# Recommended Project Description

## Introduction

Santa Clara Valley Transportation Authority's (VTA's) Bay Area Rapid Transit (BART) Silicon Valley Program consists of the extension of the BART system from its terminus at Warm Springs Station in southern Fremont in Alameda County, which opened in March 2017, into Santa Clara County through the Cities of Milpitas, San Jose, and Santa Clara. The BART Silicon Valley Program is being implemented in two phases: the Phase I Berryessa Extension Project (Phase I) and the Phase II Extension Project (Phase II) as shown on Figure 1. The Phase I Project is currently under construction and scheduled to be operational in 2018. The remaining approximately 6 miles of the BART Silicon Valley Program is called VTA's BART Silicon Valley Phase II Extension Project (Phase II Project) as described in detail below.

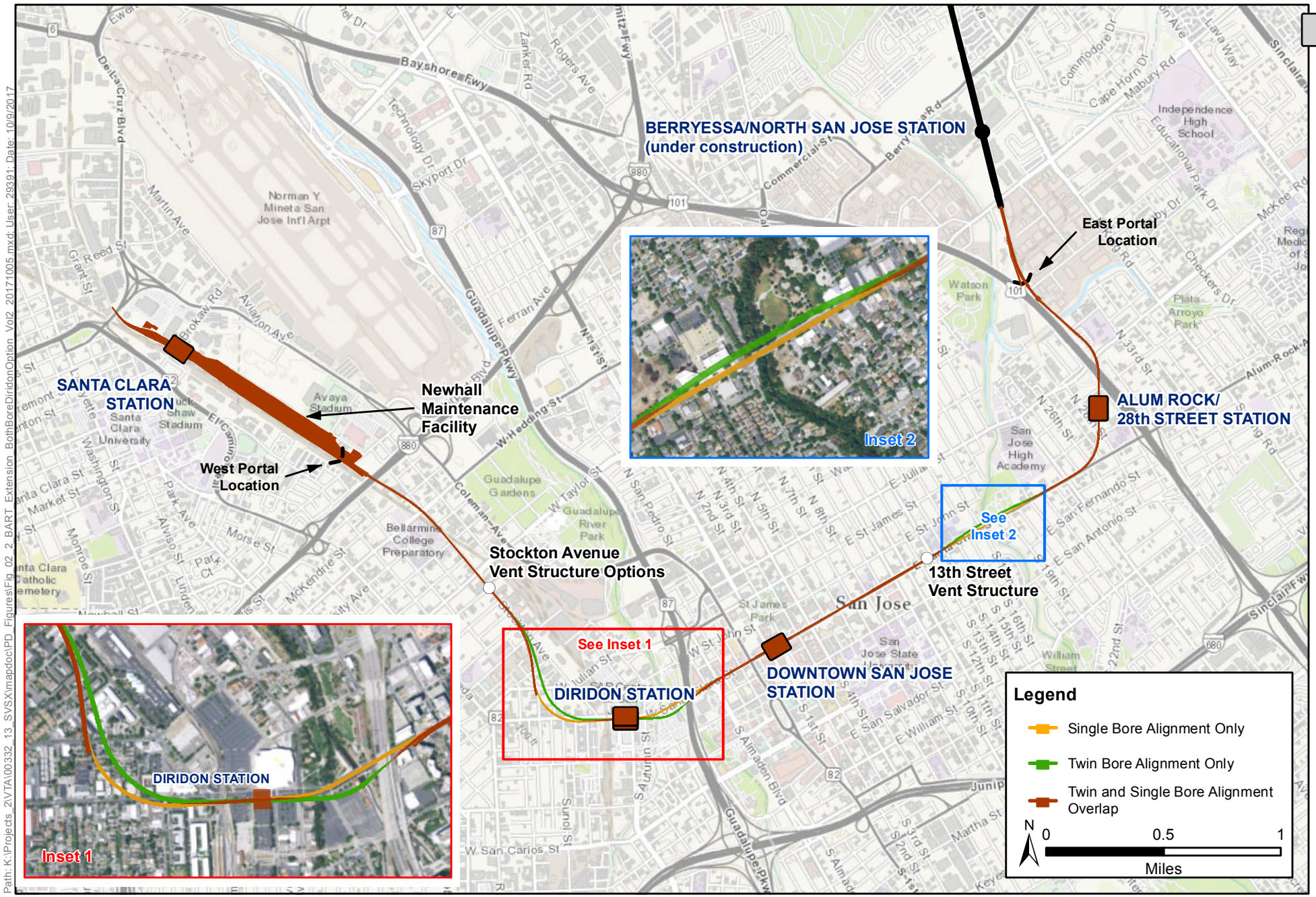
The Phase II Project's Transit-Oriented Joint Development (TOJD) would consist of retail, office, and residential uses. The TOJD would be consistent with the Public Utilities Code 100130.5 (b) (1) definition of TOJD, which includes commercial, residential or mixed-use development.

The Alum Rock/28$^{th}$ Street and Santa Clara Stations would include retail, office, and residential uses. The Downtown San Jose and Diridon Stations would incorporate retail and office uses. Two ventilation structures would have retail uses on the street frontage.

## BART Extension

The Phase II Project would consist of the approximately 6-mile extension of the BART system from the Berryessa/North San Jose Station through downtown San Jose in an approximately 5-mile-long tunnel terminating in Santa Clara near the Santa Clara Caltrain Station, as shown in Figure 1.

Two BART lines are planned to serve the Phase II Project: Santa Clara–Richmond and Santa Clara–Daly City. The following service level description represents the combined service of these two lines in one direction. BART would operate every weekday from 4 a.m. to 1 a.m., with 6- to 12-minute average headways from 4 a.m. to 6 a.m., 6-minute peak to 7.5-minute average headways from 6 a.m. to 7 p.m., and 15- to 20-minute average headways after 7 p.m. Saturday BART service would be from 6 a.m. to 1 a.m., with 7.5- to 10-minute average headways from about 9 a.m. to 6:30 p.m., and 15- to 20-minute average headways before 9 a.m. and after 6:30 p.m. Sunday BART service would be from 8 a.m. to 1 a.m., with 15- to 20-minute headways all day. However, BART service levels are subject to refinement based on BART's updates to their systemwide operating plan. Approximately 48 new BART vehicles would be needed to accommodate these service levels and the 2035 Forecast Year ridership demand.




Source: Station and Track, VTA 2014; Basemap, ESRI 2015

**Figure 1**
**BART Extension Alternative**
VTA's BART Silicon Valley – Phase II Extension Project

A summary of parking by station location is provided in Table 1 and is described in detail in the individual City discussions below.

**Table 1: Parking to be Provided as Part of the BART Extension**

| BART Station | Parking Spaces |
|---|---|
| Alum Rock/28th Street | 1,200 |
| Downtown San Jose | No park-and-ride facilities |
| Diridon | No park-and-ride facilities |
| Santa Clara | 500 |

