Schedule (lbs/day)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29
CO_2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	479.9	959.9	1456.8	1953.8	2724.6	2518.5	1541.6

Diesel Use based on Schedule (gallons/month)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29
Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	550	1101	1670	2240	3124	2888	1768

Diesel Use based on Schedule (gallons/day)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29
Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	43	65	87	121	112	69

RC Tunnel Boring Machine - Off Road Equipment

Month																												
M30	M31	M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
																1	1	1	4	4	4	4	4	4						
																1	1	0.5												
3	3	3	1.5																											
																									1	0.5				
1	1	1	0.5																											
																1	1	0.5							1	0.5				
	1	2	2	2	2	2	2	2	2	2	2	2	2	2					2	2	2	2	2	2						
	1	2	2	2	2	2	2	2	2	2	2	2	2	2					2	2	2	2	2	2						
	3	6	6	6	6	6	6	6	6	6	6	6	6	6					10	10	10	10	10	10						
																			2	2	2	2	2	2						
	1	2	2	2	2	2	2	2	2	2	2	2	2	2																
1	2	3	2.5	2	2	2	2	2	2	2	2	2	2	2					2	2	2	2	2	2						
	1	2	2	2	2	2	2	2	2	2	2	2	2	2					2	2	2	2	2	2						
2	2	2	1																											
1	2	3	2.5	2	2	2	2	2	2	2	2	2	2	2		1	1	1	2	2	2	2	2	2	1	0.5				
																1	1	0.5	2	2	2	2	2	2	1	0.5				
																1	1	1							1	0.5				

Month																												
M30	M31	M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
19.9	51.7	83.5	73.5	63.6	63.6	63.6	63.6	63.6	63.6	63.6	63.6	63.6	63.6	63.6	0.0	12.6	12.6	10.3	73.8	73.8	73.8	73.8	73.8	73.8	16.0	8.0	0.0	0.0	0.0	0.0

Month																												
M30	M31	M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
1541.6	4005.5	6469.5	5698.7	4927.9	4927.9	4927.9	4927.9	4927.9	4927.9	4927.9	4927.9	4927.9	4927.9	4927.9	0.0	976.8	976.8	798.5	5724.2	5724.2	5724.2	5724.2	5724.2	5724.2	1243.6	621.8	0.0	0.0	0.0	0.0

Month																												
M30	M31	M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
1768	4598	7429	6545	5661	5661	5661	5661	5661	5661	5661	5661	5661	5661	5661	0	1120	1120	916	6582	6582	6582	6582	6582	6582	1426	713	0	0	0	0

Month																												
M30	M31	M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
69	178	288	254	219	219	219	219	219	219	219	219	219	219	219	0	43	43	35	255	255	255	255	255	255	55	28	0	0	0	0

Vent Shaft - Off Road

Equipment Emissions Factors https://goo.gl/maps/99ETThasr2tBhu7A6

Equipment	Equipment Description	HP[1.]	Fuel Consumption (gal/hp-hr)	Load Factor	Usage Factor	Factor (g/hp-hr) CO_2
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Bobcat T650																													1	1	0.5		2
CAT 200																																	
CAT 308 Excavator																														1	0.5		
CAT 320																															1	2	
CAT 350																													1				
CAT 963D																															1	2	
CAT CS44B 1																																	
CAT D4																																	
CAT M322F Wheel Excavator																													1	1	0.5		2
Concrete Trucks																																	2
Doosan XP825-HP750																																	2
Generac MLT4060MV-STD 6kW																																	10
GenieGTH-1056 Telehandler																													1				2
Genie GTH-5519 Telehandler																																	
Liebherr LB36																														1	0.5		
Linkbelt LS248H																															1	2	2
MQ Power Whisperwatt																																	2
Muck Trucks																																	
Skyjack SJ86T Manlift																														1	0.5		
Takeuchi TB235-2																															1	2	
Trucks for material																													1	1	1.5	2	2
Volvo L50 Wheel Loader																													1				2
Yanmar ViO55																													1				2

Pollution based on Schedule (tons/month)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31	M32	M33
CO_2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.7	25.2	26.8	28.5	78.5

Pollution based on Schedule (lbs/day)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31	M32	M33
CO_2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1448.6	1953.8	2079.8	2205.8	6086.1

Diesel Use based on Schedule (gallons/month)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31	M32	M33
Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1661	2240	2385	2529	6996

