

## Chapter 2

# Project Description

## 2.1 Introduction

This chapter provides a description of the 2003 Proposed Project. The chapter begins with a discussion of the Proposed Project's setting, followed by a description of the Proposed Project. The project description includes a discussion of the Proposed Project alignment, proposed station and optional station, and ancillary facilities.

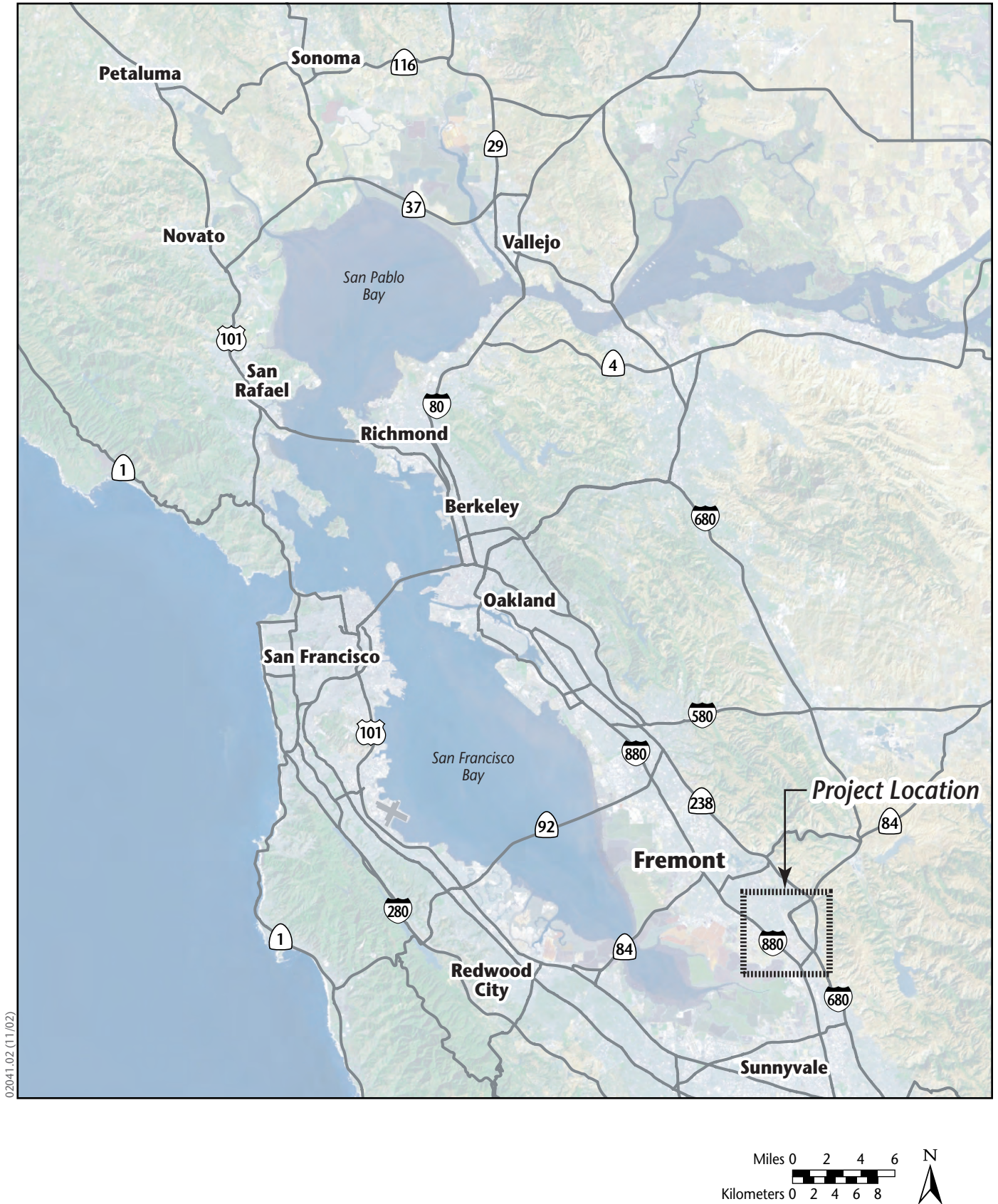
In addition to the physical description of the Proposed Project, this chapter includes a discussion of projected ridership for the Proposed Project and the proposed operating plan. Estimated costs for the Proposed Project are also presented in this chapter, as well as a discussion of project funding sources. This chapter also provides a description of the anticipated construction scenario, including general construction activities, duration of activities, and location of potential contractor laydown (storage and activity) areas, and identifies those agencies that BART will coordinate with to facilitate construction of the Proposed Project.

## 2.2 Project Setting

### 2.2.1 Project Location

The Proposed Project would be located entirely within the City of Fremont (Fremont), in the East Bay region of the San Francisco Bay Area. Fremont is the southernmost city in the southwestern portion of Alameda County. It is bounded by the San Francisco Bay to the west, the foothills and mountains of the Diablo Range to the east, the Cities of Union City and Hayward to the north, and the City of Milpitas in Santa Clara County to the south. Figure 2-1 provides a map of the regional location. Currently, the BART system extends into Fremont from the north and terminates at the Fremont BART Station, located in the north-central portion of the city.

Important regional transportation routes serving Fremont include Interstate 880 (I-880), Interstate 680 (I-680), and State Route 84 (SR 84). I-880, located west of the Fremont BART Station, is the principal north-south freeway that connects Fremont to Santa Clara County and the City of San Jose to the south, and to the City of Oakland and other communities of the East Bay to the north. I-880 parallels the Proposed Project corridor on the west; it lies within 3 miles of the Proposed Project corridor. I-680, located east of the Fremont BART Station, connects Fremont to Santa Clara County and the City of San Jose to the south, and to the communities in eastern Alameda County and central Contra Costa County to the north. Within city boundaries, I-680 generally runs parallel to and is



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Source: Basemap: San Francisco Estuary Institute EcoAtlas 2001.

**Figure 2-1**  
**Regional Location Map**

approximately 1 mile east of I-880, and serves the easternmost areas of Fremont. I-680 parallels the Proposed Project alignment for approximately 3 miles, coming to within approximately 0.25 mile of the Proposed Project corridor, and then veers slightly east. SR 84, which is the principal east-west route in the area studied, lies just to the north of the Proposed Project corridor. It runs through the north-central portion of Fremont and connects the city to the Tri-Valley area to the east and to the San Francisco Peninsula to the west via the Dumbarton Bridge.

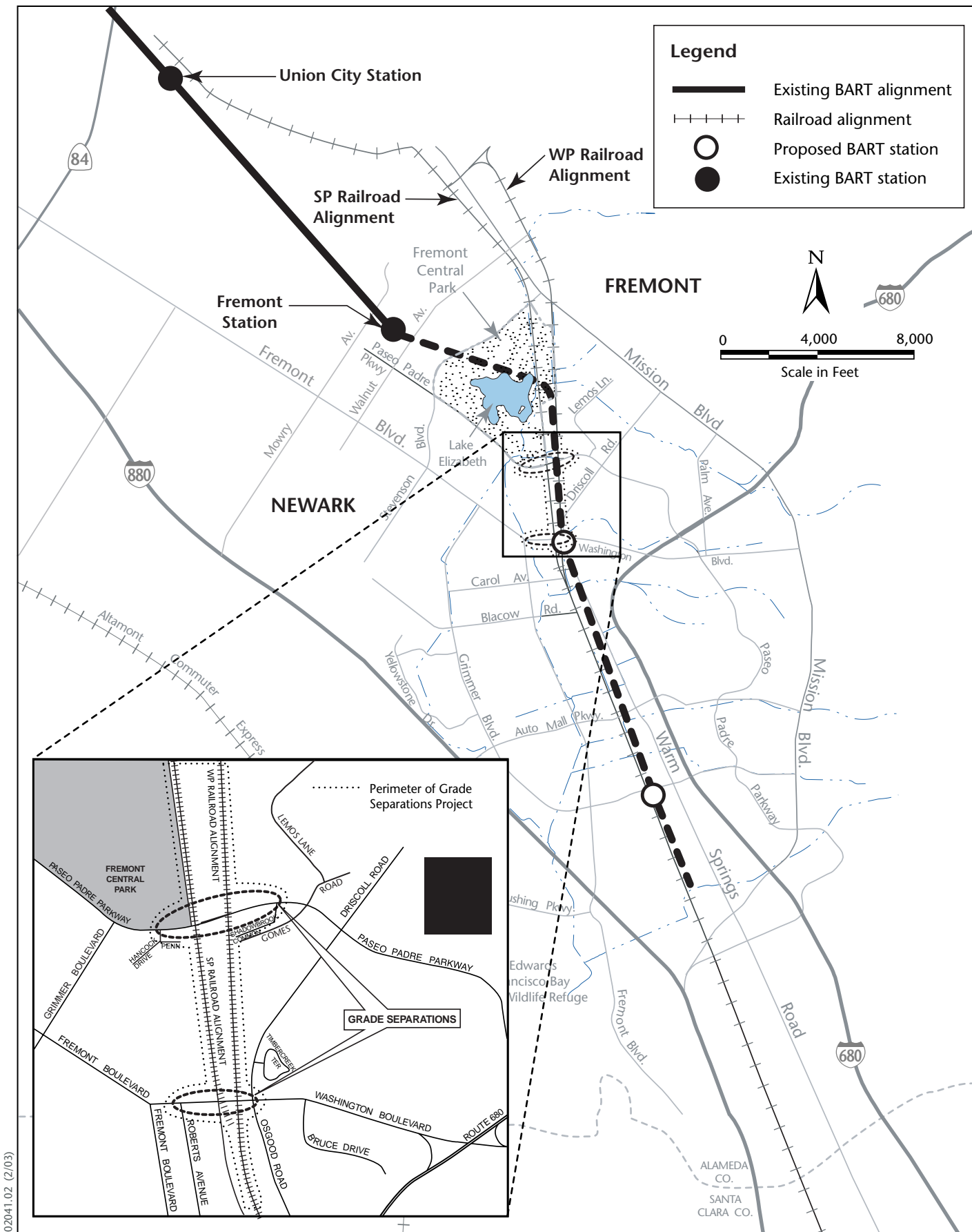
## **2.2.2 Washington Boulevard and Paseo Padre Parkway Railroad Grade Separations Project (City of Fremont)**

Since BART adopted the original WSX project in 1992, the City of Fremont has independently undertaken the Washington Boulevard and Paseo Padre Parkway Railroad Grade Separations Project (referred to herein as the “city’s grade separations project”). The project involves constructing two grade-separated railroad crossings. An automobile underpass is planned for Paseo Padre Parkway between Gomes Road and Hancock Drive, and an automobile overpass is planned for Washington Boulevard between Bruce Drive and Roberts Avenue.