# Alignment and Station Features by City

## City of San Jose

### Connection to Phase I Berryessa Extension

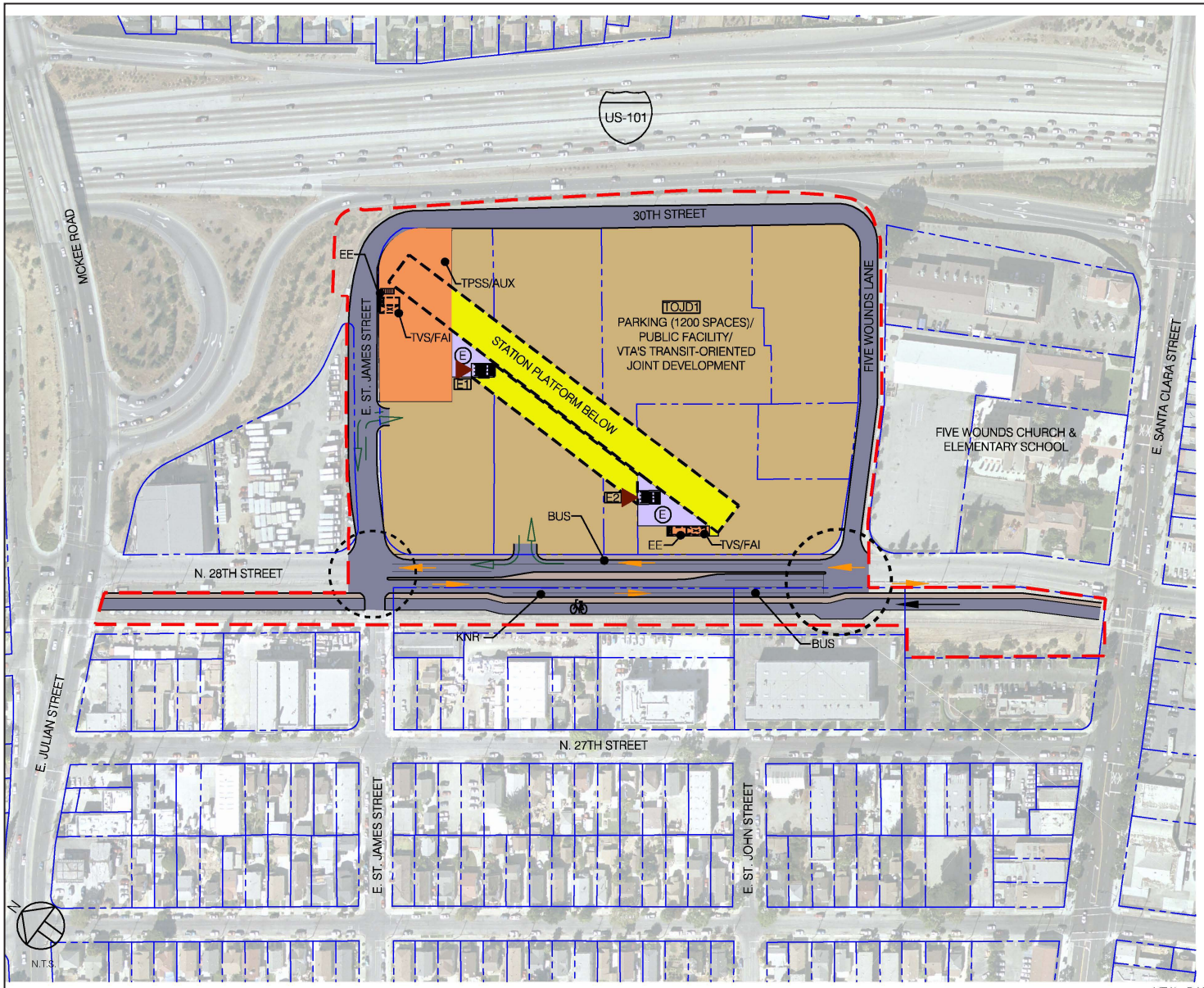
The BART Extension would begin in the City of San Jose where the Phase I tail tracks end. The at-grade Phase I tail tracks would be partially removed to allow for construction of the bored tunnel, East Tunnel Portal, and supporting facilities. The new tracks would be connected to the Phase I tracks to allow for future BART operation along the entire BART Silicon Valley corridor from southern Fremont to Santa Clara.

The alignment would transition from a retained-fill configuration east of U.S. 101 and south of Mabury Road near the end of the Phase I alignment into a retained-cut configuration and enter the East Tunnel Portal near Las Plumas Avenue (approximately STA 573+00).

South of the portal, the alignment would pass beneath North Marburg Way, then approximately 30 feet below the creek bed of Lower Silver Creek (STA 581+00), just to the east of U.S. 101 (STA 581+00), then curve under U.S. 101 south of the McKee Road overpass, and enter Alum Rock/28th Street Station.

### Alum Rock/28th Street Station

Alum Rock/28th Street Station would be located between U.S. 101 and North 28th Street (starting at approximately STA 600+00) and between McKee Road and Santa Clara Street. The approximately 11-acre station campus would include facilities such as a parking structure, systems facilities, and roadway improvements to North 28th Street, as shown on Figure 2. The station would be underground with street-level entrance portals with elevators, escalators, and stairs covered by canopy structures. The station would have a minimum of two entrances. An underground concourse level would span between the two entrances adjacent to the tunnel. The location and configuration of the station entrances would be finalized during final design based on applicable BART Facilities Standards and ridership projections. Signage for all stations would comply with Metropolitan Transportation Commission's Regional Transit Wayfinding Guidelines and Standards.




LEGEND

- STATION ENTRANCE OPTIONS
- UNDERGROUND STATION, CONCOURSE, & SYSTEM FACILITIES
- ABOVE AND BELOW GROUND SYSTEMS FACILITIES
- PARKING/PUBLIC FACILITY/ VTA'S TRANSIT-ORIENTED JOINT DEVELOPMENT
- ROADWAY MODIFICATIONS
- CONSTRUCTION STAGING AREA
- KEY PEDESTRIAN LINKAGE
- BUS CIRCULATION
- VEHICLE ACCESS
- NEW SIGNALIZED INTERSECTION
- BIKE FACILITY
- Ⓔ ELEVATOR
- EE EMERGENCY EGRESS (PASSENGER; SERVICE ENTRY)
- E1 ENTRANCE #
- FAI FRESH AIR INTAKE
- KNR KISS-AND-RIDE
- TOJD1 VTA'S TRANSIT-ORIENTED JOINT DEVELOPMENT LOCATION #
- TPSS TRACTION POWER SUBSTATION
- TVS TUNNEL VENTILATION SHAFT
- AUX AUXILIARY POWER SUBSTATION

**DRAFT CONCEPTUAL EXHIBITS**

ALUM ROCK/28TH STREET STATION

SINGLE-BORE TUNNEL

05/08/2017

*VTA's BART Silicon Valley Phase II Extension Project Final SEIS/SEIR*

Graphics ... 00332.13 (1-23-2018)

Source: VTA, 2017.

**Figure 2**
**Alum Rock/28th Street Station Plan**
VTA's BART Silicon Valley–Phase II Extension Project

A parking structure of up to seven levels would accommodate BART park-and-ride demand with 1,200 parking spaces. Areas for automobiles, shuttles, and buses to drop off passengers would be provided on North 28th Street and/or within the station campus.

Access to Alum Rock/28th Street Station would be primarily from McKee Road and North 28th Street at the north end of the station site, and from Santa Clara and North 28th Streets at the south end of the site. New or modified traffic signals would be provided at the intersections of North 28th Street and McKee Road, and North 28th and Santa Clara Streets. New traffic signals would also be provided in the station area on North 28th Street at St. James Street and at Five Wounds Lane for access to the parking structure and passenger loading areas. A pedestrian connection along the south side of the station campus at North 28th Street from Santa Clara Street would be designed as a pedestrian/bicycle/transit gateway into the station campus with amenities such as street trees, wide sidewalks, bicycle facilities, and pedestrian-scaled lighting. This gateway would link the station with buses and Bus Rapid Transit (BRT) operating on Santa Clara Street and Alum Rock Avenue. Accommodations for the future Five Wounds Trail would be provided along North 28th Street as part of station access improvements.

The station would include systems facilities such as electrical, ventilation, and communication equipment. Systems facilities include a Traction Power Substation (TPSS), Train Control Communications Room (TCCR), an auxiliary power substation, and an emergency generator. Systems facility sites within public view would be surrounded by an approximately 9-foot-high concrete masonry unit (CMU) wall, and sites outside of public view would be surrounded by a 9-foot-high fence. Most of these system facilities would be located underground; however, some systems facilities may also be located aboveground. If aboveground, access to the aboveground systems facilities and parking areas for service vehicles would be restricted by access gates. The station would include emergency exhaust ventilation facilities and ventilation shafts as shown on Figure 2. Fresh air intake/exhaust hatches at grade would be near the emergency ventilation facilities.