Diesel Use based on Schedule (gallons/day)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31	M32	M33
Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64	87	92	98	271

Vent Shaft - Off Road

Month

M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
2	2																	2	2	2	1	0.5				
																					1	0.5				
2	2																	2	2	2						
2	2																	2	2	2						
2	2																	2	2	2						
10	10																	10	10	10						
2	2																	2	2	2						
2	2																	2	2	2						
2	2																	2	2	2						
2	2																	2	2	2	1	0.5				
2	2																	2	2	2	1	0.5				
2	2																	2	2	2	1	0.5				

Month

M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
78.5	78.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.5	78.5	78.5	10.4	5.2	0.0	0.0	0.0	0.0

Month

M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
6086.1	6086.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6086.1	6086.1	6086.1	803.6	401.8	0.0	0.0	0.0	0.0

Month

M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
6996	6996	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6996	6996	6996	921	461	0	0	0	0

Month

M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
271	271	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	271	271	271	36	18	0	0	0	0

ONT T4 - Off Road

Equipment Emissions Factors https://goo.gl/maps/Wh7RuhJoetaHh1u88

Equipment	Equipment Description	HP[1.]	Fuel Consumption (gal/hp-hr)	Load Factor	Usage Factor	Factor (g/hp-hr) CO_2
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CAT 308 Excavator	Excavator	69.5	0.020	0.38	0.70	203.8905
CAT 320	Excavator	172	0.020	0.38	0.70	201.5985
CAT 350	Excavator	414	0.020	0.38	0.70	201.3185
CAT 963D	Tractors/Loaders/Backhoes	189	0.019	0.37	0.70	194.4147
CAT CS44B 1[2.]	Roller	100.6	0.019	0.38	0.70	198.1089
CAT D4	Rubber Tired Dozer	130	0.019	0.40	0.70	190.4557
CAT M322F Wheel Excavator	Excavator	169	0.020	0.38	0.70	201.5985
Concrete Trucks[3.]	Off-Highway Trucks	400	0.020	0.38	0.70	202.0881
Doosan XP825-HP750	Air Compressor	266	0.016	0.48	0.70	164.9749
Generac MLT4060MV-STD 6kW[4.]	Generator Sets	12.2	0.042	0.74	0.70	420.5477
Genie GTH-1056 Telehandler	Forklift	121	0.010	0.20	0.70	106.0205
Genie GTH-5519 Telehandler	Forklift	74	0.010	0.20	0.70	104.6385
Liebherr LB36	Bore/Drill Rig	523	0.026	0.50	0.70	261.8643
Linkbelt LS248H	Crane	270	0.015	0.29	0.70	151.9901
MQ Power Whisperwatt	Generator Sets	300	0.016	0.74	1	164.9749
Muck Trucks[4.]	Other Construction Equipment	5.5	0.024	0.42	0.70	244.8642
Skyjack SJ86T Manlift	Aerial Lift	74	0.016	0.31	0.70	162.6890
Takeuchi TB235-2	Excavator	24.4	0.022	0.38	0.70	223.8902
Trucks for material[3.]	Off-Highway Trucks	400	0.020	0.38	0.70	202.0881
Volvo L50 Wheel Loader	Tractors/Loaders/Backhoes	90	0.019	0.37	0.70	195.1959
Yanmar ViO55	Excavator	48.4	0.022	0.38	0.70	224.1851

Cells with this contain equipment in a double shift. [accounted for in count]

Notes:

1. Horsepowers are gathered through an internet search as well as emails with clients
2. Even though it does go over the speed bin, the horsepower is so close to 100 we assume it is 100.
3. Assumed to be one vehicle
4. Lower hp bin unavailable since no hourly data, went with closest available bin

Equipment Schedule (daily counts per month of construction)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31	M32	M33
Bobcat T650																													1	1	1		
CAT 200																																	
CAT 308 Excavator																															1		
CAT 320																																4	4
CAT 350																																	
CAT 963D																																2	2
CAT CS44B 1																																	
CAT D4																																	
CAT M322F Wheel Excavator																													1	1	1		
Concrete Trucks																																	
Doosan XP825-HP750																																	
Generac MLT4060MV-STD 6kW																																	
GenieGTH-1056 Telehandler																													1	1			
Genie GTH-5519 Telehandler																																	
Liebherr LB36																															1		
Linkbelt LS248H																																2	2
MQ Power Whisperwatt																																	
Muck Trucks																																	
Skyjack SJ86T Manlift																															1		
Takeuchi TB235-2																																4	4
Trucks for material																													1	1	1	2	2
Volvo L50 Wheel Loader																													1	1			
Yanmar ViO55																													1	1			

