ENERGY STUDY

West Valley Connector Project

sbcta
San Bernardino County Transportation Authority

OmniTrans
Connecting Our Community.

April 2018
(Updated January 2020)

Revision Log

Date	Description
April 2018	Original report prepared
January 2020	Project schedule update

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Appendix A - Energy Calculations

LIST OF ACRONYMS

AB	Assembly Bill
ADA	Americans with Disabilities Act
BRT	Bus Rapid Transit
Btu	British Thermal Units
CAFE	Corporate Average Fuel Economy
Caltrans	California Department of Transportation
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CNG	Compressed Natural Gas
CTP	California Transportation Plan
DGE	Diesel Gallon Equivalent
EA	Environmental Assessment
EIR	Environmental Impact Report
FTA	Federal Transit Administration
MAP-21	Moving Ahead for Progress in the 21st Century Act
NEPA	National Environmental Policy Act
RCP	Regional Comprehensive Plan
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
SANBAG	San Bernardino Associated Governments
SCAG	Southern California Association of Governments
TSP	Transit Signal Priority
VMT	Vehicle Miles Traveled

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EXECUTIVE SUMMARY

The Energy Study was prepared in compliance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). The analysis addresses consistency with energy conservation plans, compares energy consumption between the alternatives, and discusses potential impacts to existing energy facilities. The proposed West Valley Connector Bus Rapid Transit (BRT) project (the project) is a mass transit system that is consistent with State and regional policies to reduce long-term energy use and construction activity is considered an efficient short-term use of non-renewable energy resources.

A quantitative analysis was completed to describe changes in energy use in terms of British Thermal Units (Btu) and fuel consumption. Alternatives A and B would marginally increase Btu and fuel consumption in 2023 and 2040 when compared to the No Build Alternative. Compared to the 2016 CEQA baseline, the Build Alternatives would decrease Btu consumption by 6.4 percent in 2023 and 18 percent in 2040 and decrease gasoline consumption by 6.5 percent in 2023 and 18 percent in 2040.

No significant impacts have been identified under CEQA and no adverse effects have been identified under NEPA. No mitigation or control measures are necessary to reduce excessive energy use.

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1.0 INTRODUCTION

This Energy Study analyzes the potential energy resources impacts along the West Valley Connector (WVC) Project (the WVC Project or the proposed project). The objectives of this analysis are to describe the regulatory setting, affected environment, impacts on energy resources that would result from the project, and mitigation measures that would reduce these impacts.

The San Bernardino County Transportation Authority (SBCTA), in cooperation with the cities of Pomona, Montclair, Ontario, Rancho Cucamonga, and Fontana, proposes construction of the WVC Project, a 35-mile-long Bus Rapid Transit (BRT) project that will decrease travel times and improve the existing public transit system within the corridor.

In January 2017, SBCTA entered into a cooperative agreement with Omnitrans designating SBCTA as the lead agency for the proposed WVC Project. SBCTA intends to construct the WVC, which will then be operated by Omnitrans. SBCTA has the authority to allocate Federal Transit Administration (FTA) funds; however, it does not have the ability to receive funds directly from FTA. Omnitrans is the direct FTA grantee for the San Bernardino Valley. As a result, SBCTA and Omnitrans have developed a successful direct recipient/ subrecipient working relationship to deliver projects with FTA funds. The current relationship allows the delivery of FTA-funded projects that meet FTA requirements without duplicating staff, assuring the best use of limited public funds available. Omnitrans and SBCTA executed Memorandum of Understanding (MOU) 15-1001289 in October 2015, setting forth the roles and responsibilities of the recipient/subrecipient relationship.

The project is subject to state and federal environmental review requirements because it involves the use of federal funds from the Federal Transit Administration (FTA). An Environmental Impact Report (EIR)/Environmental Assessment (EA) has been prepared for the proposed project in compliance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). SBCTA is the CEQA lead agency, and FTA is the NEPA lead agency. This Energy Study has been prepared as part of the technical analysis required to support the EIR/EA.

1.1 Project Location and Setting

The proposed project is located primarily along Holt Avenue/Boulevard and Foothill Boulevard, which would connect the cities of Pomona, Montclair, Ontario, Rancho Cucamonga, and Fontana in the counties of Los Angeles and San Bernardino, California. The project limits extend from Main Street in the City of Pomona on the west side to Sierra Avenue in the City of Fontana on the east side and Church Street in the City of Rancho Cucamonga on the north side to Ontario International Airport on the south side (see Figures 1-1 and 1-2). The proposed project area is primarily urban, and generalized land uses include low-, medium-, and medium-high-density residential, commercial, industrial, open space and recreation, transportation and utilities, agriculture, vacant, public facilities, airport, educational facilities, and offices.

1.2 Purpose and Need

The purpose of the proposed project is to improve corridor mobility and transit efficiency in the western San Bernardino Valley from the City of Pomona, in Los Angeles County, to the City of Fontana, in San Bernardino County, with an enhanced, state-of-the-art BRT system (i.e., the system that includes off-board fare vending, all-door boarding, transit signal priority [TSP], optimized operating plans, and stations that consist of a branded shelter/canopy, security cameras, benches, lighting, and variable message signs).

The proposed project would address the growing traffic congestion and travel demands of the nearly one million people that would be added to Los Angeles and San Bernardino County by 2040 per Southern California Association of Government's (SCAG) 2016 Regional Transportation Plan (RTP)/Sustainable Communities Strategy (SCS) growth forecast. Improved rapid transit along the project corridor would help Omnitrans/SBCTA achieve its long-range goals to cost effectively enhance lifeline mobility and accessibility, improve transit operations, increase ridership, support economic growth and redevelopment, conserve nonrenewable resources, and improve corridor safety.

Recognizing the importance of the WVC transit corridor, SBCTA is proposing a project that is designed to achieve the following objectives:

- Improve transit service by better accommodating high existing bus ridership.
- Improve ridership by providing a viable and competitive transit alternative to the automobile.
- Improve efficiency of transit service delivery while lowering Omnitrans' operating costs per rider.
- Support local and regional planning goals to organize development along transit corridors and around transit stations.

The project purpose and objectives stated above would respond to the following needs:

- Current and future population and employment conditions establish a need for higher-quality transit service.
- Current and future transportation conditions establish a need for an improved transit system.
- Transit-related opportunities exist in the project area.