From Alum Rock/28th Street Station, the alignment would curve under North 28th Street, North 27th Street, and North 26th Street before aligning under Santa Clara Street (STA 620+00). The alignment would continue under the Santa Clara Street right-of-way (ROW) until the alignment approaches Coyote Creek (STA 644+00).

TOJD would be located within the station campus and would consist of a maximum of 500,000 square feet of office space with approximately 1,650 parking spaces, 20,000 square feet of retail with 100 parking spaces, and up to 275 dwelling units with approximately 400 parking spaces. The TOJD would range from 4 to 9 stories within the station area. Design of the TOJD plans would be coordinated with parking provided for BART.

### Tunnel Alignment near Coyote Creek

The alignment would continue directly under Santa Clara Street and pass approximately 55 feet beneath the creekbed of Coyote Creek and approximately 20 feet below the existing bridge foundations.

### 13th Street Ventilation Structure

A systems facility site would be located at the northwest corner of Santa Clara and 13th Streets. This site would include a tunnel ventilation structure, which would be an aboveground structure with an associated ventilation shaft.

TOJD would be co-located with the ventilation structure at the northwest corner of Santa Clara and 13th Streets. The development would consist of a maximum of 13,000 square feet of ground-level retail along the street frontage facing Santa Clara Street.

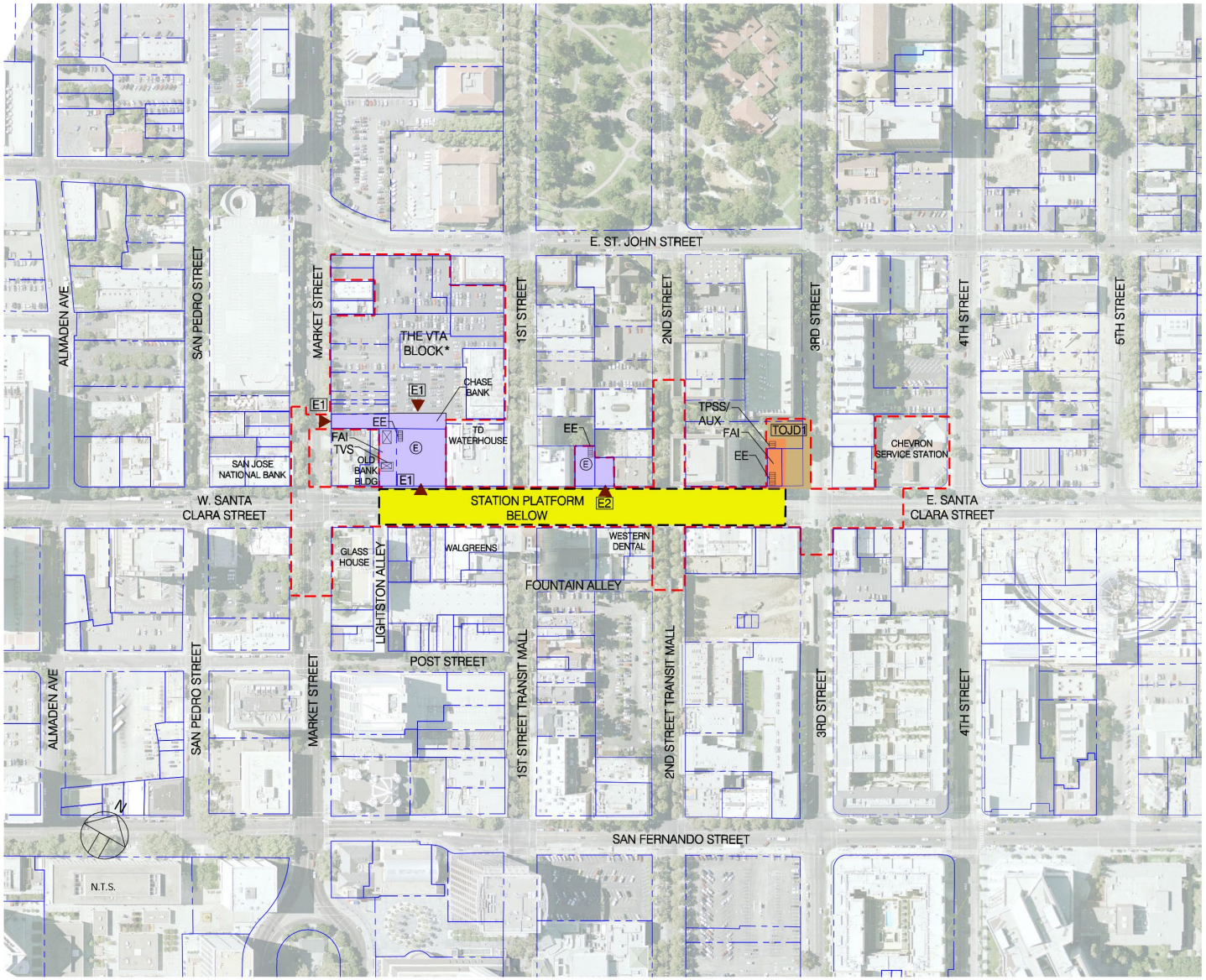
### Downtown San Jose Station

The alignment would continue beneath Santa Clara Street to the Downtown San Jose Station. Crossover tracks would be located east of the station within the limits of 8th and 13th Streets. The station would not have dedicated park-and-ride facilities.

The Downtown San Jose Station would be located between Market and 3rd Streets. The station would consist of boarding platform levels and some systems facilities within the tunnel beneath Santa Clara Street, and entrances at street level, as shown on Figure 3. Vertical circulation elements, including elevators, escalators, and stairs, would be at station portal entrances, providing pedestrian access to the boarding platforms. Escalators and stairs would have canopy structures. The station would have a minimum of two entrances. One station entrance would be located north of Santa Clara Street between 2nd and 1st Streets, and a second entrance would be located north of Santa Clara Street between 1st and Market Streets on the VTA-owned property, the VTA Block. Stairs and escalators would be provided at each of the entrances.

Elevators would be provided near each end of the station. The configuration of the station entrances would be finalized during final design and would be based on applicable BART Facilities Standards and ridership projections.

Systems facilities would be located aboveground and underground, and would include a TPSS, an auxiliary power substation, ventilation facilities, and a TCCR. Most of these system facilities would be located underground; however, some may be aboveground. The station would also include emergency exhaust ventilation facilities with ventilation shafts and fresh air intake/exhaust hatches.




LEGEND

- STATION ENTRANCE
- UNDERGROUND STATION & SYSTEM FACILITIES
- ABOVE AND BELOW GROUND SYSTEMS FACILITIES
- PUBLIC FACILITY/ VTA'S TRANSIT-ORIENTED JOINT DEVELOPMENT
- CONSTRUCTION STAGING AREA
- (E) ELEVATOR
- EE EMERGENCY EGRESS (PASSENGER; SERVICE ENTRY)
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- TVS TUNNEL VENTILATION SHAFT
- AUX AUXILIARY POWER SUBSTATION
- * PROPERTY OWNED BY VTA

**DRAFT CONCEPTUAL EXHIBITS**
DOWNTOWN SAN JOSE STATION

SINGLE-BORE TUNNEL

05/08/2017

*VTA's BART Silicon Valley Phase II Extension Project Final SEIS/SEIR*

Source: VTA, 2017.

Graphics ... 00332.13 (1-23-2018)

**Figure 3**
**Downtown San Jose Station Plan**
VTA's BART Silicon Valley–Phase II Extension Project

Streetscape improvements would be provided along Santa Clara Street from Market and 4th Streets to San Jose City Hall and San Jose State University in order to create a pedestrian corridor connecting San Jose City Hall and San Jose State University with the Downtown Commercial District. Streetscape improvements would be guided by San Jose's Master Streetscape Plan.

The TOJD site for the Downtown Station is 0.35 acre and located north of Santa Clara Street and west of 3rd Street. System facilities—including a TPSS, elevator, tunnel ventilation shaft, fresh air intake, exhaust, emergency egress, and an equipment access shaft—would also be located at this site. Because of the high groundwater table, underground parking would be limited to three levels. The TOJD would consist of one level of retail (approximately 10,000 square feet) and two and one-half levels of office (approximately 35,000 square feet). Three levels of underground parking would accommodate approximately 128 spaces (40 spaces for retail uses and 88 spaces for office uses).