Pollution based on Schedule (tons/month)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31	M32	M33
CO_2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.4	12.4	25.2	34.5	34.5

Pollution based on Schedule (lbs/day)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31	M32	M33
CO_2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	959.9	959.9	1953.8	2676.6	2676.6

Diesel Use based on Schedule (gallons/month)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31	M32	M33
Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1101	1101	2240	3069	3069

Diesel Use based on Schedule (gallons/day)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31	M32	M33
Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43	43	87	119	119

ONT T4 - Off Road

Month																								
M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
																1	1	1	0.5							
																4	4									
																					1	0.5				
																2	2									
																					1	0.5				
																					1	0.5				
2	2																	2	2	2						
2	2																	2	2	2						
10	10																	10	10	10						
2	2																	2	2	2						
2	2															2	2	2	2	2						
2	2																	2	2	2						
																4	4									
2	2															3	3	3	2.5	2	1	0.5				
																					1	0.5				
																1	1	1	0.5		1	0.5				

Month																								
M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
67.0	67.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.5	42.5	75.0	71.0	67.0	18.0	9.0	0.0	0.0	0.0	0.0

Month																								
M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
5193.6	5193.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3296.7	3296.7	5813.8	5503.7	5193.6	1396.5	698.2	0.0	0.0	0.0	0.0

Month																								
M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
5973	5973	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3780	3780	6684	6329	5973	1601	801	0	0	0	0

Month																								
M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
232	232	0	0	0	0	0	0	0	0	0	0	0	0	0	0	147	147	259	245	232	62	31	0	0	0	0

ONT T2 - Off Road

Equipment Emissions Factors https://goo.gl/maps/Jnmf9fKSYmd11xGf8

Equipment	Equipment Description	HP[1.]	Fuel Consumption (gal/hp-hr)	Load Factor	Usage Factor	Factor (g/hp-hr) CO_2
Bobcat T650	Tractors/Loaders/Backhoes	74.3	0.019	0.37	0.70	194.4212
CAT 200	Excavator	118	0.020	0.38	0.70	201.5985
CAT 308 Excavator	Excavator	69.5	0.020	0.38	0.70	203.8905
CAT 320	Excavator	172	0.020	0.38	0.70	201.5985
CAT 350	Excavator	414	0.020	0.38	0.70	201.3185
CAT 963D	Tractors/Loaders/Backhoes	189	0.019	0.37	0.70	194.4147
CAT CS44B 1[2.]	Roller	100.6	0.019	0.38	0.70	198.1089
CAT D4	Rubber Tired Dozer	130	0.019	0.40	0.70	190.4557
CAT M322F Wheel Excavator	Excavator	169	0.020	0.38	0.70	201.5985
Concrete Trucks[3.]	Off-Highway Trucks	400	0.020	0.38	0.70	202.0881
Doosan XP825-HP750	Air Compressor	266	0.016	0.48	0.70	164.9749
Generac MLT4060MV-STD 6kW[4.]	Generator Sets	12.2	0.042	0.74	0.70	420.5477
Genie GTH-1056 Telehandler	Forklift	121	0.010	0.20	0.70	106.0205
Genie GTH-5519 Telehandler	Forklift	74	0.010	0.20	0.70	104.6385
Liebherr LB36	Bore/Drill Rig	523	0.026	0.50	0.70	261.8643
Linkbelt LS248H	Crane	270	0.015	0.29	0.70	151.9901
MQ Power Whisperwatt	Generator Sets	300	0.016	0.74	1	164.9749
Muck Trucks[4.]	Other Construction Equipment	5.5	0.024	0.42	0.70	244.8642
Skyjack SJ86T Manlift	Aerial Lift	74	0.016	0.31	0.70	162.6890
Takeuchi TB235-2	Excavator	24.4	0.022	0.38	0.70	223.8902
Trucks for material[3.]	Off-Highway Trucks	400	0.020	0.38	0.70	202.0881
Volvo L50 Wheel Loader	Tractors/Loaders/Backhoes	90	0.019	0.37	0.70	195.1959
Yanmar ViO55	Excavator	48.4	0.022	0.38	0.70	224.1851

Cells with this contain equipment in a double shift. [accounted for in count]

Notes:

1. Horsepowers are gathered through an internet search as well as emails with clients
2. Even though it does go over the speed bin, the horsepower is so close to 100 we assume it is 100.
3. Assumed to be one vehicle
4. Lower hp bin unavailable since no hourly data, went with closest available bin

Equipment Schedule (daily counts per month of construction)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30
Bobcat T650																							1	2	2	2	2	2		
CAT 200																														
CAT 308 Excavator																							1	2	2	2	2	2		
CAT 320																							2	4	4	4	4	4		
CAT 350																														
CAT 963D																							1	2	2	2	2	2		
CAT CS44B 1																														
CAT D4																														
CAT M322F Wheel Excavator																							1	2	2	2	2	2		
Concrete Trucks																							1	2	2	2	2	2		
Doosan XP825-HP750																							1	2	2	2	2	2		
Generac MLT4060MV-STD 6kW																							8	16	16	16	16	16		
GenieGTH-1056 Telehandler																							1	2	2	2	2	2		
Genie GTH-5519 Telehandler																														
Liebherr LB36																							1	2	2	2	2	2		
Linkbelt LS248H																							1	2	2	2	2	2		
MQ Power Whisperwatt																							1	2	2	2	2	2		
Muck Trucks																							1	2	2	2	2	2		
Skyjack SJ86T Manlift																							1	2	2	2	2	2		
Takeuchi TB235-2																							2	4	4	4	4	4		
Trucks for material																							1	2	2	2	2	2		
Volvo L50 Wheel Loader																							1	2	2	2	2	2		
Yanmar ViO55																														

Pollution based on Schedule (tons/month)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30
CO_2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.0	130.1	130.1	130.1	130.1	130.1	0.0	0.0

Pollution based on Schedule (lbs/day)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30
CO_2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5042.0	10083.9	10083.9	10083.9	10083.9	10083.9	0.0	0.0

Diesel Use based on Schedule (gallons/month)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30
Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5796	11591	11591	11591	11591	11591	0	0

Diesel Use based on Schedule (gallons/day)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30
Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	225	449	449	449	449	449	0	0

ONT T2 - Off Road

Month																														
M31	M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
																1	1	1	0.5										
																1	1	1											
																								1	0.5				
																1	1	1						1	0.5				
																								1	0.5				
																					2	2	2						
																					2	2	2						
																					10	10	10						
																					2	2	2						
																					2	2	2						
																					2	2	2						
																1	1	1	0.5		2	2	2	1	0.5				
																1	1	1						1	0.5				
																1	1	1	0.5					1	0.5				

Month																														
M31	M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.6	12.6	12.6	4.0	0.0	67.0	67.0	67.0	18.0	9.0	0.0	0.0	0.0	0.0

Month																														
M31	M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	976.8	976.8	976.8	310.1	0.0	5193.6	5193.6	5193.6	1396.5	698.2	0.0	0.0	0.0	0.0

Month																														
M31	M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1120	1120	1120	356	0	5973	5973	5973	1601	801	0	0	0	0

Month																														
M31	M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43	43	43	14	0	232	232	232	62	31	0	0	0	0

RC TBM - On Road

Vehicle Emissions Factors https://goo.gl/maps/BSVtDazZVQfuJxWk9

Vehicle Type	Fuel Type	Miles Driven	RUNEX Emission Factor (MT/VMT)[a]		
			CO_2	CH_4	N_2O
Worker Vehicles	Mix	14.7	2.78E-04	2.67E-09	4.80E-09
Construction Trucks - T7 Single Dump Class 8	Mix	20	1.61E-03	6.62E-10	2.54E-07
Ancillary Delivery Trucks -T6 Instate Delivery/T7 Tractor Class 8	Mix	20	2.38E-05	1.29E-11	3.74E-09

Vehicle Type	STREX Emission Factor (MT/trip)[b]		
	CO_2	CH_4	N_2O
Worker Vehicles	6.76E-05	6.36E-08	3.10E-08
Construction Trucks - T7 Single Dump Class 8	0.00E+00	0.00E+00	0.00E+00
Ancillary Delivery Trucks -T6 Instate Delivery/T7 Tractor Class 8	0.00E+00	0.00E+00	0.00E+00

a. Emissions includes: g/mile for RUNEX

b. Emissions includes: g/trip for STREX. Assume 2 trips per vehicle per day for STREX.