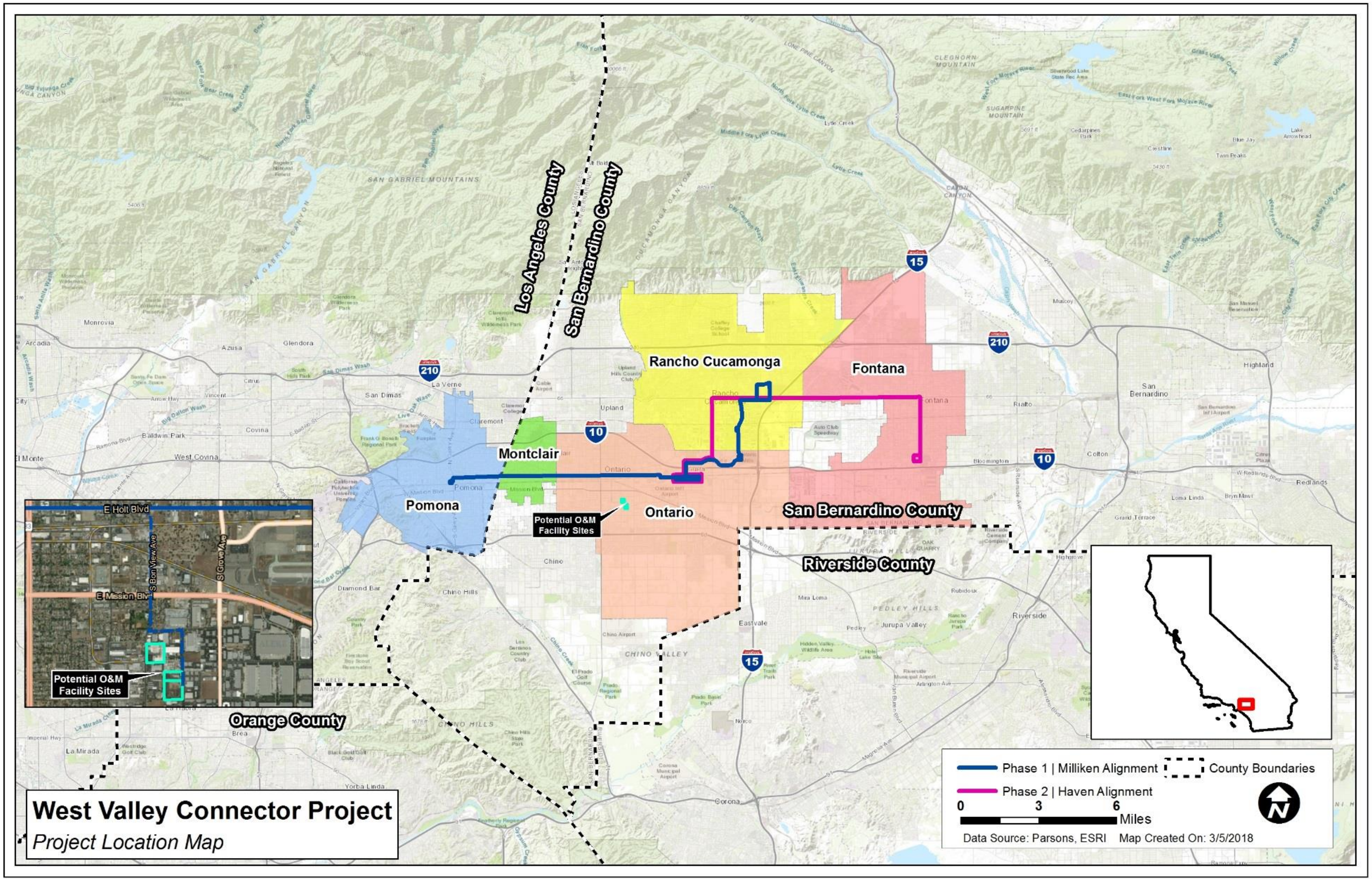

Figure 1-1: Project Location Map

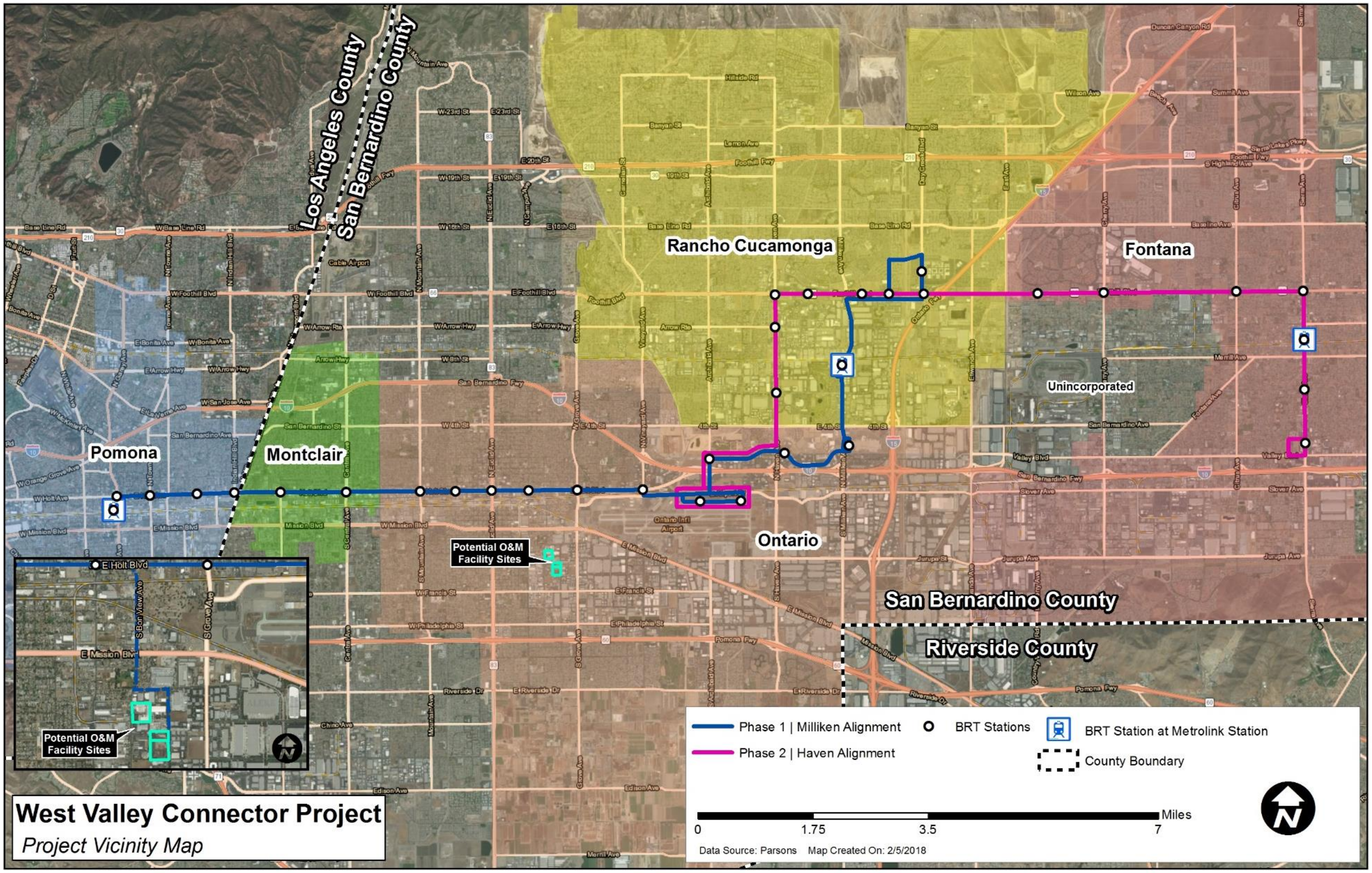

Figure 1-2: Project Vicinity Map

2.0 PROJECT DESCRIPTION

2.1 Proposed Project

The WVC Project is a 35-mile-long BRT corridor project located primarily along Holt Avenue/ Boulevard and Foothill Boulevard that would connect the cities of Pomona, Montclair, Ontario, Rancho Cucamonga, and Fontana in the counties of Los Angeles and San Bernardino, California. The project proposes limited stops, providing speed and quality improvements to the public transit system within the corridor. The project includes BRT stations at up to 33 locations/major intersections and associated improvements, premium transit service, TSP and queue jump lanes, dedicated lanes, and integration with other bus routes.

The project alignment consists of two phases. Phase I of the project would construct the “Milliken Alignment,” from the Pomona Regional Transit Center (downtown Pomona Metrolink Station) to Victoria Gardens in Rancho Cucamonga. Phase II of the project would construct the “Haven Alignment,” from Ontario International Airport to Kaiser Permanente Medical Center in Fontana. The Phase I/Milliken Alignment would begin construction in 2020 and is proposed to have 10-minute peak and 15-minute off-peak headways. Phase II is intended to be constructed immediately following completion of Phase I, depending on the availability of funding.

Phase I/Milliken Alignment

Phase I of the project would construct the Milliken Alignment from the western boundary limit in Pomona to Victoria Gardens in Rancho Cucamonga. In Pomona, the alignment starts from the Pomona Regional Transit Center station, travels along Holt Avenue and into Montclair.

In Montclair, the alignment runs on Holt Boulevard between Mills Avenue and Benson Avenue and into Ontario.

In Ontario, the alignment continues on Holt Boulevard, starting from Benson Avenue, and then continues to Vineyard Avenue and into Ontario International Airport (loop through Terminal Way). From the airport, it heads north on Archibald Avenue to Inland Empire Boulevard and turns right and travels east on Inland Empire Boulevard.

On Inland Empire Boulevard, the alignment goes straight into Ontario Mills (loop through Mills Circle) and then heads north on Milliken Avenue into Rancho Cucamonga.

In Rancho Cucamonga, the alignment makes a loop into the Rancho Cucamonga Metrolink Station off Milliken Avenue and then continues up Milliken Avenue and turns east onto Foothill Boulevard.

The alignment continues east on Foothill Boulevard, turns north onto Day Creek Boulevard, and then terminates with a layover at Victoria Gardens at Main Street. From Victoria Gardens, the bus line begins a return route by continuing north on Day Creek Boulevard, turns west onto Church Street, turns south onto Rochester Avenue, and then turns west back onto Foothill Boulevard.

Phase II/Haven Alignment

Phase II of the project would construct the Haven Alignment, from Ontario International Airport to Kaiser Permanente Medical Center in Fontana. In Ontario, the alignment makes a loop through Terminal Way at Ontario International Airport. From the airport, it heads north on Archibald Avenue to Inland Empire Boulevard and turns right to go east on Inland Empire Boulevard.

From Inland Empire Boulevard, the alignment turns left to go north up Haven Avenue into Rancho Cucamonga, then turns right to go east onto Foothill Boulevard and into Fontana.

In Fontana, the alignment continues east on Foothill Boulevard until turning south onto Sierra Avenue. The alignment follows Sierra Avenue, including a stop at the Fontana Metrolink Station, and then continues until turning west onto Marygold Avenue, where the bus line would begin a turn-around movement by heading south onto Juniper Avenue, east onto Valley Boulevard, and north back onto Sierra Avenue to Kaiser Permanente Medical Center before heading northward for the return trip.

2.2 Project Alternatives

Many alternatives were considered during the project development phase of the project. A No Build Alternative and two build alternatives (Alternatives A and B) are being analyzed in the EIR/EA.

2.2.1 No Build Alternative

The No Build Alternative proposes no improvements to the existing local bus services. Under the No Build Alternative, the existing local bus service on Routes 61 and 66 would maintain current service of 15-minute headways (total of four buses per hour in each direction).

2.2.2 Build Alternatives

Figure 2-1 presents the map of both build alternatives. All design features of both build alternatives are the same, as described in more details in Section 2.3, with the exception of the following:

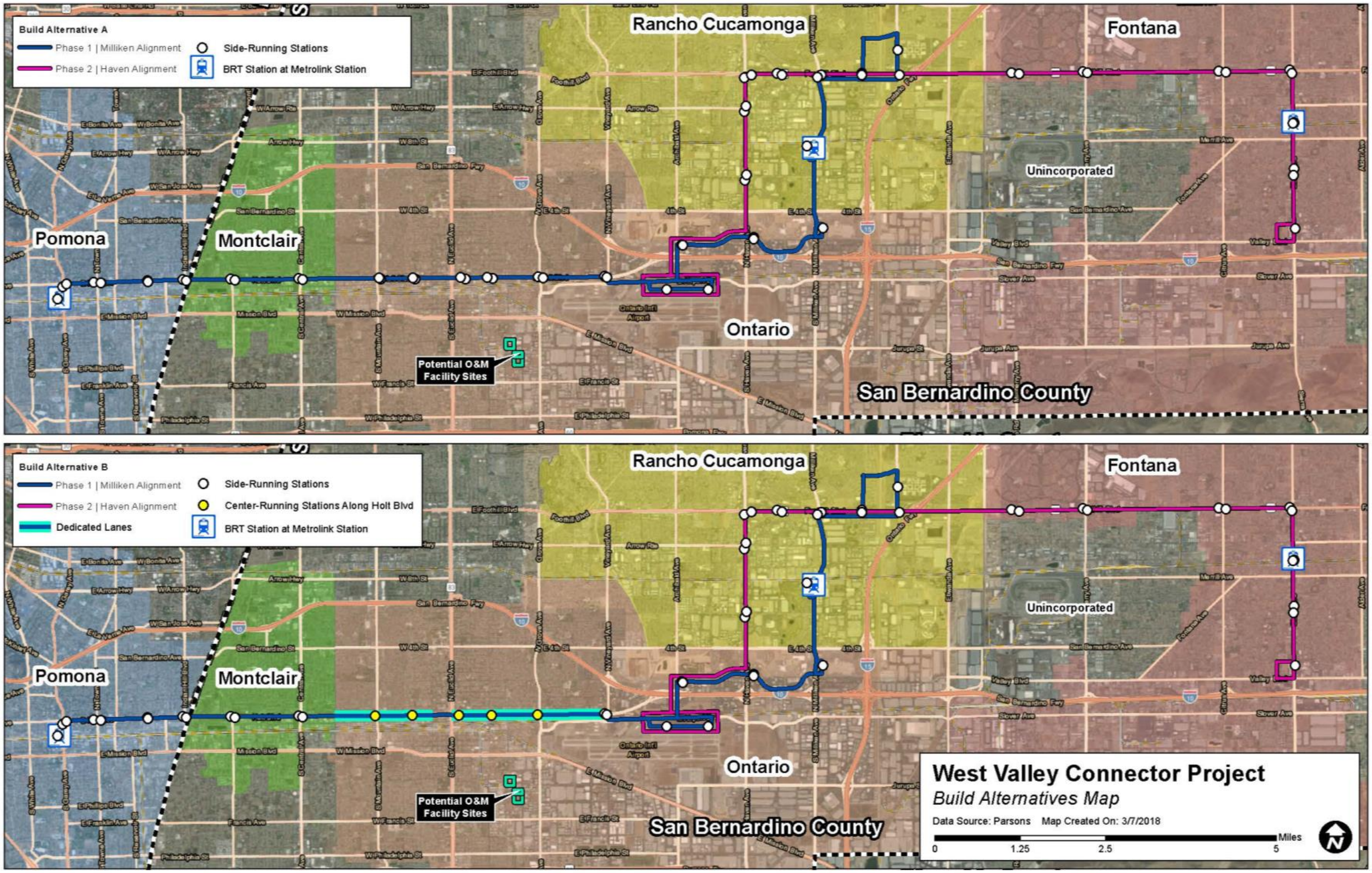

Figure 2-1: Build Alternatives Map

Alternative A – Full BRT with no Dedicated Bus-only Lanes

Alternative A would include the 35-mile-long BRT corridor, which is comprised of the Phase I/Milliken Alignment, Phase II/ Haven Alignment, and 60 side-running stations at up to 33 locations/major intersections. The BRT buses will operate entirely in the mixed-flow lanes. The right-of-way (ROW) limits and travel lane width vary in other segments of the corridor. Implementation of Build Alternative A will not require permanent or temporary ROW acquisition.