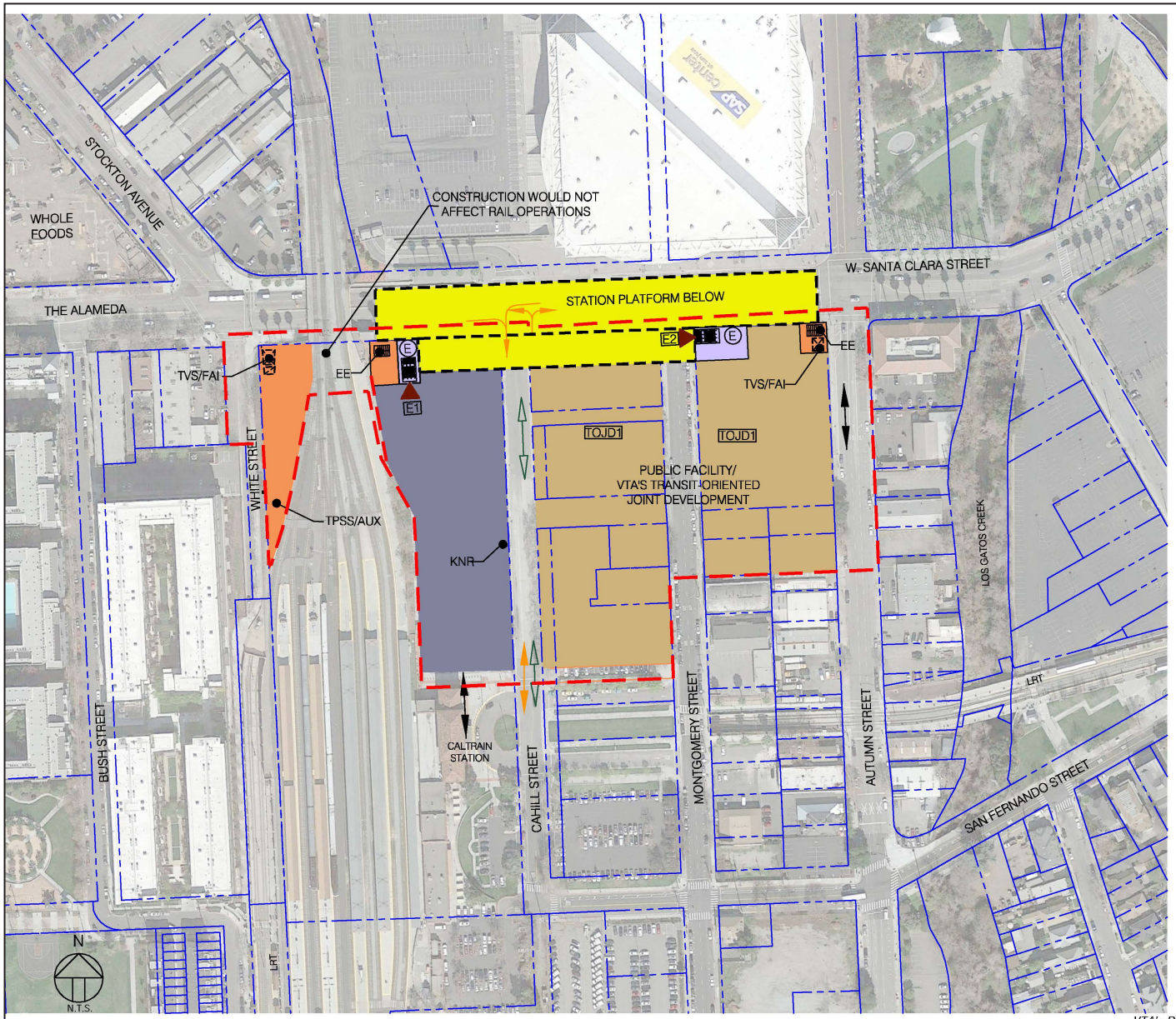
### Tunnel Alignment into Diridon Station

The alignment would remain beneath Santa Clara Street and continue 45 feet below the riverbed of the Guadalupe River and 40 feet below the creekbed of Los Gatos Creek. The boarding platforms within tunnel would be located between Montgomery and White Streets.

### Diridon Station

Diridon Station would be located between Autumn Street to the east, White Street to the west, Santa Clara Street to the north, and West San Fernando Street to the south, as shown on Figure 4. The underground station platforms would be located directly under Santa Clara Street.

The station would consist of a boarding platform level, a concourse level, and entrances at street-level portals. Street-level station entrance portals would provide pedestrian linkages to the Diridon Caltrain Station and SAP Center. Entrances would have elevators, escalators, and stairs covered by canopy structures. The station would have a minimum of two entrances. An underground concourse level would span the two entrances adjacent to the tunnel. Stairs and escalators would be provided at each of the entrances, and elevators would be provided at each station near each end. The location and configuration of station entrances would be finalized during final design based on applicable BART Facilities Standards and ridership projections.




LEGEND

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**DRAFT CONCEPTUAL EXHIBITS**

DIRIDON STATION

SINGLE-BORE TUNNEL
10/05/2017

*VTA's BART Silicon Valley Phase II Extension Project Final SEIS/SEIR*

Graphics ... 00332.13 (1-23-2018)

Source: VTA, 2017.

**Figure 4**
**Diridon Station Plan**
VTA's BART Silicon Valley–Phase II Extension Project

The existing VTA bus transit center would be reconfigured for better access and circulation to accommodate projected bus and shuttle transfers to and from the BART station. The reconfiguration would be compatible/consistent with the Diridon Transportation Facilities Master Plan's design of the area. Kiss-and-ride facilities would be located along Cahill Street. No park-and-ride parking would be provided.

Systems facilities would be located aboveground and underground, and would include a TPSS, an auxiliary power substation, ventilation facilities, associated ventilation shafts, and a TCCR. Most of these system facilities would be located underground; however, some may be located aboveground. The station would also include emergency exhaust ventilation facilities with ventilation shafts and fresh air intake/exhaust hatches. System facility sites within public view would be surrounded by an approximately 9-foot-high CMU wall, and sites outside of public view would be surrounded by a 9-foot-high fence. Access to the aboveground systems facilities and parking areas for service vehicles would be restricted by access gates.

West of the station, the alignment would continue under Santa Clara Street/The Alameda. The alignment would then turn towards the north at Wilson Avenue, crossing under Rhodes Court and under West Julian Street before aligning under Stockton Avenue (STA 775 + 00).

TOJD would be located adjacent to Diridon Station and would consist of a maximum of 640,000 square feet of office space and 72,000 square feet of retail. The TOJD would be approximately eight levels high and would have three levels of underground parking with approximately 400 parking spaces.

### Tunnel Alignment along Stockton Avenue

Around Pershing Avenue, the alignment lines up directly under Stockton Avenue. On the east side of Stockton Avenue between Schiele Avenue and West Taylor Street, there are four alternate locations for a systems facility site that would house a tunnel ventilation structure, an auxiliary power substation, and a gap breaker station. Sites within public view would be surrounded by an approximately 9-foot-high CMU wall, and sites outside of public view would be surrounded by a 9-foot-high fence. Access to the aboveground systems facilities and parking areas for service vehicles would be restricted by access gates.

The alignment would continue north and cross under the Caltrain tracks then under Hedding Street (STA 802+00 and STA 808+00). The alignment would continue on the east side of the Caltrain tracks and cross under Interstate (I-) 880 before ascending and exiting the West Tunnel Portal near Newhall Street (between STA 829+00 and STA 838+00).

A high-voltage substation, TPSS, and TCCR would be located at a systems facility site above the West Tunnel Portal and near Pacific Gas & Electric Company's (PG&E's) FMC Substation. A 115-kilovolt (kV) line from PG&E's existing FMC substation would serve the high-voltage substation. There are two alternate routes for this 115-kV line connection. The first would begin at the high-voltage substation, run north to Newhall Street, east on upgraded poles along Newhall Street, then south on an existing line along Stockton Avenue.