Global Warming Potential Factors	
Carbon Dioxide (CO_2)	1
Methane (CH_4)	29.8
Nitrous Oxide (N_2O)	273

Source: 2021 IPCC Sixth Assessment Report 6
IPCC = Intergovernmental Panel on Climate Change

Vehicle Type	Fuel Type	Miles Driven	Average MPG
Worker Vehicles	Gasoline	14.7	30.99
	Diesel	14.7	42.03
Construction Trucks - T7 Single Dump Class 8	Diesel	20	5.99
Ancillary Delivery Trucks -T6 Instate Delivery/T7 Tractor Class 8	Diesel	20	8.93

Quantity Schedule (daily counts per month of construction)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31
Worker Vehicles																							230	230	230	230	230	230	230	230	230
Construction Trucks - T7 Single Dump Class 8																							100	100	100	100	100	100	100	100	100
Ancillary Delivery Trucks -T6 Instate Delivery/T7 Tractor Class 8																							10	10	10	10	10	10	10	10	10

Pollution based on Schedule (MT/month)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31
CO_2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	108	108	108	108	108	108	1.08E+02	1.08E+02	1.08E+02
CH_4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N_2O	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO_2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	112	112	112	112	112	112	112	112	112

Fuel Use based on Schedule (gallons/month)

Fuel	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2815	2815	2815	2815	2815	2815	2814.95	2814.95	2814.95
Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35159	35159	35159	35159	35159	35159	35159.1	35159.1	35159.1

RC TBM - On Road

Month																											
M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
230	230	230	230	230	230	230	230	230	230	230	230	230		230	230	230	230	230	230	230	230	230	230	230				
100	100	100	100	100	100	100	100	100	100	100	100	100		100	100	100	100	100	100	100	100	100	100	100				
10	10	10	10	10	10	10	10	10	10	10	10	10		10	10	10	10	10	10	10	10	10	10	10				

Month																											
M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
1.08E+02	1.08E+02	1.08E+02	1.08E+02	108	108	108	108	108	108	108	108	108	0	108	108	108	108	108	108	1.08E+02	1.08E+02	1.08E+02	1.08E+02	1.08E+02	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
112	112	112	112	112	112	112	112	112	112	112	112	112	0	112	112	112	112	112	112	112	112	112	112	112	0	0	0	0

Month																											
M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
2814.95	2814.95	2814.95	2814.95	2815	2815	2815	2815	2815	2815	2815	2815	2815	0	2815	2815	2815	2815	2815	2815	2814.95	2814.95	2814.95	2814.95	2814.95	0	0	0	0
35159.1	35159.1	35159.1	35159.1	35159	35159	35159	35159	35159	35159	35159	35159	35159	0	35159	35159	35159	35159	35159	35159	35159.1	35159.1	35159.1	35159.1	35159.1	0	0	0	0

Vent Shaft - On Road

Vehicle Emissions Factors https://goo.gl/maps/99ETThasr2tBhu7A6

Vehicle Type	Fuel Type	Miles Driven	RUNEX Emission Factor (MT/VMT)[a]		
			CO_2	CH_4	N_2O
Worker Vehicles	Mix	14.7	2.78E-04	2.67E-09	4.80E-09
Construction Trucks - T7 Single Dump Class 8	Mix	20	1.61E-03	6.62E-10	2.54E-07
Ancillary Delivery Trucks -T6 Instate Delivery/T7 Tractor Class 8	Mix	20	2.38E-05	1.29E-11	3.74E-09

Vehicle Type	STREX Emission Factor (MT/trip)[b]		
	CO_2	CH_4	N_2O
Worker Vehicles	6.76E-05	6.36E-08	3.10E-08
Construction Trucks - T7 Single Dump Class 8	0.00E+00	0.00E+00	0.00E+00
Ancillary Delivery Trucks -T6 Instate Delivery/T7 Tractor Class 8	0.00E+00	0.00E+00	0.00E+00

a. Emissions includes: g/mile for RUNEX

b. Emissions includes: g/trip for STREX. Assume 2 trips per vehicle per day for STREX.