The city’s grade separations project will include relocation of the former SP railroad tracks to maintain vehicular access at Gomes Road, Hancock Drive, Roberts Avenue, and Bruce Drive. Currently, the former WP and SP railroad tracks, both of which are currently owned by UP, are separated by approximately 500 feet at Paseo Padre Parkway and approximately 300 feet at Washington Boulevard. The former SP track will be relocated to the east, parallel to the WP alignment. Relocating the former SP track will provide the opportunity to construct a Paseo Padre Parkway underpass and a Washington Boulevard overpass that are not unduly long or prohibitively expensive.

The grade separations project has been approved by the City of Fremont, and funding has been obtained. The purpose of the two grade separations is to decrease traffic delays and reduce risks resulting from the existing at-grade rail crossings. The grade separations will help facilitate the extension of BART through the area, but the grade separations project is needed to improve traffic flow and safety independent of BART and will proceed regardless of whether the Proposed Project is adopted. In identifying the project setting for this SEIR, the grade separations project is recognized as a change to the existing setting that will occur before the Proposed Project is constructed and therefore must be taken into account in project design and in evaluating impacts and alternatives. However, because CEQA requires a description of existing conditions at the time the Notice of Preparation (NOP) for an EIR is issued (CEQA Guidelines Section 15125), conditions without the grade separations project are also described in this document. Figure 2-2 illustrates the geographical extent of the city’s grade separations project.

To avoid unnecessary expense, disruption, and inconvenience to the public, the Proposed Project and the city’s grade separations project will be coordinated during both design and construction.



Source: Base map: Jones & Stokes 2002; inset map provided by City of Fremont 2002.

**Figure 2-2  
Fremont Grade Separations Project**

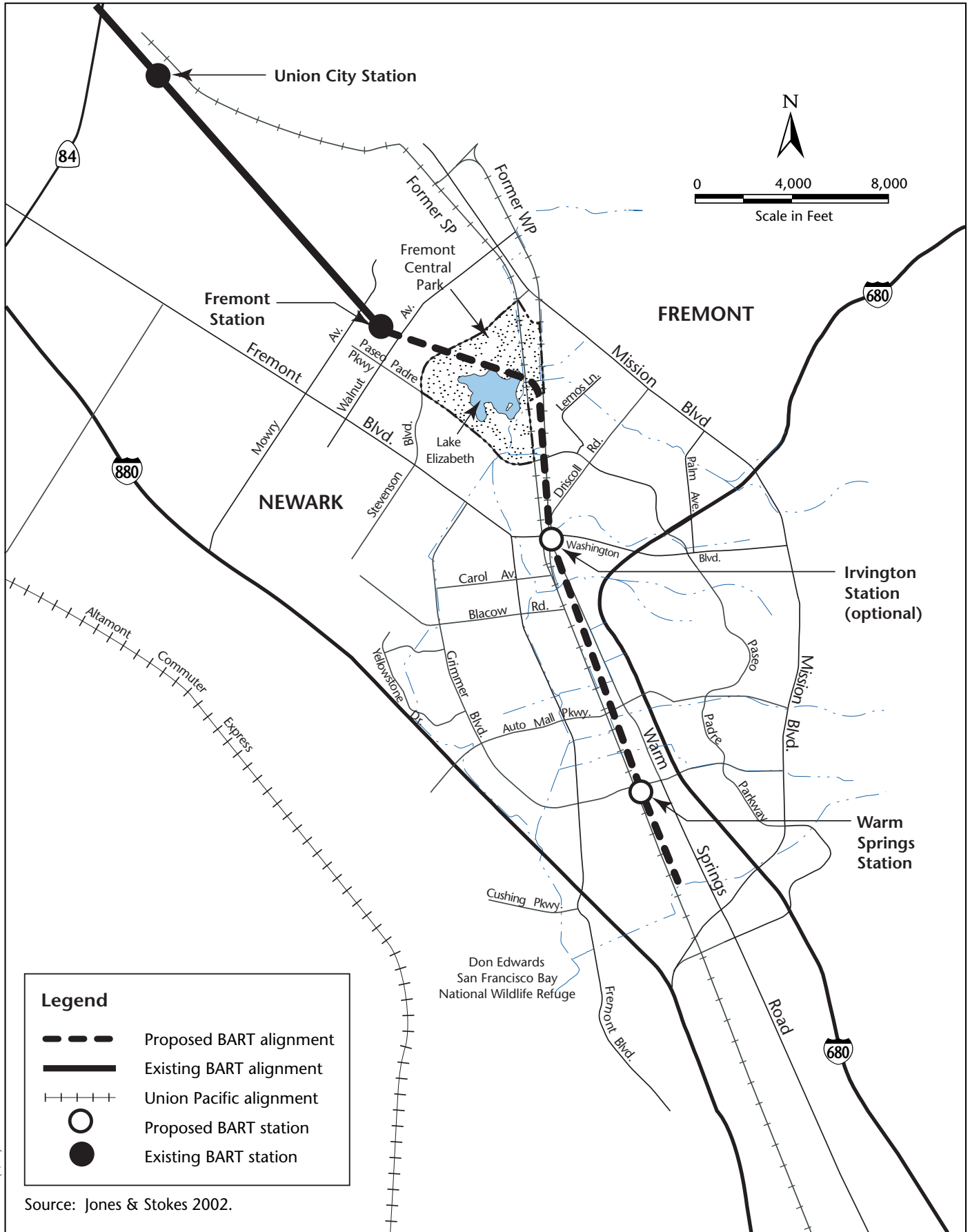
- **Coordination at Paseo Padre Parkway:** Planning and construction of certain physical features, including utility relocations, bridge abutments, piers, the bridge superstructure, retaining walls, and foundations, will need to be coordinated. BART and the city will make their best efforts to coordinate construction timing and contractor access.
- **Coordination at Washington Boulevard:** Coordination will be required with respect to utility relocations, alignment coordination (lateral and headroom clearances), construction timing, and contractor access. The coordination will facilitate future construction of the optional Irvington Station.

## 2.3 2003 Proposed Project

The Proposed Project consists of a 5.4-mile extension of the BART system, with a new station in the Warm Springs district of Fremont. An optional second station in the Irvington district of the city is also being proposed.

The Proposed Project alignment would generally parallel portions of the UP railroad corridor, which contains the former WP and SP railroad tracks, and I-680 and I-880 in southern Alameda County (Figure 2-3). The initial segment of the Proposed Project alignment would begin on an embankment at the south end of the existing Fremont BART Station. The Proposed Project alignment would pass over Walnut Avenue on a bridge structure and descend into a cut-and-cover subway north of Stevenson Boulevard. It would continue southward in a subway under Fremont Central Park and the eastern arm of Lake Elizabeth. The alignment would surface to grade between the former WP and SP railroad alignments north of Paseo Padre Parkway. It would pass over a grade-separated Paseo Padre Parkway on a bridge structure, and then continue southward at grade, passing under a grade-separated Washington Boulevard. From Washington Boulevard, the Proposed Project alignment would generally occupy the former WP right-of-way to just north of South Grimmer Boulevard, where it would veer slightly to the east, and run adjacent to the former WP right-of-way, before entering a new terminus at Warm Springs and Grimmer Boulevards in the Warm Springs District. The railroad corridor configuration would consist of BART on the eastern side (operating in the location of the former WP tracks) and UP on the western side (operating on the former SP tracks). The Proposed Project alignment is described in greater detail below in Section 2.3.1.

Facilities along the Proposed Project alignment would include the new and optional stations (discussed below in Sections 2.3.2 and 2.3.4, respectively) and ancillary facilities spaced out along the alignment, including electrical substations, gap breaker stations, train control facilities, ventilation structures, and a maintenance facility. The ancillary facilities are discussed below in Section 2.3.3. Table 2-1 provides a summary description of the Proposed Project.



**Legend**

- Proposed BART alignment
- Existing BART alignment
- + + + + Union Pacific alignment
- Proposed BART station
- Existing BART station

Source: Jones & Stokes 2002.