The second route would also run north to Newhall Street and then east on upgraded poles along Newhall Street, but a new line would be constructed to traverse the PG&E substation site. The 115-kV line would require approximately 80- to 115-foot-high galvanized tapered tubular steel poles or wood poles spaced approximately every 150 to 300 feet.

Crossover tracks would be located in the retained-cut trench just outside the West Tunnel Portal (between approximately STA 830+00 and STA 840+00). The alignment would then transition to an at-grade configuration (between STA 839+00 and STA 851+00) as it enters the Newhall Maintenance Facility and Santa Clara Station to the north.

TOJD would be located on the east side of Stockton Avenue, south of Taylor Street, with the ventilation structure at the rear of the site. The development would consist of a maximum of 15,000 square feet of ground level retail along the street frontage facing Stockton Avenue.

## City of Santa Clara

The BART Extension in Santa Clara would consist of the project Maintenance Facility and the Santa Clara Station. The San Jose/Santa Clara boundary is located approximately midway through the Newhall Maintenance Facility.

### Newhall Maintenance Facility

The Newhall Maintenance Facility is approximately 40 acres and would begin north of the West Tunnel Portal at Newhall Street in San Jose and extend to De La Cruz Boulevard near the Santa Clara Station in Santa Clara, as shown in Figure 5.

A single tail track would extend north from the Santa Clara Station and cross under the De La Cruz Boulevard overpass and terminate on the north side of the overpass. A systems facility that includes a radio tower, traction power substation, and auxiliary power substation is located north of Brokaw Road.

The maintenance facility would be constructed on the former Union Pacific Railroad (UPRR) Newhall Yard that was purchased by VTA in 2004 and has been cleared of all structures. The main entrance to the facility would be from Newhall Drive. Other secured entrances would be provided at various locations for employees and emergency personnel. The site would include service roads to all buildings and approximately 225 onsite parking spaces for employees, authorized visitors, and delivery and service vehicles.

The maintenance facility would serve two purposes: (1) general maintenance, running repairs, and storage of up to 200 BART revenue vehicles and (2) general maintenance of non-revenue vehicles. The facility would also include maintenance and engineering offices and a yard control tower. To provide for these functions, several buildings and numerous transfer and storage tracks would be constructed.

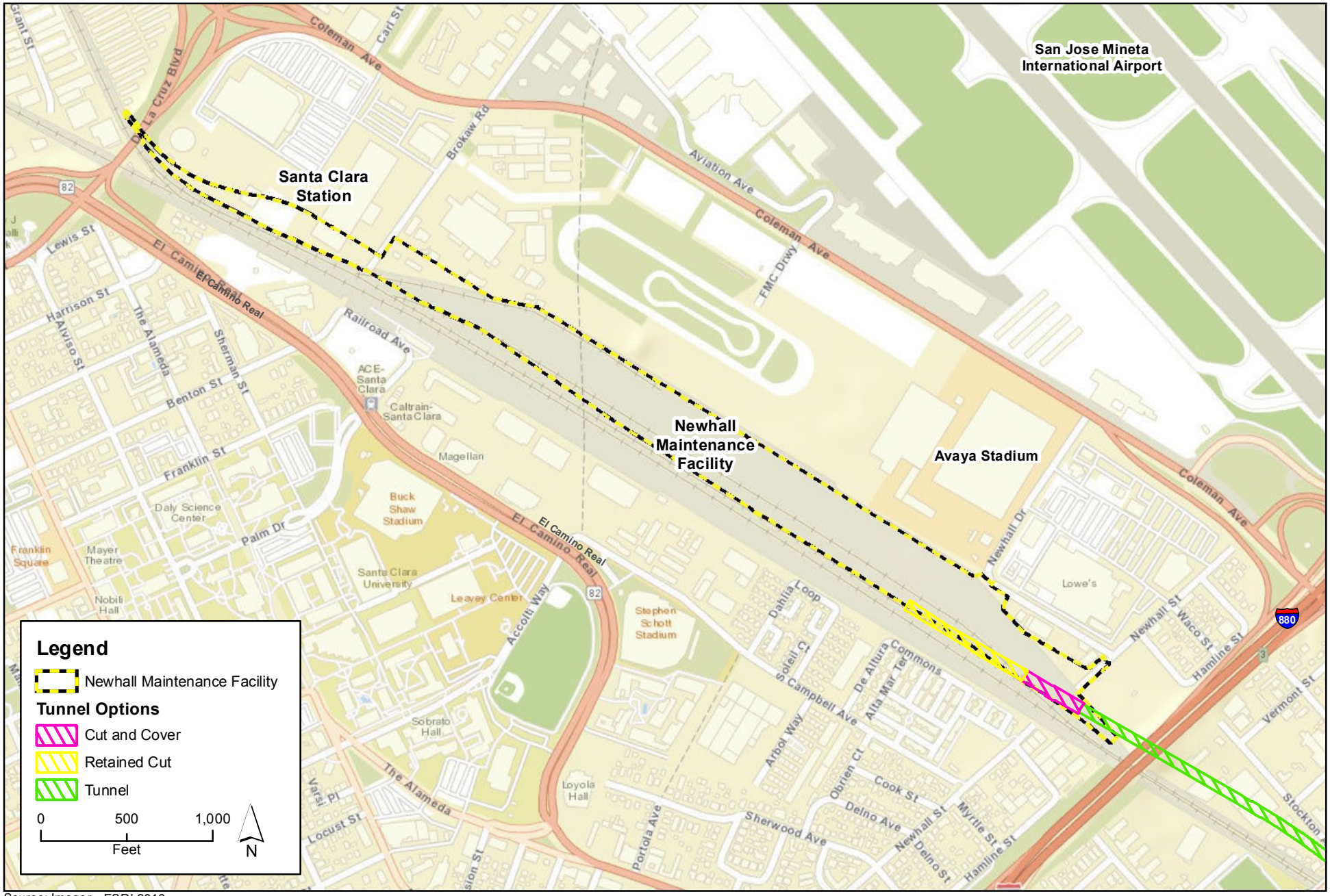


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**Figure 5**
**Newhall Maintenance Facility**
VTA's BART Silicon Valley – Phase II Extension Project

The following systems facilities would be located in the maintenance facility: a TPSS (11,000 square feet and 12 feet high), an auxiliary power substation (3,000 square feet and 12 feet high), two gap breaker stations (one 3,800 square feet and 12 feet high, and the other 3,200 square feet and 12 feet high), and a TCCR (3,300 square feet and 35 feet high).

System facility sites within public view would be surrounded by an approximately 9-foot-high CMU wall, and sites outside of public view would be surrounded by a 9-foot-high fence. The systems site would require two access points with gates and internal parking areas for service vehicles. An approximately 150-foot-high radio tower and an associated equipment shelter would be located within the systems site north of Brokaw Road.

Provisions would be made in the maintenance facility area for storage of maintenance equipment and supplies. Two detention basins, one in each city, would be constructed to retain and provide controlled release of stormwater into the respective city's storm drain systems.

Specific features of the Newhall Maintenance Facility are described below.