Global Warming Potential Factors	
Carbon Dioxide (CO_2)	1
Methane (CH_4)	29.8
Nitrous Oxide (N_2O)	273

Source: 2021 IPCC Sixth Assessment Report 6
IPCC = Intergovernmental Panel on Climate Change

Vehicle Type	Fuel Type	Miles Driven	Average MPG
Worker Vehicles	Gasoline	14.7	30.99
	Diesel	14.7	42.03
Construction Trucks - T7 Single Dump Class 8	Diesel	20	5.99
Ancillary Delivery Trucks -T6 Instate Delivery/T7 Tractor Class 8	Diesel	20	8.93

Quantity Schedule (daily counts per month of construction)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31
Worker Vehicles																													230	230	230
Construction Trucks - T7 Single Dump Class 8																													100	100	100
Ancillary Delivery Trucks -T6 Instate Delivery/T7 Tractor Class 8																													10	10	10

Pollution based on Schedule (tons/month)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31
CO_2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.08E+02	1.08E+02	1.08E+02
CH_4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N_2O	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO_2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	112	112	112

Fuel Use based on Schedule (gallons/month)

Fuel	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2814.95	2814.95	2814.95
Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35159.1	35159.1	35159.1

Vent Shaft - On Road

Month																										
M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
230	230	230	230																	230	230	230	230	230				
100	100	100	100																	100	100	100	100	100				
10	10	10	10																	10	10	10	10	10				

Month																										
M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
1.08E+02	1.08E+02	1.08E+02	1.08E+02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.08E+02	1.08E+02	1.08E+02	1.08E+02	1.08E+02	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
112	112	112	112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	112	112	112	112	112	0	0	0	0

Month																										
M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
2814.95	2814.95	2814.95	2814.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2814.95	2814.95	2814.95	2814.95	2814.95	0	0	0	0
35159.1	35159.1	35159.1	35159.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35159.1	35159.1	35159.1	35159.1	35159.1	0	0	0	0

ONT T4 - On Road

Vehicle Emissions Factors https://goo.gl/maps/Wh7RuhJoetaHh1u88

Vehicle Type	Fuel Type	Miles Driven	RUNEX Emission Factor (MT/VMT)[a]		
			CO_2	CH_4	N_2O
Worker Vehicles	Mix	14.7	2.78E-04	2.67E-09	4.80E-09
Construction Trucks - T7 Single Dump Class 8	Mix	20	1.61E-03	6.62E-10	2.54E-07
Ancillary Delivery Trucks -T6 Instate Delivery/T7 Tractor Class 8	Mix	20	2.38E-05	1.29E-11	3.74E-09

Vehicle Type	STREX Emission Factor (MT/trip)[b]		
	CO_2	CH_4	N_2O
Worker Vehicles	6.76E-05	6.36E-08	3.10E-08
Construction Trucks - T7 Single Dump Class 8	0.00E+00	0.00E+00	0.00E+00
Ancillary Delivery Trucks -T6 Instate Delivery/T7 Tractor Class 8	0.00E+00	0.00E+00	0.00E+00

a. Emissions includes: g/mile for RUNEX, PMBW and PMTW

b. Emissions includes: g/trip for STREX. Assume 2 trips per vehicle per day for STREX.

Global Warming Potential Factors	
Carbon Dioxide (CO_2)	1
Methane (CH_4)	29.8
Nitrous Oxide (N_2O)	273

Source: 2021 IPCC Sixth Assessment Report 6
IPCC = Intergovernmental Panel on Climate Change

Vehicle Type	Fuel Type	Miles Driven	Average MPG
Worker Vehicles	Gasoline	14.7	30.99
	Diesel	14.7	42.03
Construction Trucks - T7 Single Dump Class 8	Diesel	20	5.99
Ancillary Delivery Trucks -T6 Instate Delivery/T7 Tractor Class 8	Diesel	20	8.93

Quantity Schedule (daily counts per month of construction)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31
Worker Vehicles																													230	230	230
Construction Trucks - T7 Single Dump Class 8																													100	100	100
Ancillary Delivery Trucks -T6 Instate Delivery/T7 Tractor Class 8																													10	10	10

Pollution based on Schedule (tons/month)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31
CO_2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.08E+02	1.08E+02	1.08E+02
CH_4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N_2O	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO_2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	112	112	112

Fuel Use based on Schedule (gallons/month)

Fuel	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2814.95	2814.95	2814.95
Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35159.1	35159.1	35159.1

ONT T4 - On Road

Month																											
M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
230	230	230	230															230	230	230	230	230	230	230				
100	100	100	100															100	100	100	100	100	100	100				
10	10	10	10															10	10	10	10	10	10	10				

Month																											
M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
1.08E+02	1.08E+02	1.08E+02	1.08E+02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	108	108	1.08E+02	1.08E+02	1.08E+02	1.08E+02	1.08E+02	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
112	112	112	112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	112	112	112	112	112	112	112	0	0	0	0