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**Figure 2-3  
2003 Proposed Project**

**Table 2-1.** 2003 Proposed Project

Item	Description
<b>Proposed Project</b>	
Estimated Construction Start	2004
Begin Revenue Service	2008
Length of Alignment	5.4 miles
– Embankment	0.2 mile
– Overpass	0.1 mile
– Subway	1 mile
– At grade	3.3 miles
– Retained cut/fill	0.8 mile
Warm Springs Station Intermodal Facilities	34 acres 2,040 parking spaces --daily parking spaces --short-term parking spaces --7 bus bays --parking for the disabled
Ancillary Facilities	
– Traction Power (electrical substations, gap breaker stations)	
– Train Control and Communications	
– Subway Ventilation Structure(s)	
– Pumping/Emergency Access	
– Vehicle Maintenance	
Estimated Ridership	
– 2010	4,700 new transit riders
– 2025	7,200 new transit riders
Cost	
– Capital	\$634 million
– Operating	\$9.17 million
<b>Optional Irvington Station</b>	
Irvington Station Intermodal Facilities	18 acres 960 parking spaces --daily parking spaces --short-term parking spaces --5 bus bays --parking for the disabled

Estimated Ridership (Proposed Project with Irvington Station)	
–2010	5,700
–2025	9,100
Capital Cost (Proposed Project with optional Irvington Station)	\$710 million
Operating Cost (Proposed Project with optional Irvington Station)	\$10.67 million

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Source: San Francisco Bay Area Rapid Transit District

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### 2.3.1 Proposed Project Alignment

To provide a clear description of the Proposed Project alignment, the discussion in this section refers to the alignment as divided in the following segments.

- Fremont BART Station to Stevenson Boulevard.
- Stevenson Boulevard to SP Railroad Right-of-Way. (This segment includes Fremont Central Park).
- SP Railroad Right-of-Way to Paseo Padre Parkway.
- Paseo Padre Parkway to Washington Boulevard.
- Washington Boulevard to End of Proposed Project Alignment.

The proposed project drawings referenced in this discussion are organized as follows.

- Figures 2-4a through 2-4f show the Proposed Project alignment.
- Figures 2-5a through 2-5f show typical cross sections of bridges and other features of the alignment.
- Figures 2-6a and 2-6b show the proposed Warm Springs Station conceptual station layouts and site plans.
- Figures 2-7a through 2-7f show typical layouts of the ancillary facilities for the Proposed Project.
- Figures 2-8a and 2-8b show the proposed optional Irvington Station conceptual station layouts and site plans.

#### Fremont BART Station to Stevenson Boulevard

The existing Fremont BART Station is located on the block bounded by Walnut Avenue, Civic Center Drive, Mowry Avenue, and the Alameda County Flood Control detention basin. The station structure is elevated. BART trains currently approach the station on an aerial structure from the north. The station structure and platform are surrounded by a parking lot and a bus/taxi intermodal facility. Under the Proposed Project, no changes would be made to the station structure itself. The Proposed Project alignment would extend on an embankment southeasterly from the existing platform, across the station parking lot, to Walnut Avenue. The embankment would be



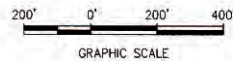
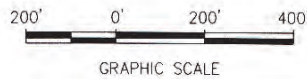
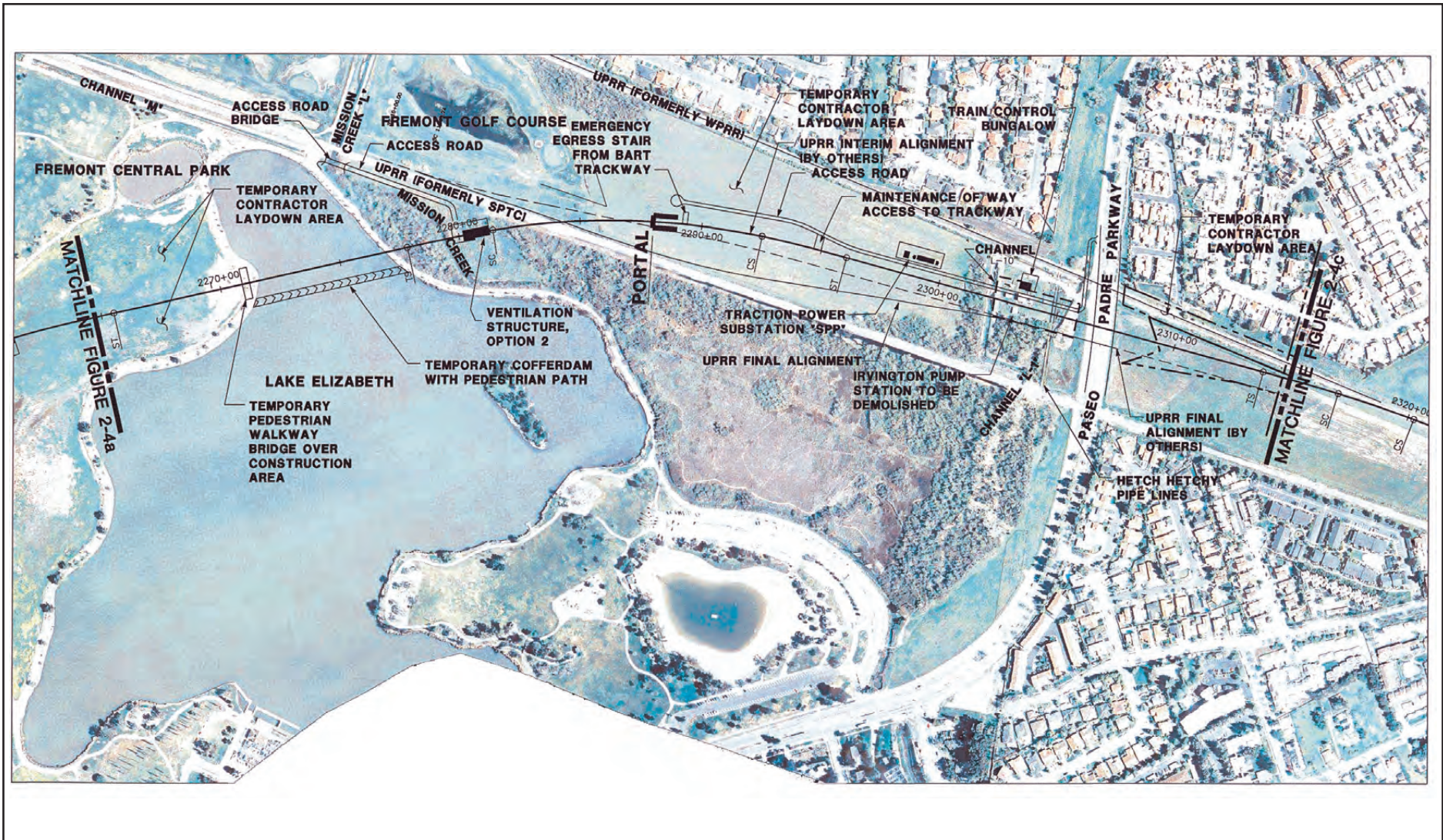


Figure 2-4a  
Proposed Project Alignment  
Fremont BART Station to  
Fremont Central Park

Source: Parsons Brinckerhoff 2003.



**Figure 2-4b**  
**Proposed Project Alignment**  
**Fremont Central Park to**  
**Paseo Padre Parkway**

Source: Parsons Brinckerhoff 2003.

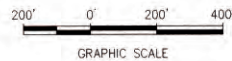
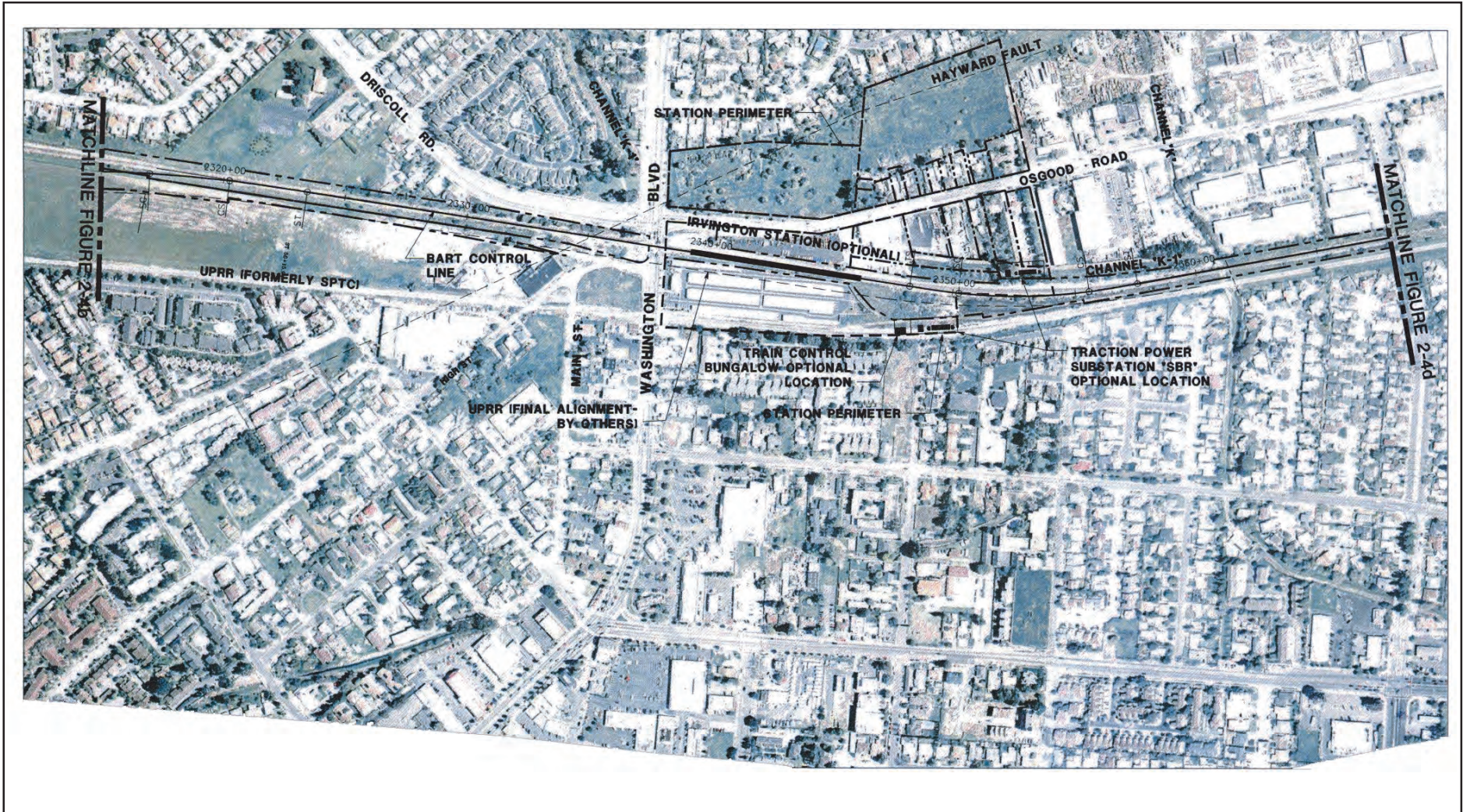
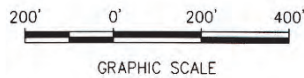