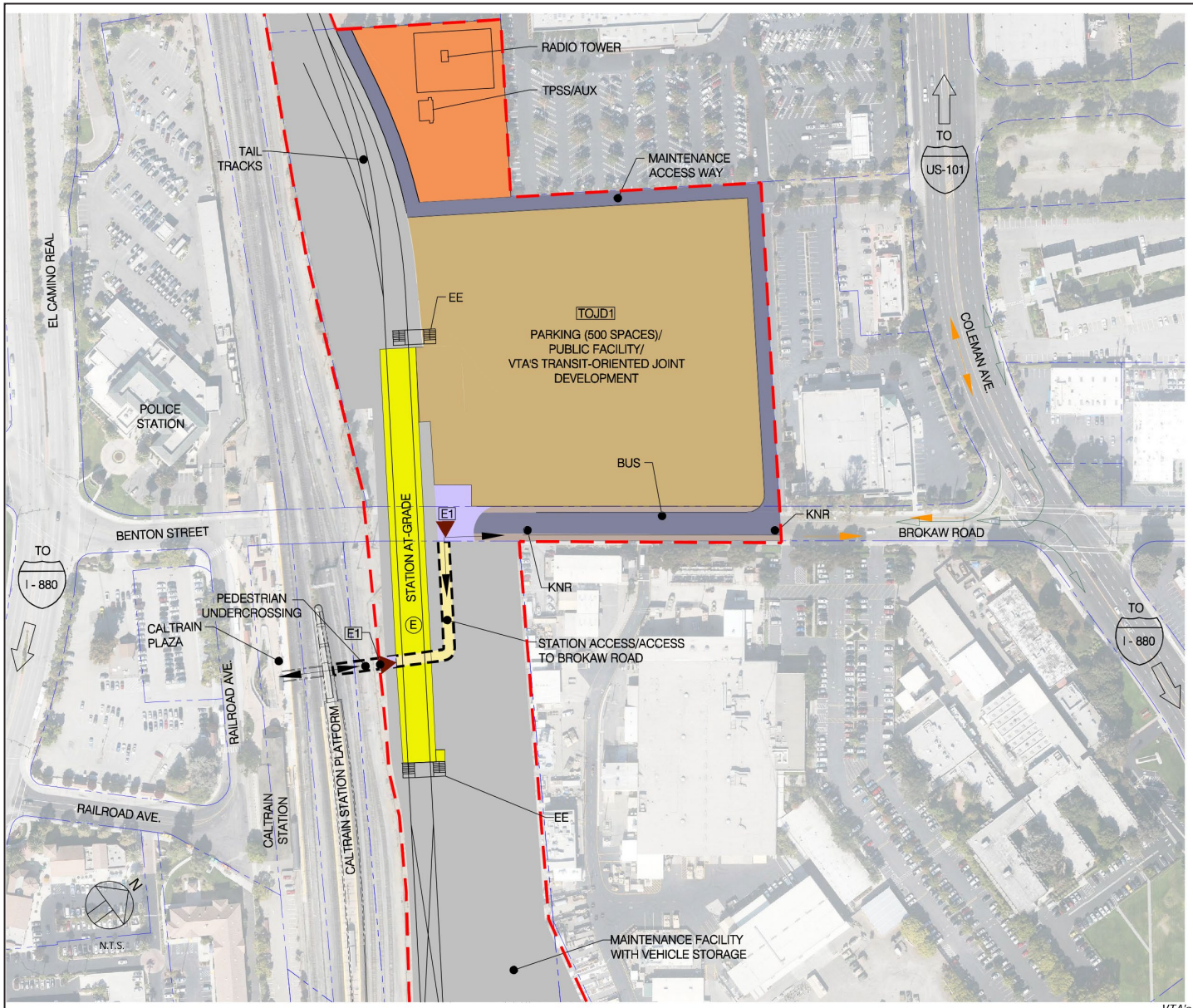
- **Train Car Washer.** The train car washer would be an open-ended building with an automated vehicle washing machine. As each train returns to the yard for storage, it would be driven through the car washer, where the exterior would be cleaned.
- **Yard Control Tower.** The yard control tower would be approximately three stories in height. The tower would be situated to have a view of train operations in the maintenance yard area. Employees staffing the tower would control the majority of train movements within the yard area, while shop area movements would be made under local control.
- **Inspection Pit.** The inspection pit would be enclosed in a shed and open at each end to allow trains to travel over a depressed pit so that the underside of trains could be inspected.
- **Blowdown Facility.** The blowdown facility would be used primarily for cleaning the underside of trains in a combined wet and dry process in preparation for scheduled inspections. The cleaning operation would be performed within a service pit.
- **Wheel Truing Facility.** The wheel truing facility would be located next to the revenue vehicle maintenance shop. The primary function of this facility would be to enclose the wheel truing pit and equipment to facilitate the maintenance and repair of BART vehicle wheel sets.
- **Revenue Vehicle Maintenance Shop.** The revenue vehicle maintenance shop would be approximately 70,000 square feet. Tracks would lead to and through the building. Vehicle car lifts, bridge cranes, and jib cranes would be located within the first floor of the shop. The second floor would be primarily for administration offices. The major functions carried out in the shop would include car inspections and repairs, parts storage, heavy component repairs, electro-mechanical repairs, and electronic repairs.

- **Vehicle Turntable.** The approximately 85-foot-diameter vehicle turntable would be located on a spur track close to the storage tracks. The vehicle turntable would be used for turning cars that must be oriented in the correct direction before they are added to a consist (a group of rail vehicles that make up a train).
- **Non-revenue Vehicle Maintenance Shop and Maintenance and Engineering Offices.** The non-revenue vehicle maintenance facility would be for maintenance of non-revenue service vehicles, such as rubber-tired vehicles, and cars for the maintenance of track and equipment. The facility would contain maintenance bays for rubber-tired vehicles, a service bay with a depressed pit for train maintenance, and a storage area for replacement parts. It would also contain an overhead crane, vehicle hoists, and diagnostic repair equipment.
- **Material Storage Area.** The material storage area would be utilized to store maintenance equipment and stockpile supplies.
- **Train Control House.** The train control house would be a one-story building located within the maintenance facility.
- **Gap Breaker Station.** The maintenance facility gap breaker station would be located adjacent to the train control house.
- **Radio Tower.** An approximately 150-foot-high radio tower and associated equipment shelter would be located near the traction power substation.
- **High-Voltage Substation.** A high-voltage substation and switching station would be located in the northeast corner of the maintenance facility.

### Santa Clara Station

The closest streets to the Santa Clara Station would be De La Cruz Boulevard to the northwest, Coleman Avenue to the northeast, and Brokaw Road to the east. The station would be at grade, centered at the west end of Brokaw Road, and would contain an at-grade boarding platform with a concourse one level below (Figure 6). Access to the boarding platform would be provided via elevators, escalators, and stairs covered by canopy structures. A pedestrian underpass would connect from the concourse level of the BART station to the Santa Clara Caltrain station. The pedestrian underpass would continue from the station concourse level to a new BART plaza near Brokaw Road. Kiss-and-ride, bus, and shuttle loading areas would be provided on Brokaw Road.

A parking structure of up to five levels would be located north of Brokaw Road and east of the Caltrain tracks within the approximately 10-acre station campus area and would accommodate 500 BART park-and-ride parking spaces in addition to public facilities on the site. Vehicular access to the parking structure would be provided from Brokaw Road. Pedestrian access from the parking structure to the Santa Clara BART Station would be provided from Brokaw Road to the below-grade BART concourse level.




LEGEND

- STATION ENTRANCE
- AT GRADE STATION
- ABOVE AND BELOW GROUND SYSTEMS FACILITIES
- PARKING/PUBLIC FACILITY/ VTA'S TRANSIT-ORIENTED JOINT DEVELOPMENT
- MAINTENANCE FACILITY WITH VEHICLE STORAGE / TAIL TRACKS
- ROADWAY MODIFICATIONS
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**DRAFT CONCEPTUAL EXHIBITS**

SANTA CLARA STATION

SINGLE- & TWIN-BORE TUNNEL

04/27/2017

*VTA's BART Silicon Valley Phase II Extension Project Final SEIS/SEIR*

Graphics ... 00332.13 (1-23-2018)

Source: VTA, 2017.

**Figure 6**
**Santa Clara Station Plan**
VTA's BART Silicon Valley–Phase II Extension Project

TOJD would be located within the station. The TOJD would consist of a maximum of 500,000 square feet of office space with approximately 1,650 parking spaces, 30,000 square feet of retail with approximately 150 parking spaces, and up to 220 dwelling units with approximately 400 parking spaces. The TOJD would range from 4 to 11 stories and have one level of underground parking. The 500 spaces of parking to accommodate BART park-and-ride demand would be coordinated with the TOJD around the station campus.