Month																											
M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
2814.95	2814.95	2814.95	2814.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2815	2815	2814.95	2814.95	2814.95	2814.95	2814.95	0	0	0	0
35159.1	35159.1	35159.1	35159.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35159	35159	35159.1	35159.1	35159.1	35159.1	35159.1	0	0	0	0

ONT T2 - On Road

Vehicle Emissions Factors https://goo.gl/maps/Jnmf9fKSYmd11xGf8

Vehicle Type	Fuel Type	Miles Driven	RUNEX Emission Factor (MT/VMT)[a]		
			CO_2	CH_4	N_2O
Worker Vehicles	Mix	14.7	2.78E-04	2.67E-09	4.80E-09
Construction Trucks - T7 Single Dump Class 8	Mix	20	1.61E-03	6.62E-10	2.54E-07
Ancillary Delivery Trucks -T6 Instate Delivery/T7 Tractor Class 8	Mix	20	2.38E-05	1.29E-11	3.74E-09

Vehicle Type	STREX Emission Factor (MT/trip)[b]		
	CO_2	CH_4	N_2O
Worker Vehicles	6.76E-05	6.36E-08	3.10E-08
Construction Trucks - T7 Single Dump Class 8	0.00E+00	0.00E+00	0.00E+00
Ancillary Delivery Trucks -T6 Instate Delivery/T7 Tractor Class 8	0.00E+00	0.00E+00	0.00E+00

a. Emissions includes: g/mile for RUNEX, PMBW and PMTW

b. Emissions includes: g/trip for STREX. Assume 2 trips per vehicle per day for STREX.

Global Warming Potential Factors	
Carbon Dioxide (CO_2)	1
Methane (CH_4)	29.8
Nitrous Oxide (N_2O)	273

Source: 2021 IPCC Sixth Assessment Report 6
IPCC = Intergovernmental Panel on Climate Change

Vehicle Type	Fuel Type	Miles Driven	Average MPG
Worker Vehicles	Gasoline	14.7	30.99
	Diesel	14.7	42.03
Construction Trucks - T7 Single Dump Class 8	Diesel	20	5.99
Ancillary Delivery Trucks -T6 Instate Delivery/T7 Tractor Class 8	Diesel	20	8.93

Quantity Schedule (daily counts per month of construction)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31
Worker Vehicles																							230	230	230	230	230	230			
Construction Trucks - T7 Single Dump Class 8																							100	100	100	100	100	100			
Ancillary Delivery Trucks -T6 Instate Delivery/T7 Tractor Class 8																							10	10	10	10	10	10			

Pollution based on Schedule (tons/month)

Equipment	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31
CO_2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	108	108	108	108	108	108	0.00E+00	0.00E+00	0.00E+00
CH_4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N_2O	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO_2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	112	112	112	112	112	112	0	0	0

Fuel Use based on Schedule (gallons/month)

Fuel	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2815	2815	2815	2815	2815	2815	0	0	0
Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35159	35159	35159	35159	35159	35159	0	0	0

ONT T2 - On Road

Month																										
M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
															230	230	230	230		230	230	230	230	230				
															100	100	100	100		100	100	100	100	100				
															10	10	10	10		10	10	10	10	10				

Month																												
M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0	0	108	108	108	108	0	1.08E+02	1.08E+02	1.08E+02	1.08E+02	1.08E+02	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	112	112	112	112	0	112	112	112	112	112	0	0	0	0

Month																												
M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2815	2815	2815	2815	0	2814.95	2814.95	2814.95	2814.95	2814.95	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35159	35159	35159	35159	0	35159.1	35159.1	35159.1	35159.1	35159.1	0	0	0	0

GHG Emissions - Cucamonga Metrolink Station and TBM Retrieval (MT/month)

	Month																													
	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31
	Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28
Cucamonga Metrolink Station and TBM Retrieval (MT/month)																															
CO_2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	118.35	124.54	130.95	137.36	147.30	144.65	132.04	132.04	163.83
Vent Shaft (MT/month)																															
CO_2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	130.84	137.36	138.99
Ontario Airport T4 Station (MT/month)																															
CO_2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	124.54	124.54	137.36
Ontario Airport T2 Station (MT/month)																															
CO_2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	177.20	242.24	242.24	242.24	242.24	242.24	0.00	0.00	0.00
Total Project (MT/month)																															
CO_2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	295.54	366.78	373.19	379.60	389.54	386.88	387.43	393.94	440.17