Figure 2-4c  
Proposed Project Alignment  
Former SP Railroad to Blacow Road

Source: Parsons Brinckerhoff 2003.



**Figure 2-4d**  
**Proposed Project Alignment**  
**Blacow Road to Auto Mall Parkway**

Source: Parsons Brinckerhoff 2003.

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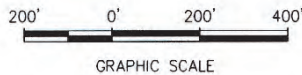
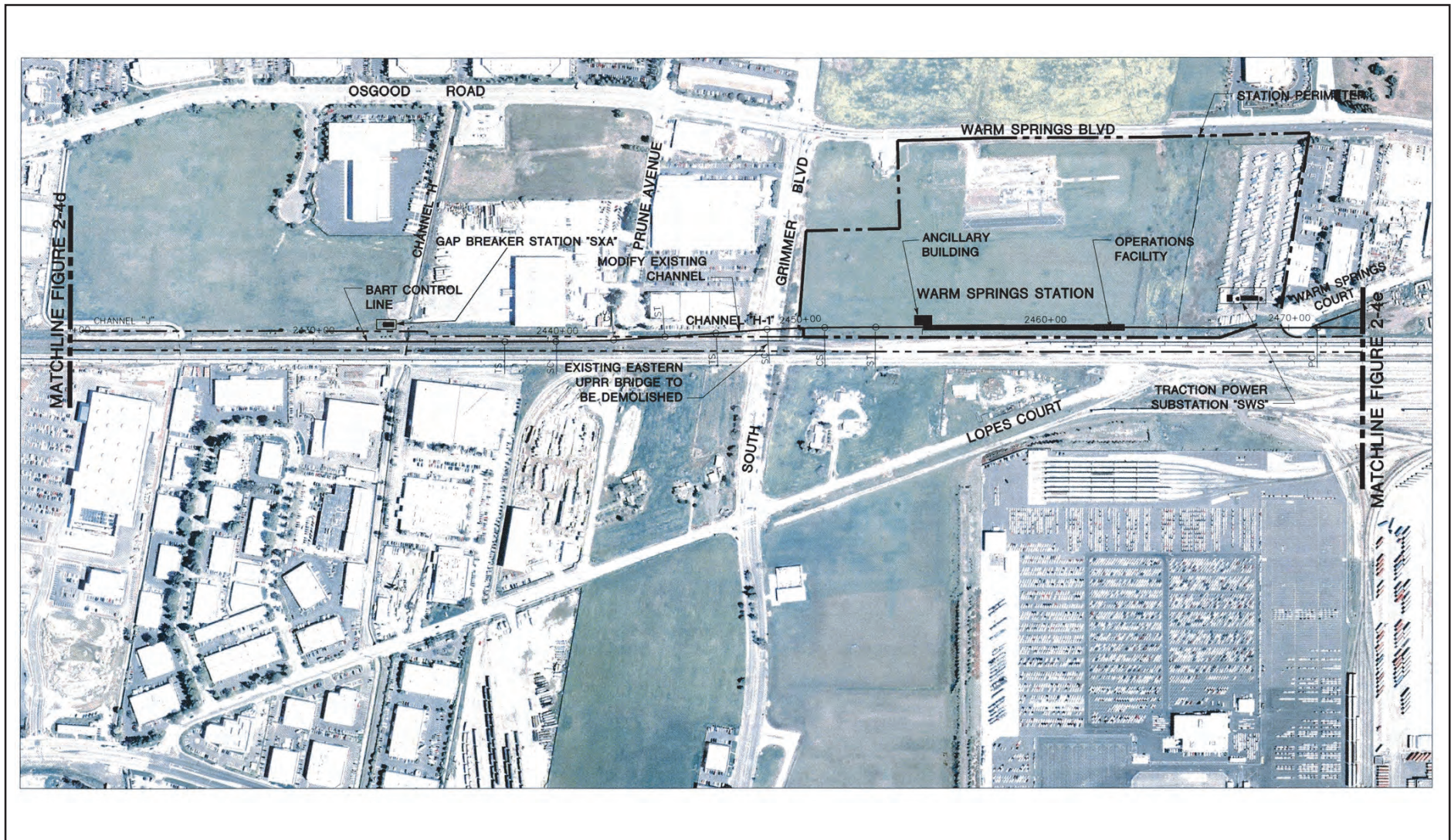
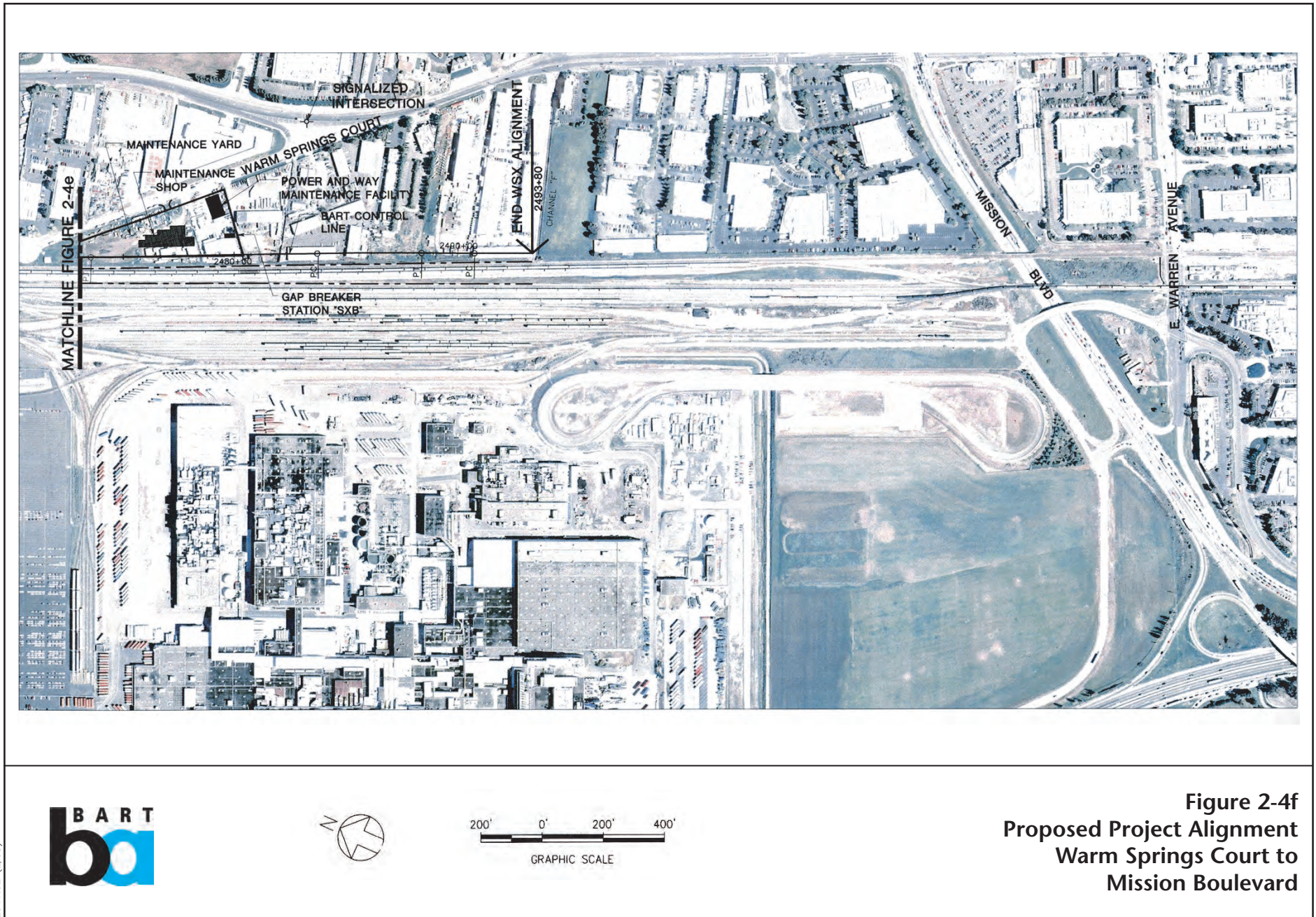