Alternative B – Full BRT with 3.5 miles of Dedicated Bus-only Lanes in Ontario

Alternative B would include the full 35-mile-long BRT corridor, which is comprised of the Phase I/Milliken Alignment, Phase II/Haven Alignment, 3.5 miles of dedicated bus-only lanes, and five center-running stations and 50 side-running stations at up to 33 locations/ major intersections. The dedicated lanes segment would include two mixed-flow lanes and one transit lane in each direction and five center-running stations. To accommodate the dedicated lanes, roadway widening and additional utilities, such as electrical and fiber-optic lines, would require permanent and temporary ROW acquisition. In addition, some areas of the project corridor would require reconfiguration, relocation, or extension of adjacent driveways, curbs, medians, sidewalks, parking lots, and local bus stops.

2.3 Design Features of Build Alternatives

2.3.1 Bus Rapid Transit Stations

BRT stations at 33 locations/major intersections and associated improvements are proposed to be located approximately 0.5 to 1 mile apart to facilitate higher operating speeds by reducing dwell time (see Figure 1-2 and Figure 2-1 for station locations). Table 2-1 lists the BRT stations to be constructed as part of Phase I/Milliken Alignment. Note that under Alternative A, all 21 stations will be side-running stations. Under Alternative B, five center platform stations are proposed as follows:

- Holt Boulevard/Mountain Avenue
- Holt Boulevard/San Antonio Avenue
- Holt Boulevard/Euclid Avenue
- Holt Boulevard/Campus Avenue
- Holt Boulevard/Grove Avenue

As part of Phase II/Haven Alignment, an additional 12 side-running stations will be constructed for both build alternatives as list in Table 2-2.

Table 2-1: Stations along Phase I/Milliken Alignment

City	Stations
Pomona	• Pomona Regional Transit Center Station • Holt Avenue/Garey Avenue • Holt Avenue/Towne Avenue • Holt Avenue/Clark Avenue • Holt Avenue/Indian Hill Boulevard
Montclair	• Holt Boulevard/Ramona Avenue • Holt Boulevard/Central Avenue
Ontario	• Holt Boulevard/Mountain Avenue* • Holt Boulevard/San Antonio Avenue* • Holt Boulevard/Euclid Avenue* • Holt Boulevard/Campus Avenue* • Holt Boulevard/Grove Avenue* • Holt Boulevard/Vineyard Avenue • Ontario International Airport • Inland Empire Boulevard/Archibald Way • Inland Empire Boulevard/Porsche Way • Ontario Mills
Rancho Cucamonga	• Rancho Cucamonga Metrolink Station • Foothill Boulevard/Milliken Avenue • Foothill Boulevard/Rochester Avenue • Victoria Gardens between North and South Main Street
Note: * denotes the center-running stations to be constructed under Alternative B.	

Source: Parsons, 2017

Table 2-2: Additional Stations to be Constructed as Part of Phase II/Haven Alignment

City	Stations
Rancho Cucamonga	• Haven Avenue/6th Street • Haven Avenue/Arrow Route • Haven Avenue/Foothill Boulevard • Foothill Boulevard/Spruce Avenue • Foothill Boulevard/Day Creek Boulevard
Fontana	• Foothill Boulevard/Mulberry Avenue • Foothill Boulevard/Cherry Avenue • Foothill Boulevard/Citrus Avenue • Foothill Boulevard/Sierra Avenue • Fontana Metrolink Station • Sierra Avenue/Randall Avenue • Sierra Avenue/Kaiser Permanente

Source: Parsons, 2017

Side-Running Stations

Side-running stations would typically be located on the far side of an intersection to facilitate transit priority and to avoid a stopped bus from blocking those turning right from the corridor. Where curb cuts for driveways and other conditions do not provide enough space along the curbside for both the San Bernardino Valley Express (sbX) and the local bus on the far side of the intersection, the local buses would be located on the near side of the intersection.

In the side-running condition, stations may include new or improved shelters with passenger amenities, or only an sbX-branded pylon with signature light. Proposed shelters would be approximately 18 feet in length and a width that would fit a 10-foot-wide-minimum sidewalk. Passenger amenities at the side platform stations would include benches, bicycle racks, trash receptacles, variable message signs, security cameras, and lighting integrated with the shelter. There would be no fare collection equipment on the sidewalks or shelters when the available ROW is less than 10 feet, and the passengers may pay the fee on the bus. Side-running stations would also include various amenities.

For all stations in Rancho Cucamonga, only an sbX-branded pylon with signature light is proposed. Should shelters be implemented in the future, coordination between the City of Rancho Cucamonga and SBCTA would be required to environmentally clear the shelters at a later time.

Center Platform Stations

As indicated in Section 2.3.1, five center-running platform stations are proposed to be constructed as part of the Phase I/Milliken Alignment (in Ontario) under Alternative B.

The center-running platform stations would be in the center of the street ROW on a raised platform with an end-block crossing. Access would be provided by crosswalks at intersections and Americans with Disabilities Act (ADA)-compliant ramps to the station platforms. Center-running platforms would be placed as close to the intersection as possible while still maintaining left-turn pockets, where required.

In the optimum center-running platform configuration, the platform would accommodate a canopy with its seating area, passenger amenities, fare equipment, and a ramp to comply with relevant accessibility requirements and provide clearance in front of ticket vending machines. Stations would include amenities that can be assembled and laid out to suit the functionality of the station and fit with the surrounding land uses.

2.3.2 sbX Bus Operations

The proposed project would require 18 buses during the Phase I operation and increase to 27 buses for the Phase I and Phase II operation to serve the designed headways and have sufficient spare vehicles.

Under Alternative A, sbX buses would operate entirely in mixed-flow lanes along the proposed 35 miles of the Phase I and Phase II alignments. For Alternative B, sbX buses would operate in mixed-flow lanes similar to Alternative A, except where dedicated bus-only lanes (3.5 miles) are proposed along Holt Boulevard, between Benson Avenue and Vine Avenue and between Euclid Avenue and Vineyard Avenue, in Ontario.

Roadway sections where the sbX would operate in mixed-flow lanes would generally be kept as existing conditions, although some modifications, such as relocated curb and gutter, may be necessary near the stations to provide sufficient room for bus stopping and loading. Reconstruction of curb and gutters would only be required for the segment where dedicated bus-only lanes are proposed. Vehicular lanes where the sbX buses would operate in dedicated bus-only lanes would feature concrete roadways, painted or striped to visually separate the exclusive lanes from mixed-flow lanes. Transition areas from mixed-flow to exclusive lanes would be provided at each end of an exclusive lane location. Such transitions would be clearly marked to separate bus movements from other vehicular traffic. Reinforced concrete bus pad in the pavement would be placed at all station locations for the sbX buses.

sbX buses would operate from 6:00 a.m. to 8:00 p.m. with peak headways for 4 hours and off-peak headways for 10 hours per day for a total span of service of 14 hours per day, Monday through Friday. From the Pomona Metrolink Transit Center station to Inland Empire Boulevard, the sbX buses would operate on 10-minute peak headways and 15-minute off-peak headways. Additional service hours, including weekend service, may be added if additional operating funds become available in the future.

2.3.3 Operations and Maintenance

Fleet Composition

The proposed project's fleet would be comprised of 60-foot-long articulated compressed natural gas (CNG) propulsion buses. sbX buses would hold approximately 96 passengers at maximum capacity with up to 8 bicycles on board. Today, the average local bus operating speeds are only 12 to 15 miles per hour (mph), and they are getting slower as corridor congestion worsens. In calculating run times, it was assumed that the average dwell time at stations would be 30 seconds (peak service), and average overall speed would be 20 mph. The average speed for sbX buses would be 18 mph.

Maintenance Requirements and Associated Facilities

Omnitrans operates and maintains its existing bus fleets from two major Operations and Maintenance (O&M) facilities: East Valley Vehicle Maintenance Facility (EVVMF), located at 1700 W. 5th Street in the City of San Bernardino and West Valley Vehicle Maintenance Facility (WVVMF), located at 4748 E. Arrow Highway in the City of Montclair. EVVMF is a Level III facility capable of full maintenance of buses and WVVMF is a Level II facility suitable for light maintenance. Neither facility has sufficient capacity to accommodate the additional maintenance and storage requirements of the bus fleet associated with the proposed WVC Project.

The purpose of the new O&M facility is to provide operations and maintenance support to the existing full-service EVVMF. The new facility would be designed and constructed to provide Level I service maintenance with a capacity to be upgraded to provide Level II service maintenance. Heavy repair functions and administrative functions would remain exclusively with the EVVMF in San Bernardino.

Facility Components

Conceptually, the new O&M facility would be built on an approximate 5-acre site. The Level I facility would include a parking area, bus washing area, fueling area, and a personnel and storage building. As needs arise, the facility could be upgraded to provide Level II service, which will include the addition of a maintenance shop and a larger administrative building. Landscaping and irrigation would be provided to enhance the comfort of employees and the appearance of the facility, and to help screen maintenance facilities and operations from offsite viewpoints within the community. Figure 2-2 shows the conceptual site plan of the Level II facility.

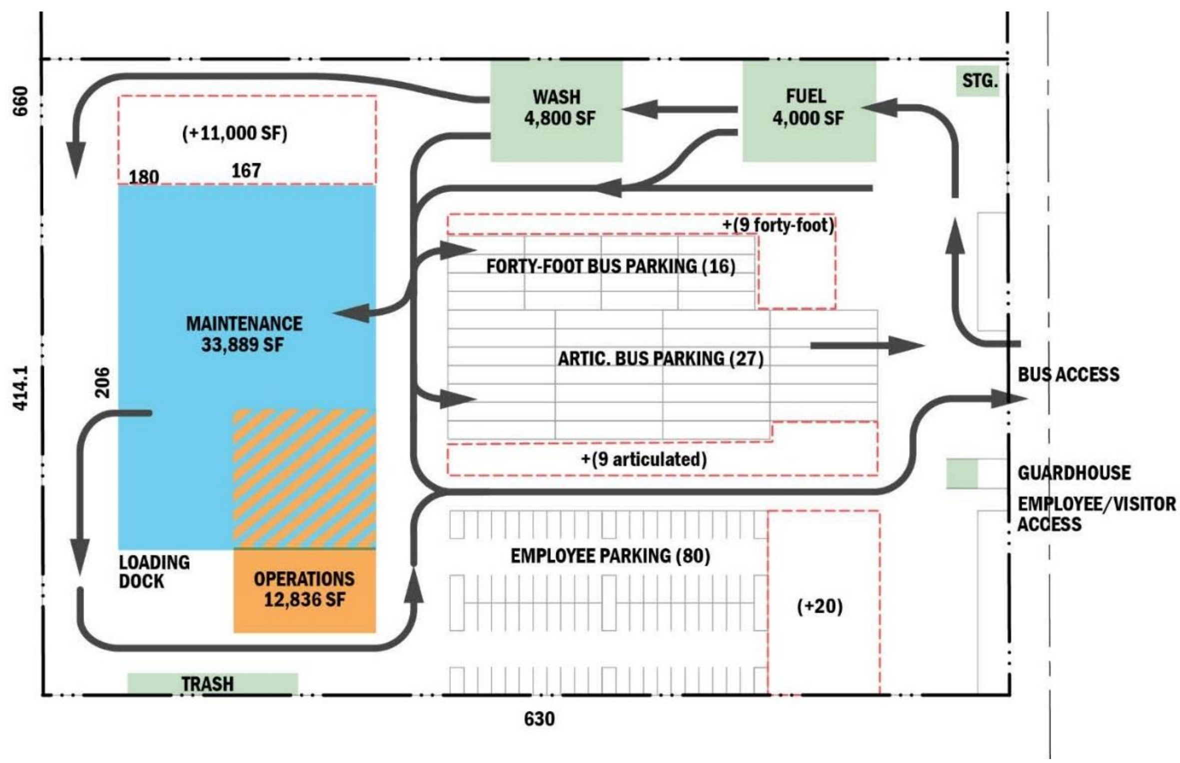

Figure 2-2: O&M Facility Conceptual Site Plan

Depending on the service level to be performed, approximately 50-100 staff would be using this facility including bus operators and O&M staff.