## Description of BART Extension Auxiliary Features

This section describes various features of the Phase II Project to assist the reader's understanding of the electrical, communication, cross passages, ventilation, and pump facilities required to operate the transit system.

### Electrical Facilities

Several types of electrical facilities are required to provide power to BART trains, stations, and associated facilities. High-voltage substations transform 115-kV AC power distributed from PG&E to 34.5-kV AC power that is then distributed to the dual 34.5-kV subtransmission cable system (two sets of cables on the guideway that deliver this intermediate voltage to various locations throughout the system such as the traction power substations). Traction power substations convert the 34.5-kV power to 1,000-volt (V) DC power that is then distributed to the BART third rail (also called the contact rail). Switching and sectionalizing stations control power on the 34.5-kV subtransmission system. The switching stations are co-located with the high-voltage substations, and the sectionalizing stations are between these locations and co-located with traction power substations.

#### High-Voltage Substations and Switching Stations

High-voltage substations transform 115-kV AC power distributed from PG&E to 34.5-kV AC power that is then distributed to the dual 34.5-kV subtransmission cable system. High-voltage substations include outdoor type equipment consisting of power utility interface equipment, such as a disconnect switch; metering potential and current transformers; a revenue metering facility; a 115-kV, outdoor-type power circuit breaker; a power transformer; a 34.5-kV indoor-type power circuit breaker; and electrical auxiliary equipment, protection relays, meters, telemetering devices, and supervisory control and data acquisition system (SCADA).

Switching stations consist of 34.5-kV metal-clad, walk-in type switchgear circuit breakers, protection relays and meters, and SCADA, all of which are used for switching, distribution, and protection of the dual 34.5-kV subtransmission cable system.

High-voltage substations would require installation of high-voltage (115-kV) power feed lines connecting to nearby existing PG&E towers and lines or to PG&E substations. Permanent overhead or underground easements would be required for the 115-kV lines. Site dimensional requirements would vary based on site-specific requirements and where sites would be combined with other facilities such as traction power substations and train control

buildings. However, approximate dimensional requirements are 75 by 190 feet and 20 feet in height for high-voltage substations and 30 by 60 feet and 20 feet in height for switching stations. Some sites would require construction of an access road.

### Traction Power Substations and Sectionalizing Stations

Traction power substations provide the power required to run BART trains on the mainlines, storage tracks, and maintenance facility tracks. These substations transform 34.5-kV AC to 1,000-V DC for distribution through BART's electrified third rail (also called the contact rail). Traction power substations include both outdoor and indoor equipment. The equipment consists of 34.5-kV AC metal clad walk-in type switchgear, transformer-rectifier assemblies, 1,000-V DC switchgear circuit breakers, control equipment, electrical auxiliary equipment, protection relays, meters and telemetering devices, SCADA, and connecting AC and DC power and control cables.

Sectionalizing stations consist of metal-clad, walk-in-type 34.5-kV switchgear circuit breakers, protection relays and meters, and SCADA, all of which are used to tie-in existing BART 34.5-kV cable distribution circuits or new 34.5-kV cable distribution circuits to obtain a flexible and reliable power supply system during contingency operations.

Site dimensional requirements would vary based on site-specific requirements and where sites would be combined with other facilities, such as train control buildings. Some sites would require an access easement or construction of an access road. Minimum approximate dimensional requirements for traction power substations are 60 by 200 feet and 15 feet in height. Approximate dimensional requirements of sectionalizing stations are 30 by 20 feet, and the equipment would be combined with the traction power substation's 34.5-kV AC switchgear assembly.

### Auxiliary Power Substations

Auxiliary power substations provide the power required to run the stations and Newhall Maintenance Facility. Electric power to the substations would be supplied by nearby overhead and underground medium voltage 480-V, 12.47-kV, and 21-kV distribution lines. Short (typically less than 1,000 feet) sections of overhead and underground power lines would be constructed from existing distribution facilities to the new facilities. Transformers and switching equipment would be located within ancillary areas at stations. In addition, each station and the Newhall Maintenance Facility would have a standby diesel-electric generator located aboveground. Additional standby diesel-electric generators would be located at pump stations and possibly at train control buildings.

### Gap Breaker Stations

Gap breaker stations isolate appropriate electrified third rail sections for maintenance and repair purposes or de-energize third rail sections during an emergency. Gap breaker stations include indoor equipment in prefabricated enclosures or custom-built buildings. The equipment consists of 1,000-V DC switchgear circuit breakers and associated ancillary

equipment such as relays and meters. DC power cables run in ductbanks from the gap breaker circuit breakers to BART's electrified third rail. Approximate dimensional requirements for gap breaker stations are 30 by 40 feet and 15 feet in height.

## Train Control and Communication Equipment

Train control equipment would be installed to provide automatic train control functions (e.g., accelerating, maintaining speed, braking, switching tracks, maintaining separation between different trains on the same track) and to integrate operations with the existing BART system. Some of the equipment required to monitor and control trains would be mounted along the trackways and on the trains. This equipment would include radios and antennae. Much of the wayside equipment would be contained in stand-alone train control buildings along the alignment or in train control rooms within the station areas. Train control buildings would be custom-built structures that range from 50 by 60 feet to 35 by 90 feet and 15 feet in height.

Communications equipment for transmission of voice, video, and data would be installed as a means to: (1) provide information to passengers; (2) facilitate communication between passengers, BART staff, and BART Central; (3) provide transmission of closed circuit television camera data to a BART security center; and (4) enable subsystems to be monitored and remotely controlled where necessary.

## Emergency Egress

Both tracks guideways would be located within one large diameter tunnel either in a stacked, side-by-side, or transitional configuration (i.e., transitioning between the stacked configuration and the side-by-side configuration). Emergency egress provided would depend on the track configuration at that particular location. In the side-by-side configuration, a fire-rated door between the two guideways would be used. For the stacked configuration, an enclosed stairwell with fire-rated doors would be used to get patrons from one guideway to another (top to bottom or bottom to top). For the transitional areas where the track is transitioning from a side-by-side configuration to a stacked configuration, a combination of fire-rated door and emergency egress enclosure/corridor would be utilized.

## Tunnel and Underground Station Ventilation Facilities

Tunnel and underground station ventilation facilities consist of emergency ventilation, fresh air intake, and exhaust facilities.

### Emergency Ventilation Facilities

Emergency ventilation facilities would be located along the tunnel alignment between the underground stations (called mid-tunnel ventilation structures) and within the underground stations. The facilities include fans, dampers, ventilation shafts, and associated facilities and they operate primarily to remove smoke in cases of emergency in either the tunnels or the stations. In addition, the facilities limit air velocities as trains pass through the tunnel and

push the air forward and ventilate the tunnel when diesel-propelled vehicles are being used during tunnel maintenance. Periodic testing of the facilities is required to ensure their proper operation.

There would be two mid-tunnel ventilation structures: one located at the northwest corner of Santa Clara and 13th Streets and another located east of Stockton Avenue south of Taylor Street. There are four optional locations for the Stockton Avenue ventilation structures. The final decision of a location would be based on the environmental impacts, property negotiations, and acquisition costs. The mid-tunnel ventilation structures would include an aboveground structure, or building, that houses the equipment required to ventilate the tunnel. The area required to accommodate each facility would be approximately 110 by 200 feet (including a small paved area used for maintenance activities or parking for maintenance personnel and an area for electrical transformers) with most of the equipment housed in a structure approximately 90 by 140 feet and 25 feet in height. A ventilation shaft would connect the structure to the tunnel below. The shaft opening would be located on the roof of the structure, with the smoke and air exhaust discharging vertically out of, or fresh air being drawn into, a protective grate.

There would be several underground ventilation facilities at the Alum Rock/28th Street, Downtown San Jose, and Diridon Stations, with all of the equipment located in the ancillary areas at both ends of the station boxes. The surface feature would be one or more ventilation shafts at each end of the station. Each shaft would be approximately 15 by 20 feet and 10 to 15 feet in height above ground level. An opening would be located at the top of each ventilation shaft with the smoke and air exhaust discharging vertically out of a protective grate.