Figure 2-4e  
Proposed Project Alignment  
Auto Mall Parkway to  
Warm Springs Court

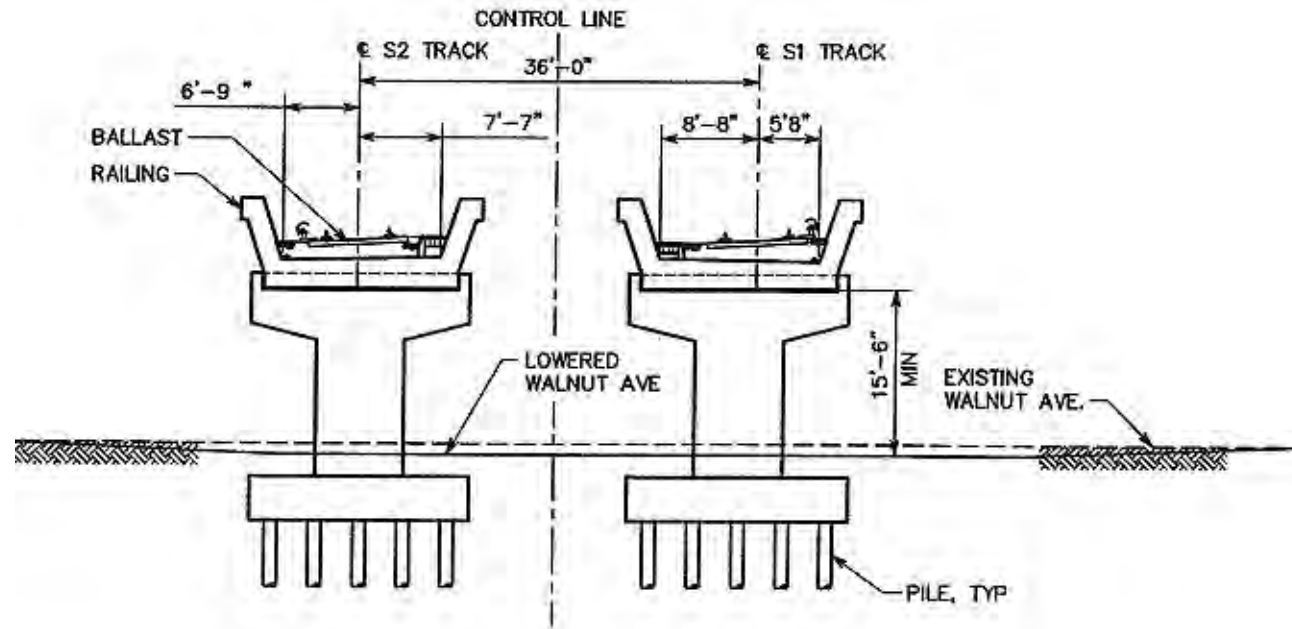
Source: Parsons Brinckerhoff 2003.

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Source: Parsons Brinckerhoff 2003.



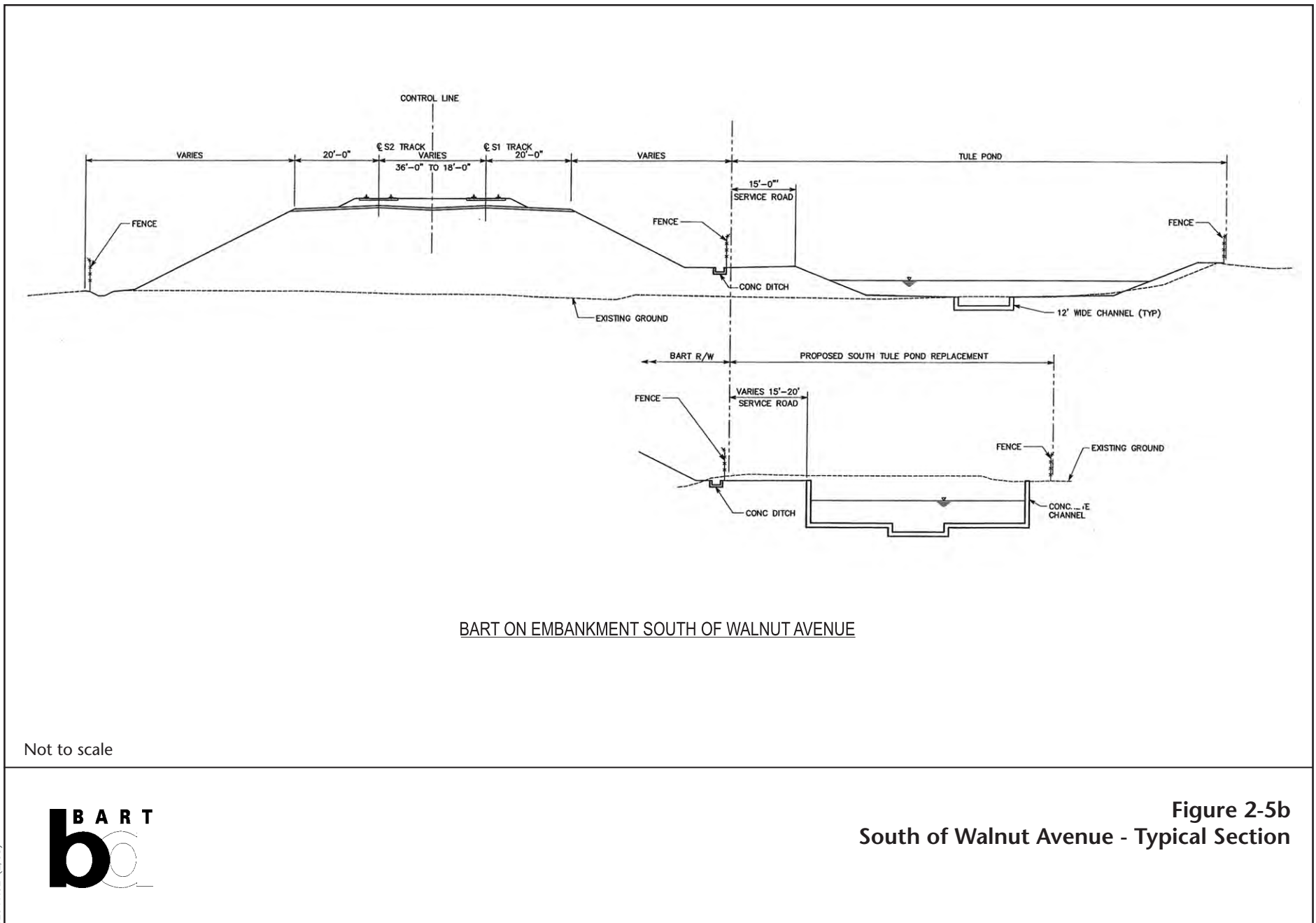
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Figure 2-5a  
Walnut Avenue BART Overpass

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Source: Parsons Brinckerhoff 2003.

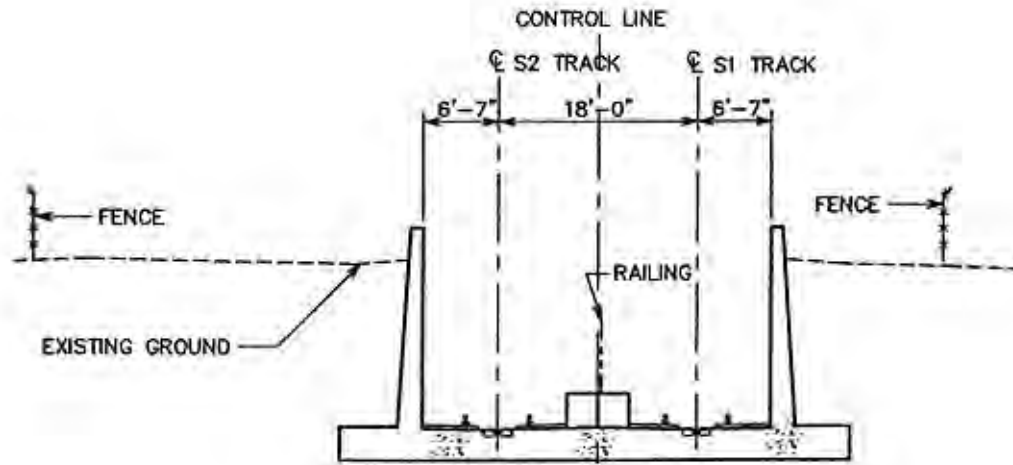


**Figure 2-5b**  
South of Walnut Avenue - Typical Section

Source: Parsons Brinckerhoff 2003.