Potential Sites

Three sites are being considered for the placement of the new O&M facility (see Figure 2-3). All are owned by the City of Ontario and are located in the industrial zoned area, slightly more than a mile from the proposed BRT corridor alignment on Holt Boulevard:

- Site 1: 1516 S. Cucamonga Avenue, Ontario (APN 1050-131-03-0000 and APN 1050-131-02-0000). The current use of this property is public works storage yard. If selected, the O&M facility will be built at the bottom portion of the parcel encompassing an area of approximately 6.0 acres.
- Site 2: 1440 S. Cucamonga Avenue, Ontario (APN 1050-141-07-0000). The current use of this property is compressed natural gas fueling station. If selected, the O&M facility will utilize the entire parcel encompassing an area of approximately 4.8 acres.
- Site 3: 1333 S. Bon View Avenue, Ontario (APN 1049-421-01-0000 and APN 1049-421-02-0000). The current use of this property is municipal utility and customer service center. If selected, the O&M facility will be built at the bottom portion of the parcel encompassing an area of approximately 6.6 acres.

Buses coming to and from the new facility could use nearby access roads that directly connect to the BRT corridor such as South Campus Avenue, South Bon View Avenue, and South Grove Avenue.

The O&M facility will be constructed during the same period as the Phase I/Milliken Alignment and would be open for operation at the same time as the Phase I alignment. Construction duration is estimated at 12 months.

2.4 Implementation Schedule

Implementation of the proposed project is planned over the next 5 years and would entail many activities, including:

- Completion of the environmental compliance phase (March 2020)
- Completion of Preliminary Engineering (March 2020)
- Completion of Final Design (May 2021) and begin construction in early 2022.
- Completion of O&M facility (December 2023)
- Completion of Construction of Phase I/Milliken Alignment and testing (December 2023)
- System operation (begin revenue operation in December 2023)
- Construction of Phase II/Haven Alignment is scheduled to occur after completion of the Phase I/Milliken Alignment pending funding availability

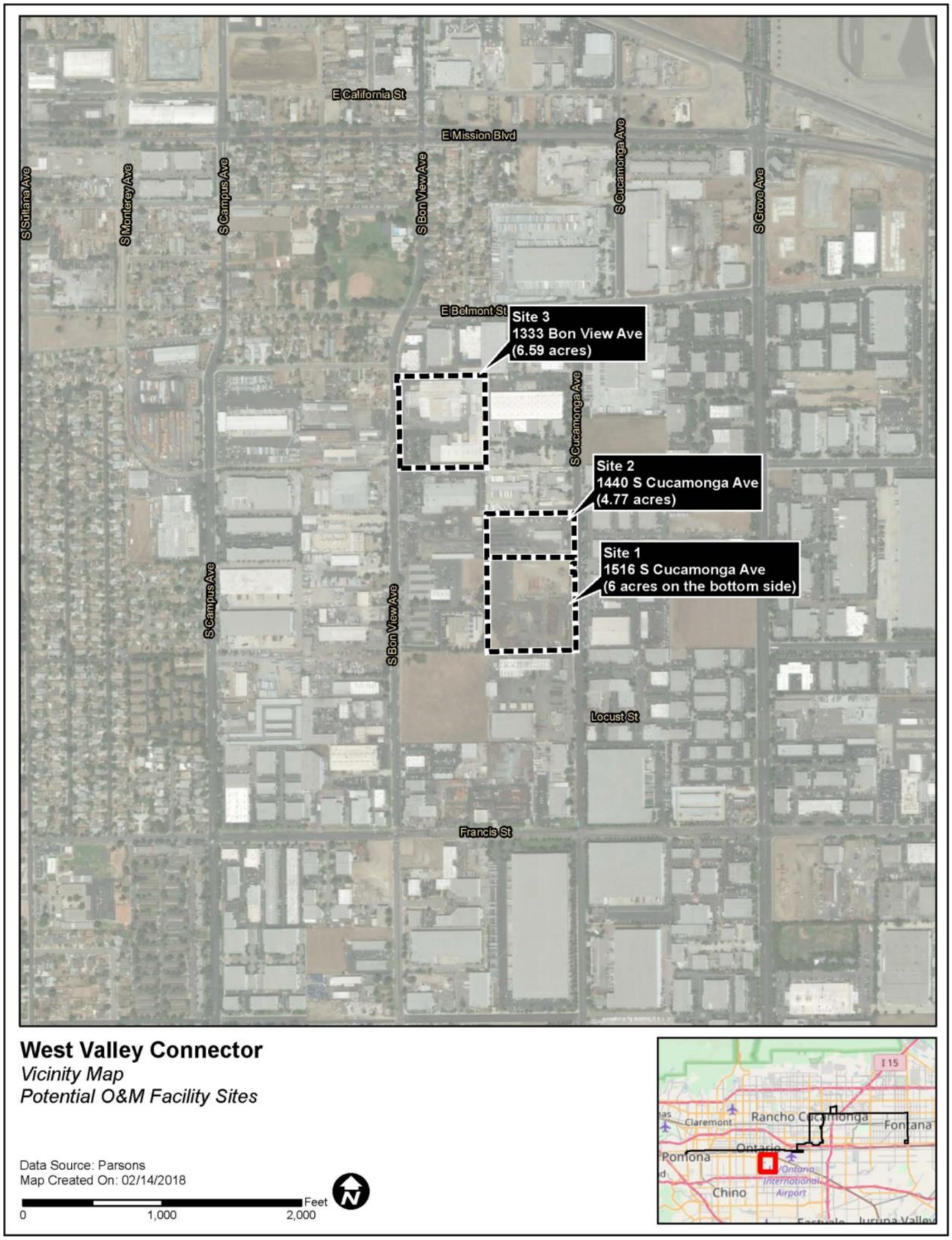

Figure 2-3: Potential Operations and Maintenance Facility Sites

3.0 REGULATORY FRAMEWORK

3.1 Federal

3.1.1 The Energy Policy and Conservation Act of 1975

The Energy Policy and Conservation Act was enacted for the purpose of serving the nation's energy demands and promoting conservation methods when feasibly obtainable. This Act mandated vehicle economy standards, extended oil price controls to 1979, and directed the creation of a strategic petroleum reserve.

3.1.2 Alternative Motor Fuels Act of 1988

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

3.1.3 Intermodal Surface Transportation Efficiency Act of 1991 and Congestion Mitigation and Air Quality Improvement Program

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

The Congestion Mitigation and Air Quality Improvement Program was created under the Intermodal Surface Transportation Efficiency Act and reauthorized in 1998 and again in 2005. The purpose of the Congestion Mitigation and Air Quality Improvement Program is to fund transportation projects or programs and related efforts that contribute air quality improvements and provide congestion relief.

3.1.4 Transportation Equity Act for the 21st Century

The Transportation Equity Act for the 21st Century was enacted in 1998 as the successor legislation to the Intermodal Surface Transportation Efficiency Act and builds on its established initiatives. This Act reauthorized the Congestion Mitigation and Air Quality

Improvement Program and authorized federal highway, highway safety, transit and other surface transportation programs over the next six years. It combines the continuation and improvement of current programs with new initiatives to meet the challenges of improving traffic safety, protecting and enhancing communities and the natural environment as transportation is provided, and advancing economic growth and competitiveness domestically and internationally through efficient and flexible transportation.

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

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

3.1.6 Energy Policy Act of 1992

The Energy Policy Act reduces dependence on imported petroleum and improves air quality by addressing all aspects of energy supply and demand, including alternative fuels, renewable energy and energy efficiency. This Act encourages the use of alternative fuels through both regulatory and voluntary activities and through the approaches carried out by the U.S. Department of Energy. It requires federal, State, and alternative fuel provider fleets to acquire alternative fuel vehicles. The Department of Energy's Clean Cities Initiative was established in response to the Energy Policy Act of 1992 to implement voluntary alternative fuel vehicle deployment activities.

3.1.7 Energy Policy Act of 2005

The Energy Policy Act necessitates the development of grant programs, demonstration and testing initiatives, and tax incentives that promote alternative fuels and advanced vehicles production and use. This Act also amends existing regulations, including fuel economy testing procedures and Energy Policy Act of 1992 requirements for federal, State, and alternative fuel provider fleets.

3.1.8 Energy Independence and Security Act of 2007

The Energy Independence and Security Act consists of provisions designed to increase energy efficiency and the availability of renewable energy. Key provisions of this Act include:

- The Corporate Average Fuel Economy (CAFE), which sets a target of 54.5 miles per gallon for the combined fleet of cars and light trucks by model year 2025.
- The Renewable Fuels Standard, which sets a modified standard that starts at 9.0 billion gallons in 2008 and rises to 36 billion gallons by 2022.
- The Energy Efficiency Equipment Standards, which includes a variety of new standards for lighting and for residential and commercial appliance equipment.
- The Repeal of Oil and Gas Tax Incentives, which includes repeal of two tax subsidies in order to offset the estimated cost to implement the CAFE provision.

3.2 State

3.2.1 California Energy Commission

The California Energy Commission (CEC) is the State's primary energy policy and planning agency. Created by the legislature in 1974, the CEC has five major responsibilities: (1) forecasting future energy needs and keeping historical energy data, (2) licensing thermal power plants 50 megawatts or larger, (3) promoting energy efficiency through appliance and building standards, (4) developing energy technologies and supporting renewable energy, and (5) planning for and directing the State's response to energy emergencies. Senate Bill 1389 (Chapter 568, Statutes of 2002) requires the CEC to prepare a biennial integrated energy policy report assessing major energy trends and issues facing the State's electricity, natural gas, and transportation fuel sectors. The report also provides policy recommendations to conserve resources, protect the environment, and ensure reliable, secure and diverse energy supplies.

3.2.2 California Public Utilities Commission

The California Public Utilities Commission regulates privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies. It regulates investor-owned electric and natural gas utilities operating in California, including Pacific Gas and Electric Company, Southern California Edison, San Diego Gas and Electric Company, and Southern California Gas Company. The California Public Utilities Commission also promotes programs to help consumers improve their energy efficiency and lower their energy bills.

3.2.3 Alternative and Renewable Fuel and Vehicle Technology Program

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

3.2.4 Senate Bill 1389, Chapter 568, Statutes of 2002

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

3.2.5 Assembly Bill 2076, Reducing Dependence on Petroleum

The CEC and California Air Resources Board are directed by AB 2076 (passed in 2000) to develop and adopt recommendations for reducing dependence on petroleum. A performance-based goal is to reduce petroleum demand to 15 percent less than 2003 demand by 2020.