Year	GHG	
2026	0	(M1 - M12)
2027	662	(M13 - M24)
2028	5,023	(M25 - M36)
2029	2,027	(M37 - M48)
2030	4,316	(M49 - M60)
Total	12,029	
Amortized	401	

Fuel Usage - Cucamonga Metrolink Station and TBM Retrieval (gal/month)

	Month																													
	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31
Cucamonga Metrolink Station and TBM Retrieval (gal/month)																															
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954
Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05
Vent Shaft (gal/month)																															
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2814.954	2814.954	2814.954
Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35159.05	35159.05	35159.05
Ontario Airport T4 Station (gal/month)																															
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2814.954	2814.954	2814.954
Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35159.05	35159.05	35159.05
Ontario Airport T2 Station (gal/month)																															
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	0	0	0
Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	0	0	0
Total Project (gal/month)																															
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5629.908	5629.908	5629.908	5629.908	5629.908	5629.908	8444.862	8444.862	8444.862
Diesel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70318.11	70318.11	70318.11	70318.11	70318.11	70318.11	105477.2	105477.2	105477.2

Year	Gas	Diesel	
2026	0	0	(M1 - M12)
2027	11,260	140,636	(M13 - M24)
2028	84,449	1,054,772	(M25 - M36)
2029	36,594	457,068	(M37 - M48)
2030	76,004	949,294	(M49 - M60)
Total	208,307	2,601,770	

M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	Total
Aug-28	Sep-28	Oct-28	Nov-28	Dec-28	Jan-29	Feb-29	Mar-29	Apr-29	May-29	Jun-29	Jul-29	Aug-29	Sep-29	Oct-29	Nov-29	Dec-29	Jan-30	Feb-30	Mar-30	Apr-30	May-30	Jun-30	Jul-30	Aug-30	Sep-30	Oct-30	Nov-30	Dec-30	
195.61	185.67	175.73	175.73	175.73	175.73	175.73	175.73	175.73	175.73	175.73	175.73	175.73	0.00	124.76	124.76	122.46	186.00	186.00	186.00	186.00	186.00	186.00	128.20	120.18	0.00	0.00	0.00	0.00	5,282
140.61	190.67	190.67	190.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	190.67	190.67	190.67	122.52	117.34	0.00	0.00	0.00	0.00	1,932
146.68	146.68	179.15	179.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	154.68	154.68	187.15	183.15	179.15	130.17	121.16	0.00	0.00	0.00	0.00	2,148
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	124.76	124.76	124.76	116.16	0.00	179.15	179.15	179.15	130.17	121.16	0.00	0.00	0.00	0.00	2,668
482.91	523.02	545.55	545.55	175.73	175.73	175.73	175.73	175.73	175.73	175.73	175.73	175.73	0.00	124.76	249.52	247.21	310.76	456.84	340.68	742.97	738.97	734.97	511.06	479.84	0.00	0.00	0.00	0.00	12,029

M32	M33	M34	M35	M36	M37	M38	M39	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	Total
2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	0	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	0	0	0	0	92,893
35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	0	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	0	0	0	0	1,160,249
2814.954	2814.954	2814.954	2814.954	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2814.954	2814.954	2814.954	2814.954	2814.954	0	0	0	0	33,779
35159.05	35159.05	35159.05	35159.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35159.05	35159.05	35159.05	35159.05	35159.05	0	0	0	0	421,909
2814.954	2814.954	2814.954	2814.954	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	0	0	0	0	39,409
35159.05	35159.05	35159.05	35159.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	0	0	0	0	492,227
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2814.954	2814.954	2814.954	2814.954	0	2814.954	2814.954	2814.954	2814.954	2814.954	0	0	0	0	42,224
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35159.05	35159.05	35159.05	35159.05	0	35159.05	35159.05	35159.05	35159.05	35159.05	0	0	0	0	527,386
8444.862	8444.862	8444.862	8444.862	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	2814.954	0	2814.954	5629.908	5629.908	5629.908	8444.862	5629.908	11259.82	11259.82	11259.82	11259.82	11259.82	0	0	0	0	208,307
105477.2	105477.2	105477.2	105477.2	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	35159.05	0	35159.05	70318.11	70318.11	70318.11	105477.2	70318.11	140636.2	140636.2	140636.2	140636.2	140636.2	0	0	0	0	2,601,770