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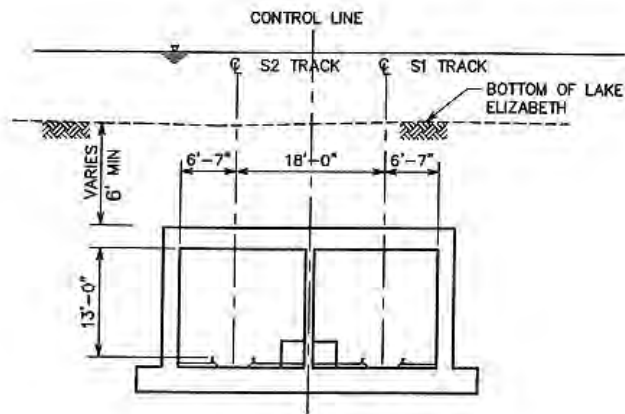
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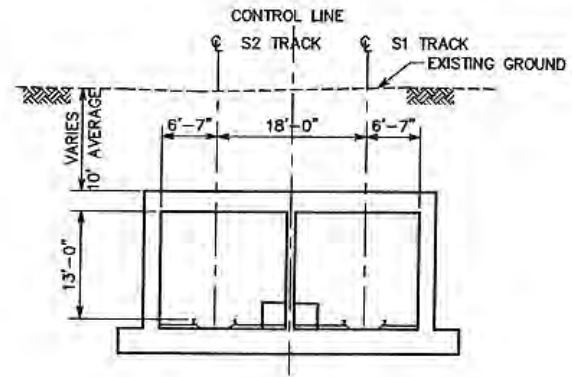
Figure 2-5c  
BART Subway Portal (Transition Structure) – Typical Section

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Source: Parsons Brinckerhoff 2003.



BART SUBWAY UNDER LAKE ELIZABETH



BART SUBWAY BENEATH PARK

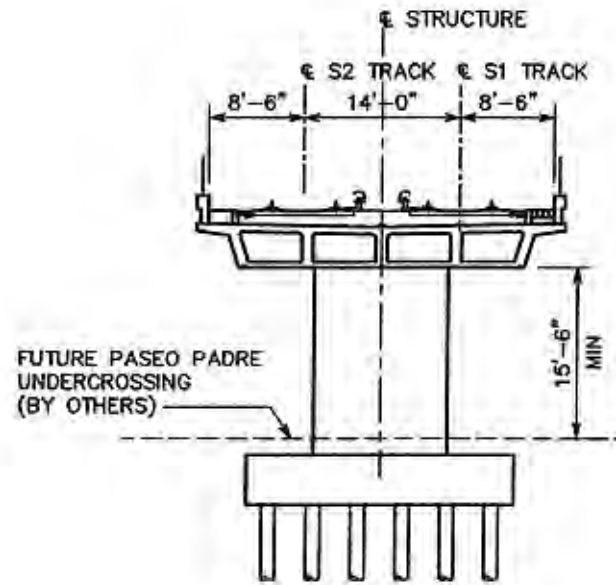
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Figure 2-5d  
BART Subway – Typical Sections

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Source: Parsons Brinckerhoff 2003.

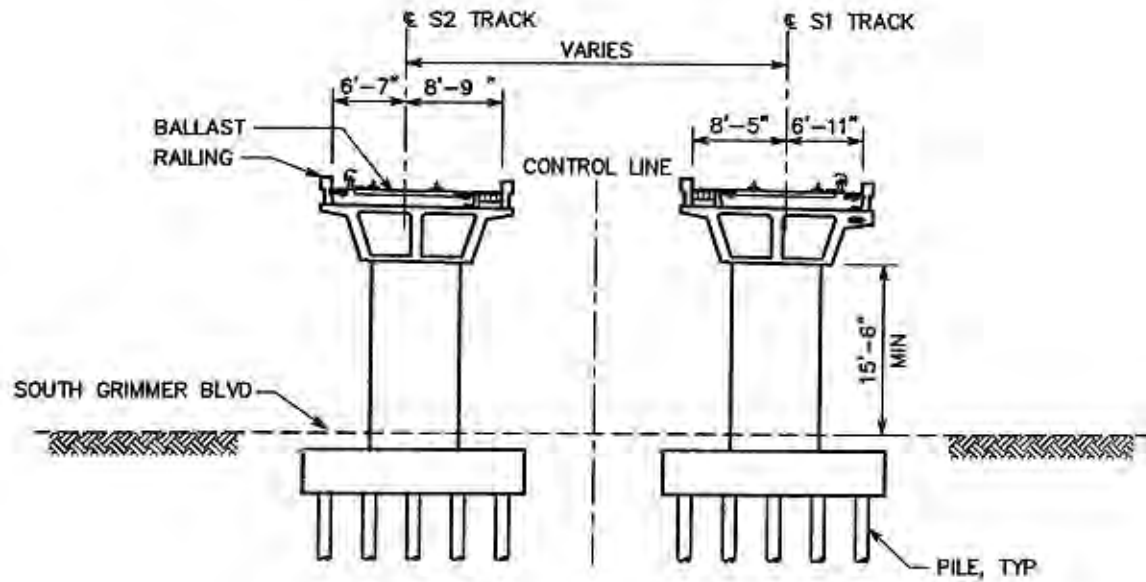


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Figure 2-5e  
Paseo Padre Parkway BART Overpass

Source: Parsons Brinckerhoff 2003.

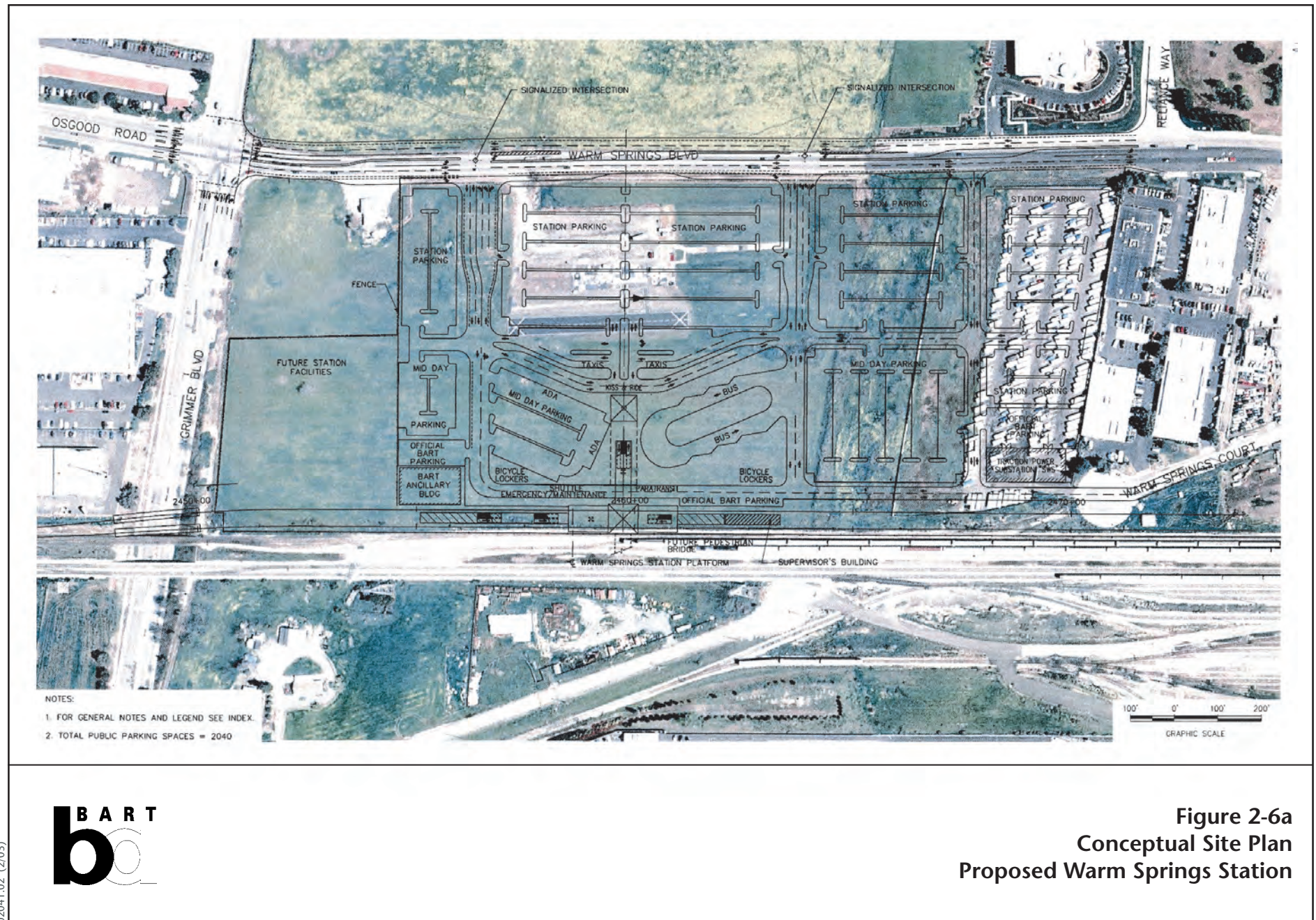


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Figure 2-5f  
South Grimmer Boulevard BART Overpass