3.2.6 California Transportation Plan

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

3.2.7 California Code of Regulations

The California Code of Regulations (CCR) includes vehicle requirements for public transit agencies. Sections 1956.1, 2020, 2023, 2023.1, and 2023.4 of Title 13 of the CCR. The Fleet Rule for Transit Agencies includes stringent exhaust emission standards for new Urban Bus engines and vehicles. The regulation also promotes advanced technologies by providing for zero-emission bus demonstration projects and requiring zero emission bus acquisitions applicable to larger transit agencies.

3.3 Regional

3.3.1 San Bernardino Associated Governments

San Bernardino Associated Governments (SANBAG) is the council of governments and transportation planning agency for the County of San Bernardino. SANBAG is responsible for cooperative regional planning and furthering an efficient multi-modal transportation system Countywide. SANBAG actively participates in the regional planning activities of the Southern California Association of Governments (SCAG). SCAG's planning area covers the counties of San Bernardino, Imperial, Los Angeles, Orange, Riverside, and Ventura. Members of the SANBAG Board of Directors serve on various SCAG committees and on the Regional Council, the governing board of SCAG.

The Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), adopted April 2016, and Regional Comprehensive Plan (RCP) are tools used for identifying the transportation priorities of the Southern California region. The policies and goals of both plans focus on the need to coordinate land use and transportation decisions to manage travel demand within the region. The RCP was never formally adopted, but serves as an advisory document that defines solutions to interrelated housing, traffic, water, air quality, energy and other regional challenges, and is intended to provide a framework for local government decision-makers regarding growth and development. The RCP lays out a strategy to reverse the current energy trends and diversify energy supplies to create clean, stable and sustainable sources of energy. This strategy includes the reduction of fossil fuel consumption and an increase in the use of clean, renewable technologies. RCP policies that are applicable to the project include:

Policy EN-14: Developers and local governments should explore programs to reduce single occupancy vehicle trips such as telecommuting, ridesharing, alternative work schedules and parking cash-outs (A State law to reduce vehicle commute trips and emissions by offering employees the option of "cashing out" their subsidized parking space and taking transit, biking, walking or carpooling to work).

Policy EN-16: Local governments and project implementation agencies should consider various best practices and technological improvements that can reduce the consumption of fossil fuels such as:

- Encouraging investment in transit, including light rail; and
- Developing infrastructure for alternative fuel vehicles.

The 2016-2040 RTP/SCS provides a framework for the future development of the regional transportation system through the year 2040 and addresses all modes of transportation within the region. The RTP/SCS goals that are applicable to the proposed project include:

- Preserve and ensure a sustainable transportation system; and
- Protect the environment, improve air quality, and promote energy efficiency.

These goals are implemented through the eight policies established in the RTP/SCS. Policies include balancing safety, maintenance and efficiency of the existing transportation system, and encouraging transportation investments that result in cleaner air and a more efficient transportation system.

3.4 Local

3.4.1 County of San Bernardino General Plan

The Conservation Element of the County of San Bernardino General Plan addresses the use and management of valuable energy. Applicable policies include:

Policy CO4.5: Reduce emissions through reduced energy consumption.

Policy CO8.1: Maximize the beneficial effects and minimize the adverse effects associated with the siting of major energy facilities. The County will site energy facilities equitably in order to minimize net energy use and consumption of natural resources, and avoid inappropriately burdening certain communities. Energy planning should conserve energy and reduce peak load demands, reduce natural resource consumption, minimize environmental impacts, and treat local communities fairly in providing energy efficiency programs and locating energy facilities.

Policy CO8.3: Assist in efforts to develop alternative energy technologies that have minimum adverse effect on the environment, and explore and promote newer opportunities for the use of alternative energy sources.

Policy CO8.4: Minimize energy consumption attributable to transportation within the County.

3.4.2 City of Fontana

The City of Fontana's General Plan does not include a specific goal related to energy, but goals developed to improve air quality and traffic circulation could help conserve energy resources in the City. The City has published a Climate Action Plan, which was developed in response to State mandates and regional guidance on reducing greenhouse gas emissions.[1] The objectives of this CAP are to:

- Provide a framework for incorporation of sustainability policies into the City's General Plan.
- Streamline the environmental review process for development projects consistent with the Climate Action Plan.
- Achieve greenhouse gas reduction targets set by The Global Warming Solutions Act (Assembly Bill 32).
- Demonstrate the City of Fontana's commitment to reducing greenhouse gas emissions in order to provide a healthier community for its residents.

3.4.3 City of Montclair

The City of Montclair General Plan promotes the use of alternative energy and transportation modes by encouraging the utilization of alternative fuels, local shuttles, and other transit in place of passenger vehicles.

3.4.4 City of Ontario

The City of Ontario uses a Policy Plan as its general plan. The Energy Element of the Plan contains goals and policies for reducing energy demands, developing renewables, and making the city ecologically and economically sustainable. Applicable policies include:

ER3-3: 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.

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.

ER3-6: Promote the use of renewable energy sources to serve public and private sector development.

[1] City of Fontana, Climate Action Plan, August 2015.

3.4.5 City of Pomona

The City of Pomona has developed a comprehensive Green Plan which contains policies to make the city more sustainable, reduce emissions, and increase energy efficiency. Applicable policies include:

Policy 3.4.1: Phase out or replace 30 percent of the City's fleet by electric or alternative fuel vehicles by 2020.

Policy 3.4.2: Increase efficiencies within existing municipal fleet operations.

Policy 4.1.1: Commit to realizing 15 percent of the City's total energy from renewable sources by 2020.

Policy 4.1.2: 30 percent of City fleet should be low-carbon based vehicles by 2020.

Policy 5.4.1: Maintain an account of and take steps to reduce the City's carbon emissions.

Policy 5.4.2: Promote cooperation among agencies and communities to reduce greenhouse gas emissions.

Policy 8.5.1: Promote municipal consideration of fuel-efficient and alternative-fuel vehicles to reduce reliance on fossil fuels.

3.4.6 City of Rancho Cucamonga

The City of Rancho Cucamonga General Plan has several policies that promote energy efficiency, conservation and emissions reductions. Applicable policies include:

Policy RC-4.1: Pursue efforts to reduce energy consumption through appropriate energy conservation and efficiency measures throughout all segments of the community.

Policy RC-4.2: Promote the use of renewable energy and alternative energy technology, and support efforts to develop small-scale, distributed energy generation (e.g., solar, wind, cogeneration, and biomass) to reduce the amount of electricity drawn from the regional power grid and reduce the use of natural gas, while providing Rancho Cucamonga with a greater degree of energy and economic self-sufficiency.

Policy RC-4.4: Reduce operational energy requirements through sustainable and complementary land use and circulation planning. Support implementation of State mandates regarding energy consumption and greenhouse gas reduction, including AB 32 and SB 375.

Policy RC-5.3: Explore and consider the costs and benefits of alternative fuel vehicles including hybrid, electric, natural gas, and hydrogen powered vehicles when purchasing new City vehicles.

The City of Rancho Cucamonga is in the process of developing a Sustainability Action Plan to identify and enhance opportunities for a cleaner and greener Rancho Cucamonga. The Sustainability Action Plan will allow Rancho Cucamonga to:

- Build Upon Recent Efforts - This project will integrate and build upon other recent planning efforts in Rancho Cucamonga, including the 2010 General Plan, the Bicycle and Pedestrian Master Plan, Healthy RC Strategic Plan, and San Bernardino Associated Governments Regional Greenhouse Gas Reduction Program.
- Evaluate Economic, Health, and Environmental Benefits - The triple bottom line analysis evaluates sustainability from the economic, health and environmental perspectives.
- Chart a Course for Future Action – The Sustainability Action Plan will identify and prioritize next steps for Rancho Cucamonga to implement additional sustainability practices to achieve the community's goals identified in the plan.

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4.0 EXISTING CONDITIONS

Based on the traffic and transportation analysis, the physical boundaries established for the existing conditions are loosely defined as south of Interstate 210, west of Garey Avenue, north of State Route 60, and east of Sierra Avenue.

Energy use is typically quantified in Btu. A Btu is the quantity of heat required to raise the temperature of one pound of water 1 degree Fahrenheit at sea level. Other units of energy can all be converted into equivalent Btu and, thus, the Btu is used as a basis for comparing energy consumption associated with different resources. For example, a gallon of gasoline equals 114,000 Btu and a gallon of diesel equals 116,090 Btu.[2]

4.1 State Energy Resources and Use

California contains abundant sources of renewable and nonrenewable energy sources. Non-renewable resources include large crude oil and natural gas deposits that are located within six geological basins in the Central Valley and along the coast. A majority of these reserves are concentrated in the southern San Joaquin Basin. Approximately 17 percent of the country's 100 largest oil fields are located in California, including the third largest oil field in the contiguous United States, the Belridge South Oil Field, located approximately 40 miles west of Bakersfield in the San Joaquin Valley. Studies have also indicated that large undiscovered deposits of recoverable oil and gas lie offshore in the Outer Continental Shelf, although federal law currently prohibits new leases on oil and gas extraction in that area.

California's renewable energy sources include: hydroelectric, with a power potential that ranks second in the country; geothermal and wind power resources found along the coastal mountain ranges and the eastern border with Nevada; and solar energy potential concentrated in the southeast deserts. California has one of the lowest per capita energy consumption rates in the country, partially attributable to energy-efficiency programs that have resulted in less energy consumption. As part of the overall economy, the transportation sector is responsible for the most energy consumption of any sector within the State. More motor vehicles are registered in California than any other state, and commute times rank as some of the longest in the country.

The U.S. Energy Information Administration last published data in 2014.[3] Energy consumption in California continues to be dominated by growth in passenger vehicles. California consumed 7,578.2 trillion Btu in 2014. The transportation sector consumed 38.7 percent, or 2,932.8 trillion Btu, of energy. The remaining energy consumption was

2 Alternative Fuels Data Center, Fuel Properties Comparison, http://www.afdc.energy.gov/fuels/fuel_comparison_chart.pdf.

3 U.S. Energy Information Administration, California State Profile and Energy Estimates, 2016.

attributed to 24.4 percent industrial, 18.6 percent commercial, and 18.3 percent residential demand. In 2013, California's per capita energy consumption ranked 48th in the nation due in part to its mild climate and energy efficiency programs.

4.2 Regional and Local Energy Use

On-road transportation energy consumption in the project area includes the fuel required for passenger vehicles (i.e., automobiles, vans, and light trucks), heavy trucks (i.e., three or more axles), and transit buses. A mix of natural gas, electricity, gasoline, and diesel fuel provide the energy source for transportation within the Geary corridor. Passenger vehicles primarily utilize gasoline as fuel, where heavy trucks primarily utilize diesel fuel. Omnitrans express and local buses, which traveled 9,207,000 miles in Fiscal Year 2015-2016, are powered by compressed natural gas (CNG).

Based on vehicle miles traveled (VMT) data obtained from the project team and fuel use data from the California Air Resources Board EMFAC2014 model, automobiles and trucks in the project area combine to use 196,483,761 gallons of fuel per year.

CNG buses average approximately 3.0 miles per diesel gallon equivalent (DGE).[4] The Omnitrans DGE value for express and local buses is approximately 3,069,000. Studies indicate that 1.0 DGE equals 114,000 Btu.[5] Therefore, the Omnitrans express and local buses consume approximately 349,866 million Btu (MMBtu) per year.