### Fresh Air Intake and Exhaust Facilities

Fresh air intake and exhaust facilities would be located within the underground stations. Dedicated fresh air intake and exhaust facilities supply fresh air exchange to the non-public ancillary areas. Similar to the tunnel and underground emergency ventilation facilities, these facilities would include shafts leading to the surface. Each shaft would be approximately 10 by 10 feet and approximately 18 feet in height above ground level. As trains pass through the tunnel and push air forward, fresh air exchanges into the station public area through the station entrances.

## Pump Stations

All the equipment for pump stations along the tunnel alignment or in underground stations would be located underground. Access to these facilities for maintenance purposes would be from the nearest underground station or another facility. Access to pump stations located elsewhere along the alignment would be from within the retained cuts or from an at-grade location.

Pump stations would be located in the East and West Tunnel Portals, in the tunnel south of Lower Silver Creek, in the tunnel at Santa Clara and 13th Streets, in the tunnel west of State Route 87, and in the tunnel between Schiele and Villa Avenues (location would vary depending on location of the ventilation structure near Stockton Avenue).

## Sustainability Strategies

To the maximum extent practicable and in consultation with BART as required, the design and operation of the BART Extension would incorporate VTA's Sustainability Program green strategies through features that reduce energy, water, and solid resource consumption and improve indoor environmental quality. Some features that VTA will consider are listed below.

- **Daylighting and lighting controls.** Daylight combined with controls for artificial lighting can reduce electric power consumption. Photosensor-driven lighting control and dimming control is a well-established technology that could be applied to station platforms and interiors, and also on train cars. Controls should also offer low-power settings for after-hours periods at stations.
- **Escalators.** Because many passengers arrive at BART stations during peak hours, running escalators at full speed during non-peak hours uses energy needlessly. To reduce energy consumption, variable speed escalators that can stop and re-start or that operate at a low-speed mode (which may result in fewer maintenance problems than the start/stop escalators) could be installed.
- **Renewable power.** Photovoltaic solar panels are typically used to generate onsite power for transportation facilities. The top of roofs provide an opportunity for installing solar panels.
- **Water.** There are numerous well-established ways to save water, reduce stormwater flooding, and improve water quality in landscape design that are directly applicable to station areas and potentially to BART trackways. These methods include planting native, drought-resistant plants; using low-flow fixtures; increasing pervious surface with porous paving and unit pavers; capturing surface flow with bioswales and raingardens; and using soil-water separators and other filters. At the Newhall Maintenance Facility, the train car washing process could use recycled grey water and save up to 90 percent of the water used. If access to the San Jose and Santa Clara recycled water networks is available, then recycled water could be used where possible for both indoor and outdoor uses.
- **Replacement and New Landscaping**. Replacement and new landscaping on VTA ROW will comply with VTA's Sustainable Landscaping Policy, which emphasizes native and drought-tolerant plantings.
- **Plant-based lubricants and coolants.** Soy-based oil is being considered in the design for use with large transformers and potentially other system machinery.

- **Materials and resources.** Green strategies in this category include the management of construction and demolition waste through recycling and reuse to keep waste out of landfills to the maximum extent practicable; the use of recycled and regionally or locally available materials; and the reuse of soils on site or elsewhere in the vicinity. Excavated soils could also be made available for use at other sites.
- **Indoor environmental quality.** Given that there would be indoor space involved, measures are being considered to address indoor environmental quality. These include the use of paints, coatings, carpet, and other materials containing reduced volatile organic compounds and green cleaning products.

# Transit-Oriented Joint Development

The TOJD would involve VTA staff working with a private developer to develop mixed-use developments consistent with California Public Utilities Code Section 100130-100133. The code defines TOJD as a commercial, residential, or mixed-use development that is undertaken in connection with existing, planned, or proposed transit facilities and is located ¼ mile or less from the external boundaries of that facility. However, the design of the stations and structures would not preclude TOJD.

The TOJD may be constructed at the same time as the Project or later in time, dependent on the availability of funding and subject to market forces. However, the design of the BART stations and structures would not preclude TOJD. No private developer has been identified at this time, and the TOJD may be subject to refinement once a private developer is identified. The TOJD is intended to be consistent with the City of San Jose and City of Santa Clara general plans and approved area plans, as applicable.

## Planned Development

TOJD (office, retail, and residential land uses) would be constructed at the four BART stations (Alum Rock/28$^{th}$ Street, Downtown San Jose, Diridon, and Santa Clara), which offers the benefit of encouraging transit ridership. TOJD would also be constructed at two mid-tunnel ventilation structure locations (the northwest corner of Santa Clara and 13$^{th}$ Streets and east of Stockton Avenue south of Taylor Street). The primary objective for the TOJD is to encourage transit ridership and support land use development patterns that make the most efficient and feasible use of existing infrastructure and public services while promoting a sense of community as envisioned by the San Jose and Santa Clara General Plans and relevant adopted specific plans. The TOJD planned densities at the station sites and at the mid-tunnel ventilation structure locations are provided below and are based on current San Jose and Santa Clara General Plans, approved area plans, the existing groundwater table constraints, and market conditions.

Table 2 summarizes the land uses at each TOJD location. The number of parking spaces is based on meeting the Cities of San Jose and Santa Clara parking requirements for residential

and commercial land uses. Parking for BART riders is not included in the table nor is it shared parking with BART riders.

**Table 2: TOJD Densities and Parking**

| Location | Residential (dwelling units) | Retail (square feet) | Office (square feet) | Parking (spaces) | Acres |
|---|---|---|---|---|---|
| Alum Rock/28th Street Station | 275 | 20,000 | 500,000 | 2,150[a] | 11 |
| Santa Clara and 13th Streets Ventilation Structure | N/A | 13,000 | N/A | N/A | 1.18 |
| Downtown San Jose Station | N/A | 10,000 | 35,000 | 128 | 0.35 |
| Diridon Station | N/A | 72,000 | 640,000 | 400 | 8 |
| Stockton Avenue Ventilation Structure | N/A | 15,000 | N/A | N/A | 1.18–1.7 |
| Santa Clara Station | 220 | 30,000 | 500,000 | 2,200[b] | 10 |

[a] Total Parking (BART Extension + TOJD) at Alum Rock/28th Street Station will be 3,350 spaces.
[b] Total Parking (BART Extension + TOJD) at Santa Clara Station will be 2,700 spaces.

# Timeline for Future Option Decisions

This section describes future refinements to the design options and construction methodology during the engineering phase. All the environmental impacts of these options have been fully addressed and disclosed in the Final SEIS/SEIR.

1. **Refine Location for Stockton Avenue Ventilation Structure**

   The decision regarding location of the Stockton Avenue Ventilation Structure will be made during the engineering phase prior to right-of-way acquisition. This decision will be made by VTA after the Record of Decision. All of the environmental impacts associated with the location options have been fully disclosed in the Final SEIS/SEIR.

2. **Refine Underground Entrances Locations**

   The decision regarding design and configuration of underground entrances at the Alum Rock/28th Street and Downtown San Jose Stations will be made by VTA after FTA issues the Record of Decision during the engineering phase prior to right-of-way acquisition. The decisions will be made in coordination with the City of San Jose and in consideration of input from public workshops and public involvement. This decision will be made by VTA after the Record of Decision. All of the environmental impacts associated with the entrance location options have been fully disclosed in the Final SEIS/SEIR.

3. **Refine Tunnel-Boring Machine Option (Earth-Pressure-Balanced, Slurry, or Hybrid of the two)**

   After the Record of Decision, the decision regarding the type of tunnel-boring machine will be made by VTA with input from, and the recommendations of, the Contractor selected to perform the tunnel excavation work based on their experience and expertise.

All of the environmental impacts associated with the tunnel-boring machine options have been fully disclosed in the Final SEIS/SEIR.