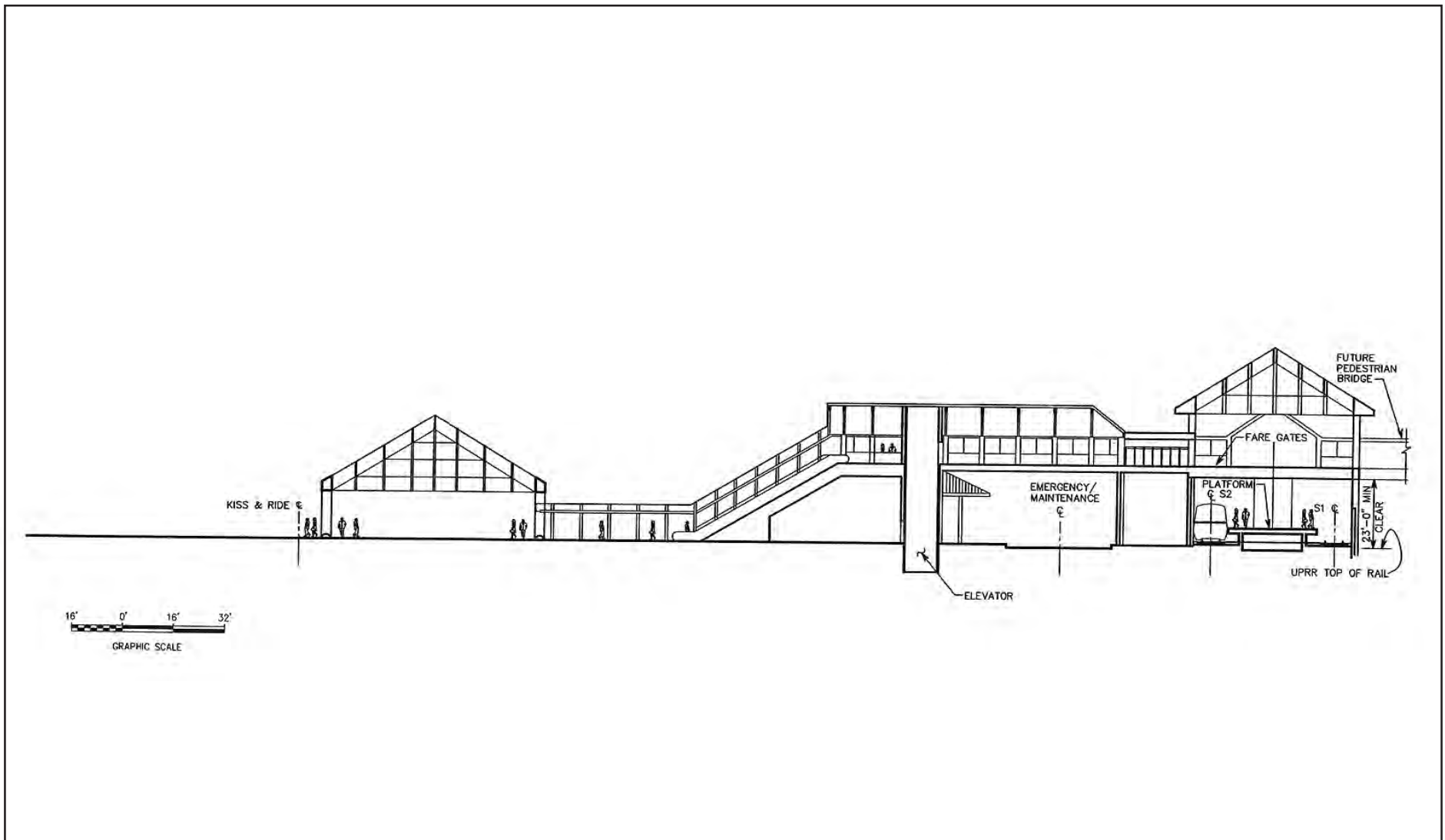
Source: Parsons Brinckerhoff 2003.



**Figure 2-6a  
Conceptual Site Plan  
Proposed Warm Springs Station**

Source: Parsons Brinckerhoff 2003.

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**Figure 2-6b**  
**Conceptual Station Section Looking South**  
**Proposed Warm Springs Station**

Source: Parsons Brinckerhoff 2003.

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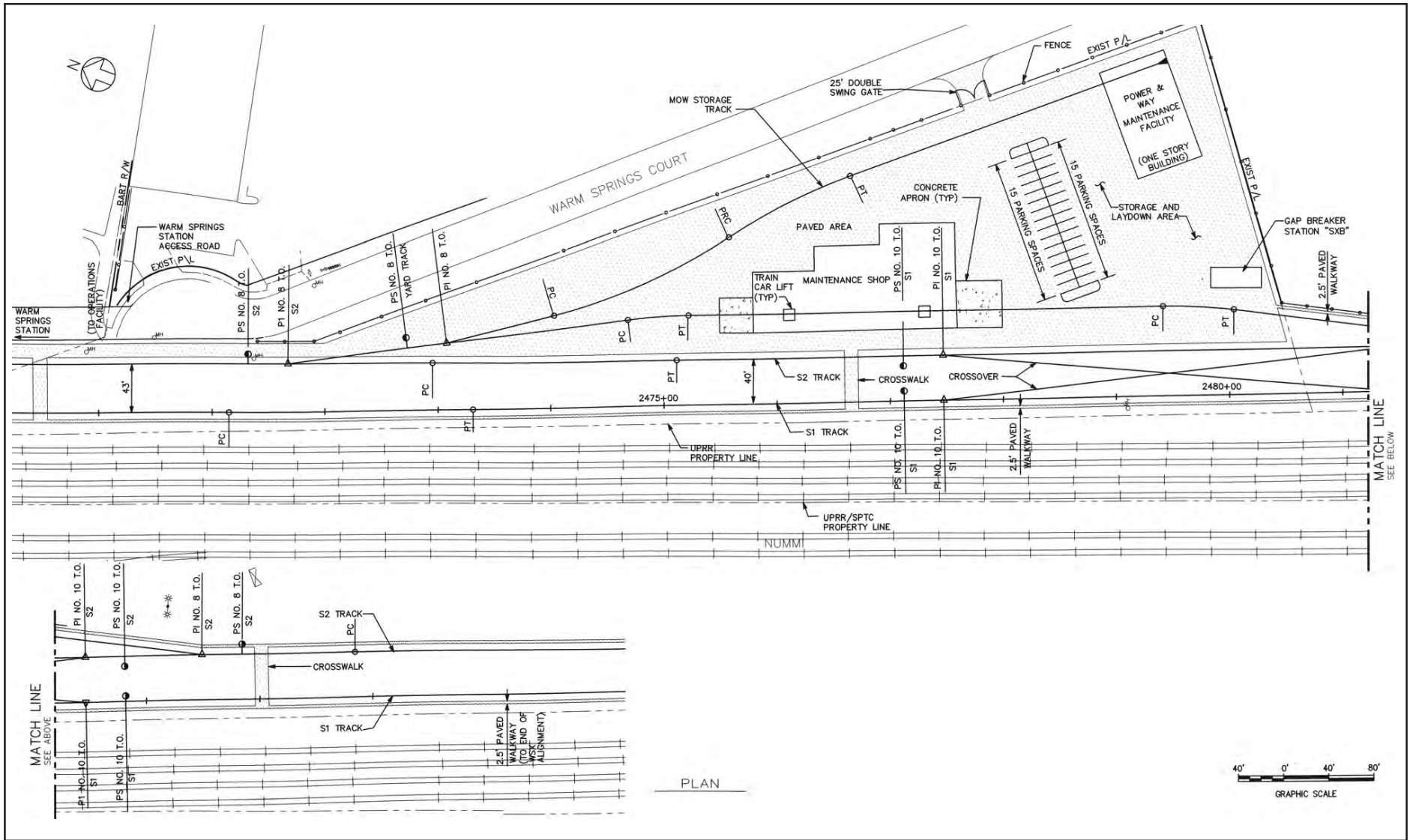
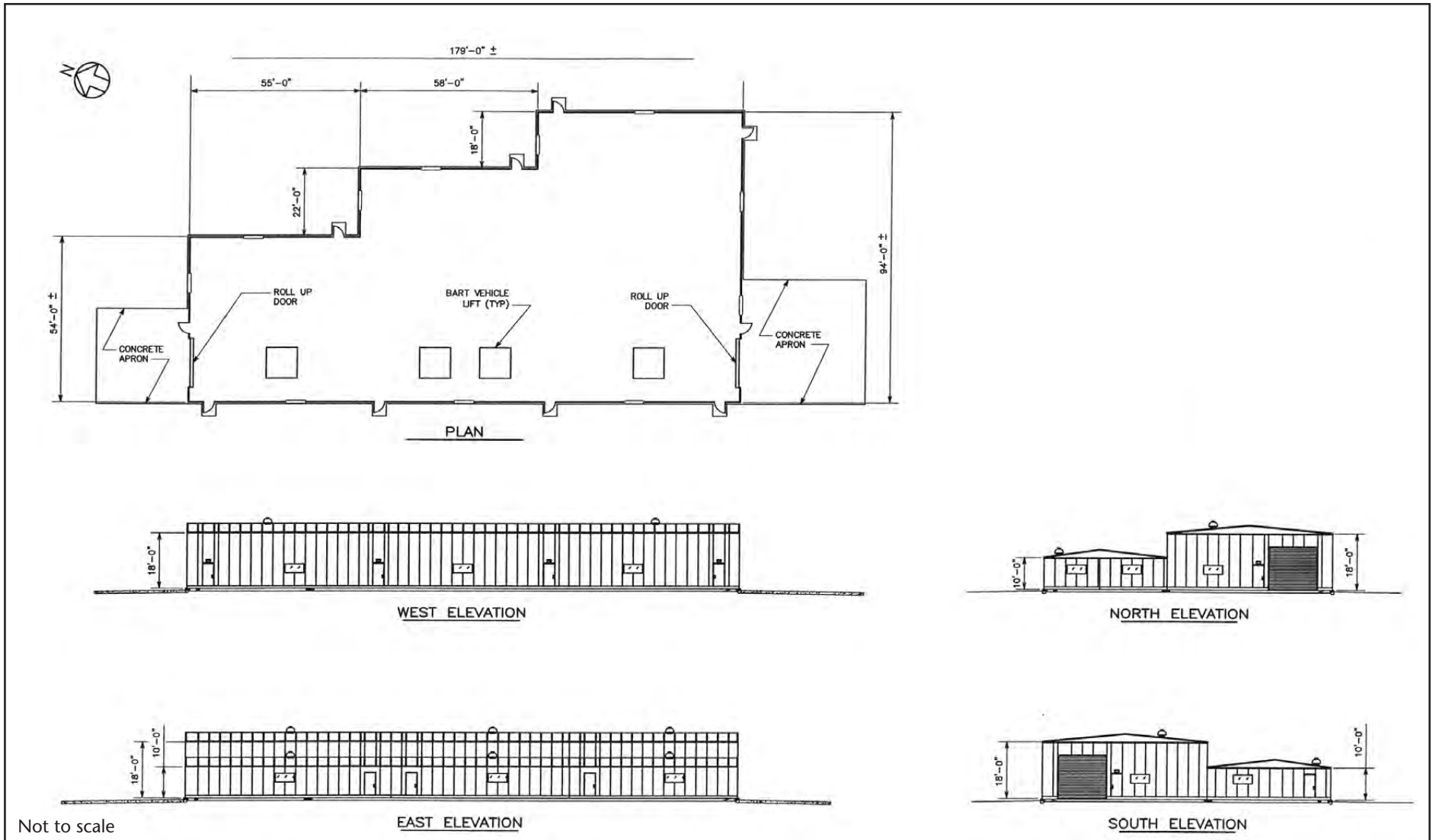