Passenger vehicles in the project area and Omnitrans express and local buses combine to consume approximately 23,085,572 MMBtu per year.

Omnitrans provided data indicating that the existing 66-bus West Valley O&M facility uses 546,832 kilowatt-hours of electricity per year and 12,080 therms (1,208 MMBtu) of natural gas per year.

[4] M.J. Bradley & Associates LLC, Clean Diesel versus CNG Buses: Cost, Air Quality, & Climate Impacts, February 22, 2012.

[5] Ibid.

5.0 IMPACTS ANALYSIS

5.1 Significance Thresholds

5.1.1 National Environmental Policy Act

According to the Council on Environmental Quality regulations (40 CFR §§ 1500-1508), the determination of a significant impact is a function of both context and intensity. Context means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Both short- and long-term effects are relevant. Intensity refers to the severity of impact. To determine significance, the severity of the impact must be examined in terms of the type, quality and sensitivity of the resource involved; the location of the proposed project; the duration of the effect (short- or long-term) and other consideration of context. Adverse impacts will vary with the setting of the proposed action and the surrounding area.

5.1.2 California Environmental Quality Act

In accordance with Appendix F of the CEQA Guidelines, the project would result in a significant impact related to energy if it would:

- Conflict with adopted energy conservation plans;
- Use non-renewable resources in a wasteful or inefficient manner; and/or
- Result in a need for energy supplies and distribution infrastructure or capacity enhancing alterations to existing power or natural gas facilities.

5.2 Methodology

The impact discusses energy conservation plans, compares energy consumption between the No Build and Build Alternatives, and discusses potential impacts to existing energy facilities. The analysis of consistency with energy conservation plans and potential impacts to existing energy facilities are qualitative discussions without detailed methodologies. The quantification of energy use for comparison between the alternatives was based off the VMT shown in Table 5-1. The energy use for the proposed O&M facility was estimated using the energy use for the existing West Valley O&M facility.

Table 5-1: Daily Vehicle Miles Traveled

Scenario and Year	Automobiles	Trucks	Total
CEQA Baseline (2016)	12,077,347	849,522	12,926,868
2023			
No Build Alternative	12,496,047	897,224	13,393,271
Alternative A	12,491,817	897,308	13,389,125
Alternative B	12,491,045	898,157	13,389,202
2040			
No Build Alternative	14,589,549	1,135,735	15,725,284
Alternative A	14,585,971	1,135,842	15,721,813
Alternative B	14,584,599	1,137,681	15,722,280
Note: The VMT analysis was prepared when 2020 was the estimated opening year. The current opening year estimate is 2023. Nevertheless, the traffic modeling forecast considered VMT through 2040, and indicates that VMT would decrease in the opening and horizon years. A three-year delay in the opening date does not substantially alter this analysis. In addition, within the EMFAC2014 model, pollutant emissions decrease in future years due to fleet turn over and improvements in engine exhaust technology.			

Source: Iteris, 2016

The VMT was translated to gasoline and diesel fuel use and then converted to Btu based on the energy content of the fuel. The California Air Resources Board EMFAC2014 model provides existing and future VMT and fuel consumption by County and year. EMFAC2014 was used to obtain gallons per mile of fuel use in 2016, 2023, and 2040. The fuel economy of automobiles and trucks for each year is shown in Table 5-2. The analysis used energy contents of 116,090 Btu per gallon of gasoline and 114,000 Btu per gallon of diesel.[6]

Table 5-2: Vehicles and Fuel Economy

Year	Vehicle Classification	Fuel Economy (Gallons per Miles)
2016	Automobile	0.03858
2016	Truck	0.15989
2023	Automobile	0.03421
2023	Truck	0.15404
2040	Automobile	0.02384
2040	Truck	0.13918

Source: California Air Resources Board, EMFAC2014

6 Alternative Fuels Data Center, Fuel Properties Comparison, http://www.afdc.energy.gov/fuels/fuel_comparison_chart.pdf.

The energy analysis also considered energy use associated with bus VMT. Energy use related to CNG buses was estimated using a CNG-equivalence factor of 3.0 miles per gallon of diesel fuel. Existing and No Build bus VMT was obtained from Omnitrans. The bus VMT for the Build Alternatives was estimated using a 35-mile corridor with 10-minute peak and 15-minute off-peak headways. The estimation included 18 service hours per day on weekdays and 12 service hours per day on weekends. The peak periods were assumed to be six hours on weekdays and no peak periods on weekends. The energy calculation files are included in the appendix.

Roadway construction energy use was estimated using data from the Sacramento Metropolitan Air Quality Management OFFROAD model. The analysis inputs included equipment mix, load factors, fuel rate, fuel use per hour, and hours per day. The appendix includes a detailed spreadsheet of construction energy use and the associated assumptions.

5.3 Impact Analysis

The following section discusses energy conservation plans, compares energy consumption between the alternatives, and discusses potential impacts to existing energy facilities.

5.3.1 Energy Conservation Plans

The 35-mile corridor passes through multiple local jurisdictions with competing energy policies. State, regional, and local regulatory bodies, including the California Energy Commission and SCAG, consistently list mass transit as a means of reducing energy consumption through decreased vehicle miles traveled. As shown in **Table 5-1**, above, the proposed project would reduce regional VMT. There are no State, regional, or local energy conservation plans that promote increased passenger vehicles on the roadway network. In addition, the O&M facility would comply with Title 24 and all other current State and local energy conservation measures. There is no potential for the proposed project to interfere with regulatory policies to reduce energy use. Therefore, there would no impact under CEQA and no adverse effect under NEPA related to energy conservation plans.

5.3.2 Wasteful or Inefficient use of Non-Renewable Resources

The long-term change in energy use associated with the proposed project was estimated in terms of Btu and gasoline consumption. The Btu analysis accounts for CNG use by Omnitrans buses while the change in fuel consumption is only estimated for passenger vehicles and trucks. **Table 5-3** shows the Btu comparison between the alternatives. Alternative A would marginally decrease Btu consumption in 2023 and 2040 when compared to the No Build Alternative. Alternative B would marginally decrease Btu consumption in 2023 but marginally increase Btu consumption in 2040. Each of the Build Alternatives would decrease passenger vehicle VMT. Btu consumption would slightly increase under Alternative B in 2040 primarily due to the increased truck VMT associated with slight trip diversions. When compared to the No Build Alternative as required under NEPA, Alternatives A and B would not result in a substantial change in Btu consumption. Therefore, the proposed project would not result in an adverse effect related to Btu consumption.

Compared to the 2016 CEQA baseline, the Build Alternatives would decrease Btu consumption by approximately 6.4 percent in 2023 and 18 percent in 2040. The decrease is because passenger vehicles and trucks are anticipated to be more fuel efficient in future years when compared to existing conditions. This trend is evident in the California Air Resources Board EMFAC2014 model and associated information provided in the methodology for this study. When compared to the CEQA baseline, each of the Build Alternatives would result in less Btu consumption. Therefore, the proposed project would result in a less-than-significant impact related to Btu consumption.

Table 5-4 shows the change in gasoline consumption associated between the scenarios. Alternative A would marginally decrease gasoline consumption in 2023 and 2040 when compared to the No Build Alternative. Alternative B would marginally decrease gasoline consumption in 2023 but marginally increase gasoline consumption in 2040. Each of the Build Alternatives would decrease passenger vehicle VMT. Gasoline consumption would slightly increase under Alternative B in 2040 due to the increased truck VMT associated with slight trip diversions. When compared to the No Build Alternative as required under NEPA, Alternatives A and B would not result in a substantial change in gasoline consumption. Therefore, the proposed project would not result in an adverse effect related to gasoline consumption.

Table 5-3: British Thermal Unit Comparison (Annual)

Scenario and Year	Total Btu (Million)	Change Between Build and No Build Alternatives	Percent Change	Change Between Build Alternatives and CEQA Baseline	Percent Change
CEQA Baseline (2016)	23,085,572	--	--	--	--
2023					
No Build Alternative	21,613,507	--	--	-1,472,065	-6.38%
Alternative A	21,608,262	-5,245	-0.024%	-1,477,309	-6.40%
Alternative B	21,611,094	-2,413	-0.011%	-1,474,478	-6.39%
2040					
No Build Alternative	19,007,867	--	--	-4,077,705	-17.7%
Alternative A	19,005,063	-2,803	-0.015%	-4,080,509	-17.7%
Alternative B	19,011,366	3,500	0.018%	-4,074,205	-17.6%
Note: The VMT analysis was prepared when 2020 was the estimated opening year. The current opening year estimate is 2023. Nevertheless, the traffic modeling forecast considered VMT through 2040, and indicates that VMT would decrease in the opening and horizon years. A three-year delay in the opening date does not substantially alter this analysis. In addition, within the EMFAC2014 model, pollutant emissions decrease in future years due to fleet turn over and improvements in engine exhaust technology.					

Source: Terry A. Hayes Associates Inc., 2018

Table 5-4: Gasoline Consumption Comparison (Annual)

Scenario and Year	Total Gallons	Change Between Build and No Build Alternatives	Percent Change	Change Between Build Alternatives and CEQA Baseline	Percent Change
CEQA Baseline (2016)	196,483,761	--	--	--	--
2023					
No Build Alternative	183,814,562	--	--	-12,669,199	-6.45%
Alternative A	183,767,932	-46,630	-0.025%	-12,715,829	-6.47%
Alternative B	183,792,938	-21,624	-0.012%	-12,690,823	-6.46%
2040					
No Build Alternative	161,462,891	--	--	-35,020,870	-17.8%
Alternative A	161,437,300	-25,591	-0.016%	-35,046,461	-17.8%
Alternative B	161,492,800	29,908	0.019%	-34,990,961	-17.8%
Note: The VMT analysis was prepared when 2020 was the estimated opening year. The current opening year estimate is 2023. Nevertheless, the traffic modeling forecast considered VMT through 2040, and indicates that VMT would decrease in the opening and horizon years. A three-year delay in the opening date does not substantially alter this analysis. In addition, within the EMFAC2014 model, pollutant emissions decrease in future years due to fleet turn over and improvements in engine exhaust technology.					

Source: Terry A. Hayes Associates Inc., 2018

Compared to the 2016 CEQA baseline, the Build Alternatives would decrease gasoline consumption by 6.5 percent in 2023 and 18 percent in 2040. As stated previously, the decrease is because passenger vehicles and trucks are anticipated to be more fuel efficient in future years when compared to existing conditions. When compared to the CEQA baseline, each of the Build Alternatives would result in less gasoline consumption. Therefore, the proposed project would result in a less-than-significant impact related to gasoline consumption.

Based on energy use from the existing O&M facility, the proposed O&M facility would use 1,260 MMBtu per year of energy resources. This increased energy use is not considered a wasteful or inefficient use of energy resources as the energy is being used to operate and maintain a mass transit system, which has been identified by State and regional agencies as an efficient method of reducing cumulative energy use. The energy used at the proposed O&M facility is a very small amount of the total energy associated with the new mass transit system as shown in Table 5-3, above. The 1,260 MMBtu represents less than 0.0059 percent of the estimated 21.5 MMBtu consumed in 2023 for regional mobile source energy use. For 2040, the 1,260 MMBtu represents less than 0.0066 percent of the estimated 19 MMBtu consumed for regional mobile source energy use. Based on this analysis, the proposed O&M facility would not result in a wasteful or inefficient use energy.

Diesel fuel would be used for equipment and trucks, while gasoline fuel would be used for worker vehicles. Diesel and gasoline fuel use for each alternative and project phase is shown in Table 5-5. Table 5-5 also shows fossil fuel use by project phase and the fuel use associated with construction of the O&M facility. Alternative B would require more diesel and gasoline fuel than Alternative A primarily due to the longer construction schedule. The increased fuel use is not considered a wasteful or inefficient use of non-renewable resources as the fuel is being used to construct a mass transit system, which has been identified by State and regional agencies as an efficient method of reducing energy use. Therefore, there would be a less-than-significant impact under CEQA and no adverse effect under NEPA related to the efficient use of non-renewable energy resources during construction.

Table 5-5: Fossil Fuel Consumption during Construction Activities

Scenario	Equipment Diesel (gallons)	Worker Gasoline (gallons)	Truck Diesel (gallons)
Alternative A			
Phase I	50,921	51,700	9,518
Phase II	44,838	3,600	1,033
Subtotal	95,759	55,300	10,551
Alternative B			
Phase 1	164,222	103,378	32,893
Phase II	44,838	3,600	1,033
Subtotal	209,060	106,978	33,926
O&M Facility	27,693	6,084	3,611

Source: Terry A. Hayes Associates Inc., 2018

Impacts to Existing Power or Natural Gas Facilities

The proposed project would require electrical power for new stations and O&M activities. Regarding stations, electricity would be needed for lighting and emergency telephones. Omnitrans policies require energy efficient lighting and telephones, which require very small amounts of power. The proposed O&M facility would require approximately 224,200 kilowatt-hours of electricity per year. The Southern California Edison provides electricity to the project area. Southern California Edison generated 87 billion kilowatt-hours per year in 2015. The proposed O&M facility would require 0.00026 percent of regional electricity generation.[7] The electricity used by the proposed O&M facility would have no effect on regional or local energy supply or facilities.

The proposed O&M facility would require approximately 485,568 cubic feet of natural gas per year. The Southern California Gas Company provides natural gas to the project area. The area is served by a complex system of underground pipelines. The proposed O&M facility may require new connections to natural gas pipelines. However, the O&M facility

[7] Southern California Edison, Who We Are Fact Sheet, March 2018.

would not require the construction of substantial off-site facilities. The Southern California Gas Company throughput in 2016 was 2,511,000,000 cubic feet per day.[8] The proposed O&M facility would require 0.019 percent of Southern California Gas Company throughput. The natural gas used by the proposed O&M facility would have no effect on regional or local natural gas supply or facilities. Therefore, there would be a less-than-significant impact under CEQA and no adverse effect under NEPA related to the potential operational impacts to existing power or natural gas facilities.

Construction activity would not require natural gas and the majority of power would be provided by generators or diesel-fueled equipment. Construction activity would not require infrastructure or capacity enhancing alterations to existing power or natural gas facilities. Therefore, there would be a less-than-significant impact under CEQA and no adverse effect under NEPA related to the potential construction impacts to existing power or natural gas facilities.

[8] California Gas and Electric Utilities, *2017 California Gas Report*, 2017.

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6.0 CONCLUSIONS, RECOMMENDATIONS, & MITIGATION MEASURES

The Energy Study assesses consistency with energy conservation plans, compares energy consumption between the alternatives, and discusses potential impacts to existing energy facilities. The proposed BRT project is a mass transit system that is consistent with State and regional policies to reduce long-term energy use. Construction activity is considered an efficient short-term use of non-renewable energy resources and would not result in a significant impact related to energy use. No significant impacts have been identified under CEQA and no adverse effects have been identified under NEPA. No mitigation or control measures are necessary to reduce excessive energy use.

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APPENDIX A - ENERGY CALCULATIONS

Appendix A

Energy Calculations

Vehicle Miles Traveled Data

VMT (miles/day) - weekday

	Automobiles			Trucks		
	2016	2020	2040	2016	2020	2040
Existing	12,077,347	--	--	849,522	--	--
No Build		12,496,047	14,589,549		897,224	1,135,735
Alternative A		12,491,817	14,585,971		897,308	1,135,842
Alternative B		12,491,045	14,584,599		898,157	1,137,681

Annual VMT (miles/year)

	Light duty			Trucks			Bus		
	2016	2020	2040	2016	2020	2040	2016	2020	2040
Existing	4,173,979,304			221,725,182			9,207,000		
No Build		4,318,683,847	5,042,206,564		234,175,458	296,426,835		9,207,000	9,207,000
Alternative A		4,317,221,922	5,040,969,921		234,197,414	296,454,788		9,211,620	9,211,620
Alternative B		4,316,955,116	5,040,495,753		234,419,003	296,934,767		9,211,620	9,211,620

Notes:

For auto annual VMT, Saturdays are 85% of ADT and Sundays are 77.7% of ADT. Based on a similar project and confirmed as reasonable by Iteris.
For truck annual VMT, weekends are 25% of ADT.
CNG not estimated for change in fuel consumption. Only added as diesel equivalent and for the change in BTU.
Existing Bus VMT from Omnitrans website
(http://www.omnitrans.org/news-and-resources/newsroom/#quick-facts).

Bus VMT based on 33.5 mile corridor, 10-minute peak and 15-minute off-peak headways with 18 service hours per day on weekdays and 12 service hours per day on weekends. 6 hour peak periods on weekdays. No peak periods on the weekend. All multiplied by 2 for two-way.

Fuel Consumption Calculations

Fuel Consumption Factors

CNG Diesel Equivalent[1]	3.0	miles/gal
Fuel economy (Autos-2016)	0.03858	gal/mile
Fuel economy (Autos-2020)	0.03421	gal/mile
Fuel economy (Autos-2040)	0.02384	gal/mile
Fuel economy (Trucks-2016)	0.15989	gal/mile
Fuel economy (Trucks-2020)	0.15404	gal/mile
Fuel economy (Trucks-2040)	0.13918	gal/mile
Energy content of Gasoline[2]	116,090	Btu/gal
Energy content of diesel[2]	114,000	Btu/gal

[1] M.J. Bradley & Associates LLC, Clean Diesel versus CNG Buses: Cost, Air Quality, & Climate Impacts, February 22, 2012.

[2] Alternative Fuels Data Center – Fuel Properties Comparison, http://www.afdc.energy.gov/fuels/fuel_comparison_chart.pdf

Fuel usage (gal/year)

	Gasoline	Diesel	Total	Gasoline	Diesel	Total	Gasoline	Diesel	Total
	2016			2020			2040		
Existing	161,032,122	35,451,639	196,483,761						
No Build				147,742,174	36,072,387	183,814,562	120,206,204	41,256,687	161,462,891
Alternative A				147,692,162	36,075,770	183,767,932	120,176,723	41,260,577	161,437,300
Alternative B				147,683,035	36,109,903	183,792,938	120,165,419	41,327,381	161,492,800

Change in Fuel Consumption (gal) Compared to No Build Alternative

	Automobiles		Trucks		Total	
	2020	2040	2020	2040	2020	2040
AlternativeA	-50,012	-29,482	3,382	3,890	-46,630	-25,591
Alternative B	-59,140	-40,786	37,516	70,694	-21,624	29,908

Change in Fuel Consumption (gal) Compared to Existing Conditions

	Automobiles		Trucks		Total	
	2020	2040	2020	2040	2020	2040
Alternative A	-13,339,960	-40,855,399	624,130	5,808,938	-12,715,829	-35,046,461
Alternative B	-13,349,087	-40,866,703	658,264	5,875,742	-12,690,823	-34,990,961

Energy Equivalent Calculations

	Energy Equivalent in Million BTUs			% Change in Energy Equivalent in BTU to No Build		Change in Energy Equivalent in BTU to No Build		% Change in Energy Equivalent in BTU to Existing		Change in Energy Equivalent in BTU to Existing	
	2016	2020	2040	2020	2040	2020	2040	2020	2040	2020	2040
Existing	23,085,572										
No Build		21,613,507	19,007,867	-	-	-	-	-6.38%	-17.7%	-1,472,065	-4,077,705
Alternative A		21,608,262	19,005,063	-0.024%	-0.015%	-5,245	-2,803	-6.40%	-17.7%	-1,477,309	-4,080,509
Alternative B		21,611,094	19,011,366	-0.011%	0.018%	-2,413	3,500	-6.39%	-17.6%	-1,474,478	-4,074,205

-1,477,309	-4,080,509
-1,474,478	-4,074,205

Alternative A (Phase I) Construction Energy Calculations

Construction Equipment Diesel Demand									
Phase and Activity	**Equipment Type**	**Horse Power**	**Load Factor**	**Fuel Rate**	**Fuel Use/Hour**	**No. Equipment**	**Hrs/Day**	**Total Days**	**Total Fuel Use**
Grubbing/Land Clearing	Concrete/Industrial Saws	81	0.73	0.04	2.37	3	8.00	26	1,475.88
Grubbing/Land Clearing	Grader	175	0.41	0.04	2.87	3	8.00	26	1,790.88
Grubbing/Land Clearing	Signal Board	6	0.82	0.04	0.20	6	8.00	26	245.61
Grubbing/Land Clearing	Tractor/Loader/Backhoe	98	0.37	0.04	1.45	3	8.00	106	3,689.82
Grading/Excavation	Forklift	89	0.2	0.04	0.71	3	8.00	106	1,811.33
Grading/Excavation	Roller	81	0.38	0.04	1.23	3	8.00	106	3,132.17
Grading/Excavation	Signal Board	6	0.82	0.04	0.20	6	8.00	106	1,001.32
Grading/Excavation	Tractor/Loader/Backhoe	98	0.37	0.04	1.45	3	8.00	106	3,689.82
Drainage/Utilities/Subgrade	Forklift	89	0.2	0.04	0.71	3	8.00	92	1,572.10
Drainage/Utilities/Subgrade	Signal Board	6	0.82	0.04	0.20	6	8.00	92	869.07
Drainage/Utilities/Subgrade	Tractor/Loader/Backhoe	98	0.37	0.04	1.45	3	8.00	92	3,202.48
Drainage/Utilities/Subgrade	Trencher	81	0.5	0.04	1.62	3	8.00	92	3,576.96
Paving	Air Compressor	78	0.48	0.04	1.50	3	8.00	40	1,437.70
Paving	Cement and Mortar Mixer	9	0.56	0.04	0.20	3	8.00	40	193.54
Paving	Paver	126	0.42	0.04	2.12	3	8.00	40	2,032.13
Paving	Roller	81	0.38	0.04	1.23	3	8.00	40	1,181.95
Paving	Signal Board	6	0.82	0.04	0.20	6	8.00	40	377.86
Paving	Tractor/Loader/Backhoe	98	0.37	0.04	1.45	3	8.00	40	1,392.38
All Phases	Water Trucks	200	0.36	0.04	2.88	3	8.00	264	18,247.68
								Total	**50,920.67**

Construction Worker Gasoline Demand							
Phase	**Trips**	**Trip Length**	**Total Miles**	**Fuel Economy**	**Gal/Day**	**Total Days**	**Total Demand**
Grubbing/Land Clearing	176	20	3,520.0	20.0	176.0	26	4,576.0
Grading/Excavation	206	20	4,120.0	20.0	206.0	106	21,836.0
Drainage/Utilities/Subgrade	194	20	3,880.0	20.0	194.0	92	17,848.0
Paving	186	20	3,720.0	20.0	186.0	40	7,440.0
						Total	**51,700.0**

Material Hauling Diesel Demand					
Phase	**Trips**	**Trip Length**	**Total Miles**	**Fuel Economy**	**Total Demand**
Grubbing/Land Clearing	78	3.0	234.0	5.6	41.8
Grading/Excavation	954	54.0	51,516.0	5.6	9,199.3
Drainage/Utilities/Subgrade	276	3.0	828.0	5.6	147.9
Paving	240	3.0	720.0	5.6	128.6
				Total	**9,517.5**

Alternatives B (Phase I) Construction Energy Calculations

Construction Equipment Diesel Demand									
Phase and Activity	**Equipment Type**	**Horse Power**	**Load Factor**	**Fuel Rate**	**Fuel Use/Hour**	**No. Equipment**	**Hrs/Day**	**Total Days**	**Total Fuel Use**
Grubbing/Land Clearing	Concrete/Industrial Saws	81	0.73	0.04	2.37	2	8.00	53	2,005.69
Grubbing/Land Clearing	Grader	175	0.41	0.04	2.87	4	8.00	53	4,867.52
Grubbing/Land Clearing	Rubber Tired Dozer	255	0.4			2	8.01	53	-
Grubbing/Land Clearing	Signal Board	6	0.82	0.04	0.20	10	8.02	53	836.52
Grading/Excavation	Crawler Tractor	89	0.2	0.04	0.71	2	8.03	211	2,412.73
Grading/Excavation	Excavator	81	0.38	0.04	1.23	4	8.04	211	8,354.63
Grading/Excavation	Grader	175	0.41	0.04	2.87	2	8.05	211	9,749.68
Grading/Excavation	Roller	81	0.38	0.04	1.23	2	8.06	211	4,187.71
Grading/Excavation	Rubber Tired Dozer	255	0.4	0.04	4.08	2	8.07	211	13,894.60
Grading/Excavation	Signal Board	6	0.82	0.04	0.20	8	8.08	211	2,684.16
Grading/Excavation	Tractor/Loader/Backhoe	98	0.37	0.04	1.45	4	8.09	211	9,903.27
Drainage/Utilities/Subgrade	Air Compressor	78	0.48	0.04	1.50	2	8.10	185	4,488.31
Drainage/Utilities/Subgrade	Generator Set	84	0.74	0.04	2.49	2	8.11	185	7,460.94
Drainage/Utilities/Subgrade	Grader	175	0.41	0.04	2.87	2	8.12	185	8,622.63
Drainage/Utilities/Subgrade	Plate Compactor	8	0.43	0.04	0.14	2	8.13	185	413.91
Drainage/Utilities/Subgrade	Pump	84	0.74	0.04	2.49	2	8.14	185	7,488.54
Drainage/Utilities/Subgrade	ForkLift	89	0.2	0.04	0.71	4	8.15	185	4,294.07
Drainage/Utilities/Subgrade	Signal Board	6	0.82	0.04	0.20	10	8.16	185	2,970.89
Drainage/Utilities/Subgrade	Tractor/Loader/Backhoe	98	0.37	0.04	1.45	4	8.17	185	8,768.83
Drainage/Utilities/Subgrade	Trencher	81	0.5	0.04	1.62	2	8.18	185	4,903.09
Paving	Air Compressor	78	0.48	0.04	1.50	4	8.19	79	3,875.85
Paving	Cement and Mortar Mixer	9	0.56	0.04	0.20	2	8.20	79	261.19
Paving	Paver	126	0.42	0.04	2.12	1	8.21	79	1,372.94
Paving	Paving Equipment	131	0.36	0.04	1.89	1	8.22	79	1,224.99
Paving	Roller	81	0.38	0.04	1.23	2	8.23	79	1,600.98
Paving	Signal Board	6	0.82	0.04	0.20	67	8.00	79	8,333.30
Paving	Tractor/Loader/Backhoe	98	0.37	0.04	1.45	3	8.00	79	2,749.96
All Phases	Water Trucks	200	0.36	0.04	2.88	3	8.00	528	36,495.36
								Total	**164,222.28**

Construction Worker Gasoline Demand							
Phase	**Trips**	**Trip Length**	**Total Miles**	**Fuel Economy**	**Gal/Day**	**Total Days**	**Total Demand**
Grubbing/Land Clearing	176	20	3,520.0	20.0	176.0	53	9,328.0
Grading/Excavation	206	20	4,120.0	20.0	206.0	211	43,466.0
Drainage/Utilities/Subgrade	194	20	3,880.0	20.0	194.0	185	35,890.0
Paving	186	20	3,720.0	20.0	186.0	79	14,694.0
						Total	**103,378.0**

Material Hauling Diesel Demand					
Phase	**Trips**	**Trip Length**	**Total Miles**	**Fuel Economy**	**Total Demand**
Grubbing/Land Clearing	53	3.0	159.0	5.6	28.4
Grading/Excavation	3,376	54.0	182,304.0	5.6	32,554.3
Drainage/Utilities/Subgrade	185	3.0	555.0	5.6	99.1
Paving	395	3.0	1,185.0	5.6	211.6
				Total	**32,893.4**

Phase II (Alternatives A and B) Construction Energy Calculations

Construction Equipment Diesel Demand									
Phase and Activity	**Equipment Type**	**Horse Power**	**Load Factor**	**Fuel Rate**	**Fuel Use/Hour**	**No. Equipment**	**Hrs/Day**	**Total Days**	**Total Fuel Use**
Grubbing/Land Clearing	Concrete/Industrial Saws	81	0.73	0.04	2.37	3	8.00	26	1,475.88
Grubbing/Land Clearing	Grader	175	0.41	0.04	2.87	3	8.00	26	1,790.88
Grubbing/Land Clearing	Signal Board	6	0.82	0.04	0.20	6	8.00	26	245.61
Grubbing/Land Clearing	Tractor/Loader/Backhoe	98	0.37	0.04	1.45	3	8.00	106	3,689.82
Grading/Excavation	Forklift	89	0.2	0.04	0.71	3	8.00	106	1,811.33
Grading/Excavation	Roller	81	0.38	0.04	1.23	3	8.00	106	3,132.17
Grading/Excavation	Signal Board	6	0.82	0.04	0.20	6	8.00	106	1,001.32
Grading/Excavation	Tractor/Loader/Backhoe	98	0.37	0.04	1.45	3	8.00	106	3,689.82
Drainage/Utilities/Subgrade	Forklift	89	0.2	0.04	0.71	3	8.00	92	1,572.10
Drainage/Utilities/Subgrade	Signal Board	6	0.82	0.04	0.20	6	8.00	92	869.07
Drainage/Utilities/Subgrade	Tractor/Loader/Backhoe	98	0.37	0.04	1.45	3	8.00	92	3,202.48
Drainage/Utilities/Subgrade	Trencher	81	0.5	0.04	1.62	3	8.00	92	3,576.96
Paving	Air Compressor	78	0.48	0.04	1.50	3	8.00	40	1,437.70
Paving	Cement and Mortar Mixer	9	0.56	0.04	0.20	3	8.00	40	193.54
Paving	Paver	126	0.42	0.04	2.12	3	8.00	40	2,032.13
Paving	Roller	81	0.38	0.04	1.23	3	8.00	40	1,181.95
Paving	Signal Board	6	0.82	0.04	0.20	6	8.00	40	377.86
Paving	Tractor/Loader/Backhoe	98	0.37	0.04	1.45	3	8.00	40	1,392.38
All Phases	Water Trucks	200	0.36	0.04	2.88	2	8.00	264	12,165.12
								Total	**44,838.11**

Construction Worker Gasoline Demand							
Phase	**Trips**	**Trip Length**	**Total Miles**	**Fuel Economy**	**Gal/Day**	**Total Days**	**Total Demand**
Grubbing/Land Clearing	30	10	300.0	22.0	13.6	26	354.5
Grading/Excavation	30	10	300.0	22.0	13.6	106	1,445.5
Drainage/Utilities/Subgrade	30	10	300.0	22.0	13.6	92	1,254.5
Paving	30	10	300.0	22.0	13.6	40	545.5
						Total	**3,600.0**

Material Hauling Diesel Demand					
Phase		**Trip Length**	**Total Miles**	**Fuel Economy**	**Total Demand**
Grubbing/Land Clearing		3.0	78.0	6.0	13.0
Grading/Excavation		54.0	5,724.0	6.0	954.0
Drainage/Utilities/Subgrade		3.0	276.0	6.0	46.0
Paving		3.0	120.0	6.0	20.0
				Total	**1,033.0**

O&M Facility Construction Energy Calculations

Construction Equipment Diesel Demand									
Phase and Activity	Equipment Type	Horse Power	Load Factor	Fuel Rate	Fuel Use/Hour	No. Equipment	Hrs/Day	Total Days	Total Fuel Use
Demolition	Concrete/Industrial Saw	81	0.73	0.04	2.37	1	8	30	567.65
Demolition	Excavator	158	0.38	0.04	2.40	3	8	30	1,729.15
Demolition	Rubber Tired Dozer	247	0.4	0.04	3.95	2	8	30	1,896.96
Grading	Excavator	158	0.38	0.04	2.40	1	8	20	384.26
Grading	Grader	187	0.41	0.04	3.07	1	8	20	490.69
Grading	Rubber Tired Dozer	247	0.4	0.04	3.95	1	8	20	632.32
Grading	Tractor/Loader/Backhoe	97	0.37	0.04	1.44	3	8	20	689.09
Building Construction	Crane	231	0.29	0.04	2.68	1	7	210	3,939.01
Building Construction	Forklifts	89	0.2	0.04	0.71	3	8	210	3,588.48
Building Construction	Generator Sets	84	0.74	0.04	2.49	1	8	210	4,177.15
Building Construction	Tractor/Loader/Backhoe	97	0.37	0.04	1.44	3	7	210	6,331.00
Building Construction	Welder	46	0.45	0.04	0.83	1	8	210	1,391.04
Paving	Paver	130	0.42	0.04	2.18	2	8	20	698.88
Paving	Paving Equipment	132	0.36	0.04	1.90	2	8	20	608.26
Paving	Roller	80	0.38	0.04	1.22	2	8	20	389.12
Architectural Coating	Air Compressor	78	0.48	0.04	1.50	1	6	20	179.71
								Total	**27,692.76**

Construction Worker Gasoline Demand							
Phase	Trips	Trip Length	Total Miles	Fuel Economy	Gal/Day	Total Days	Total Demand
Demolition	16	14.7	235.2	38.7	6.1	44	267.4
Grading	16	14.7	235.2	38.7	6.1	176	1,069.6
Building Construction	60	14.7	882.0	38.7	22.8	154	3,509.8
Paving	16	14.7	235.2	38.7	6.1	154	935.9
Architectural Coating	12	14.7	176.4	38.7	4.6	66	300.8
						Total	**6,083.6**

Truck Diesel Demand					
Phase	Trips	Trip Length	Total Miles	Fuel Economy	Total Demand
Demolition	972	20.0	19,440.0	5.6	3,471.4
Building Construction	26	30.0	780.0	5.6	139.3
				Total	**3,610.7**