Figure 2-7a  
Proposed Maintenance and Storage Facility

Source: Parsons Brinckerhoff 2003.



**Figure 2-7b**  
Proposed Maintenance Shop Typical Layout



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Source: Parsons Brinckerhoff 2003.



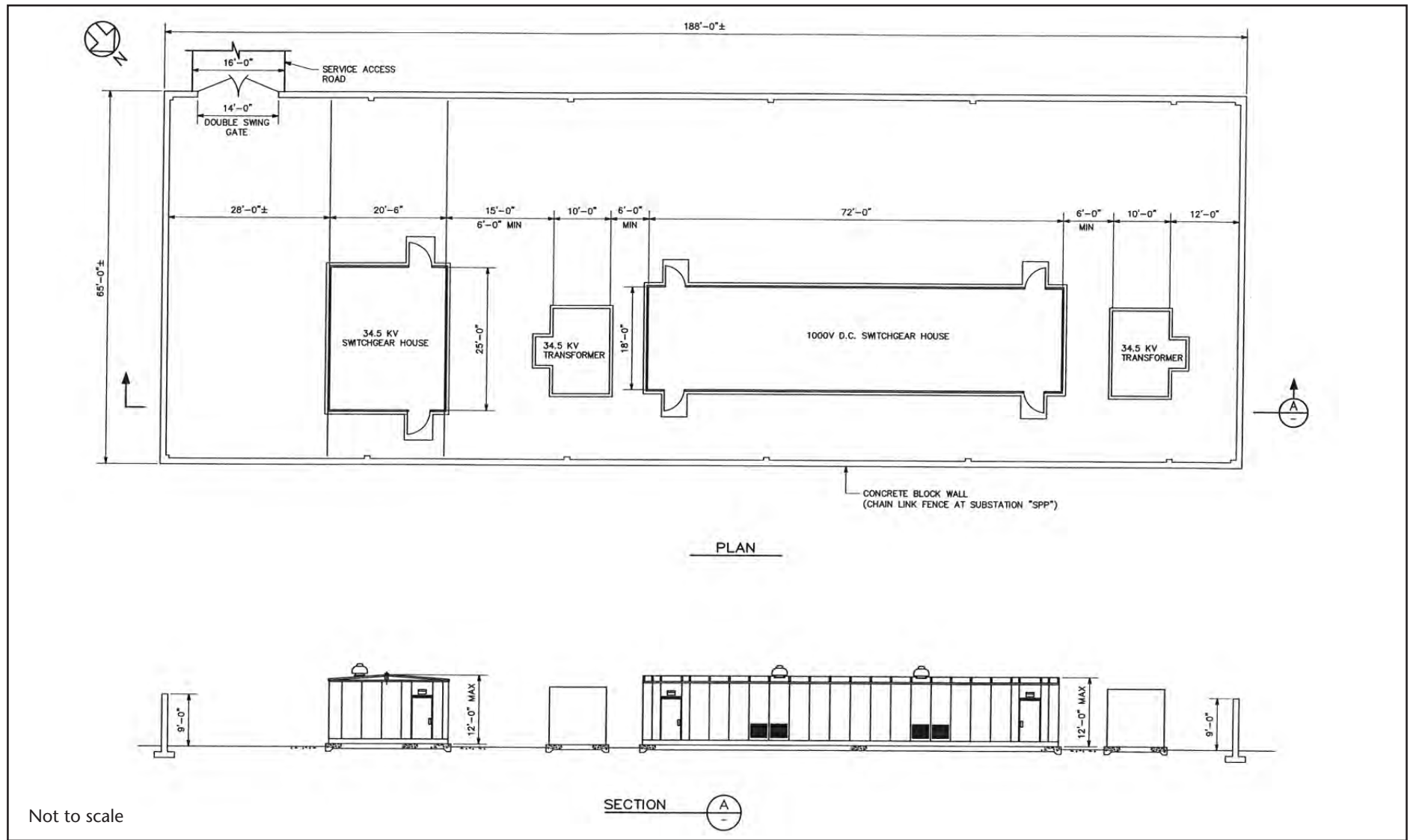
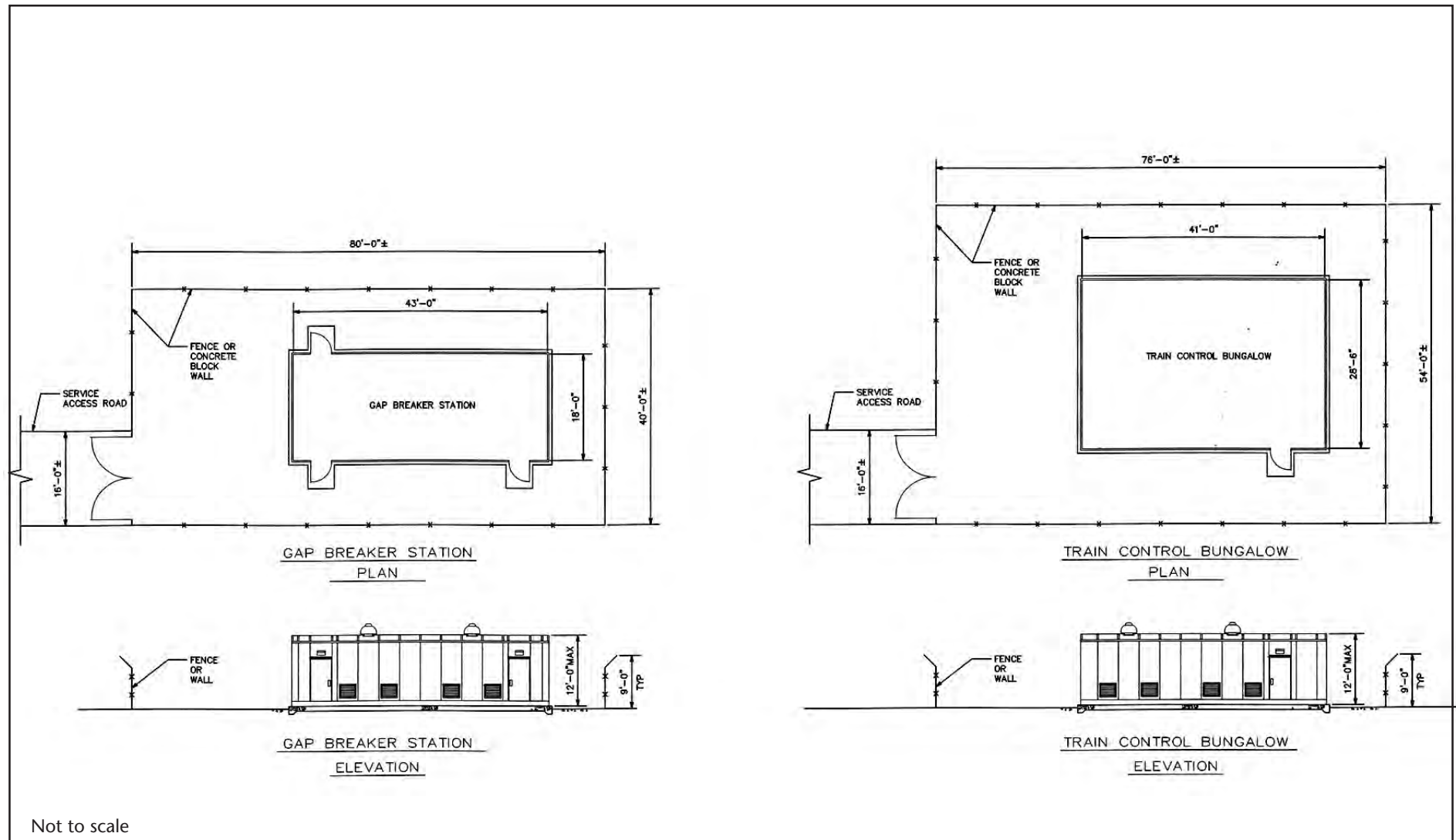


Figure 2-7c  
Proposed Traction Power Substation Typical Layout



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Source: Parsons Brinckerhoff 2003.



**Figure 2-7d**  
Proposed Wayside Facilities Typical Layouts

Source: Parsons Brinckerhoff 2003.

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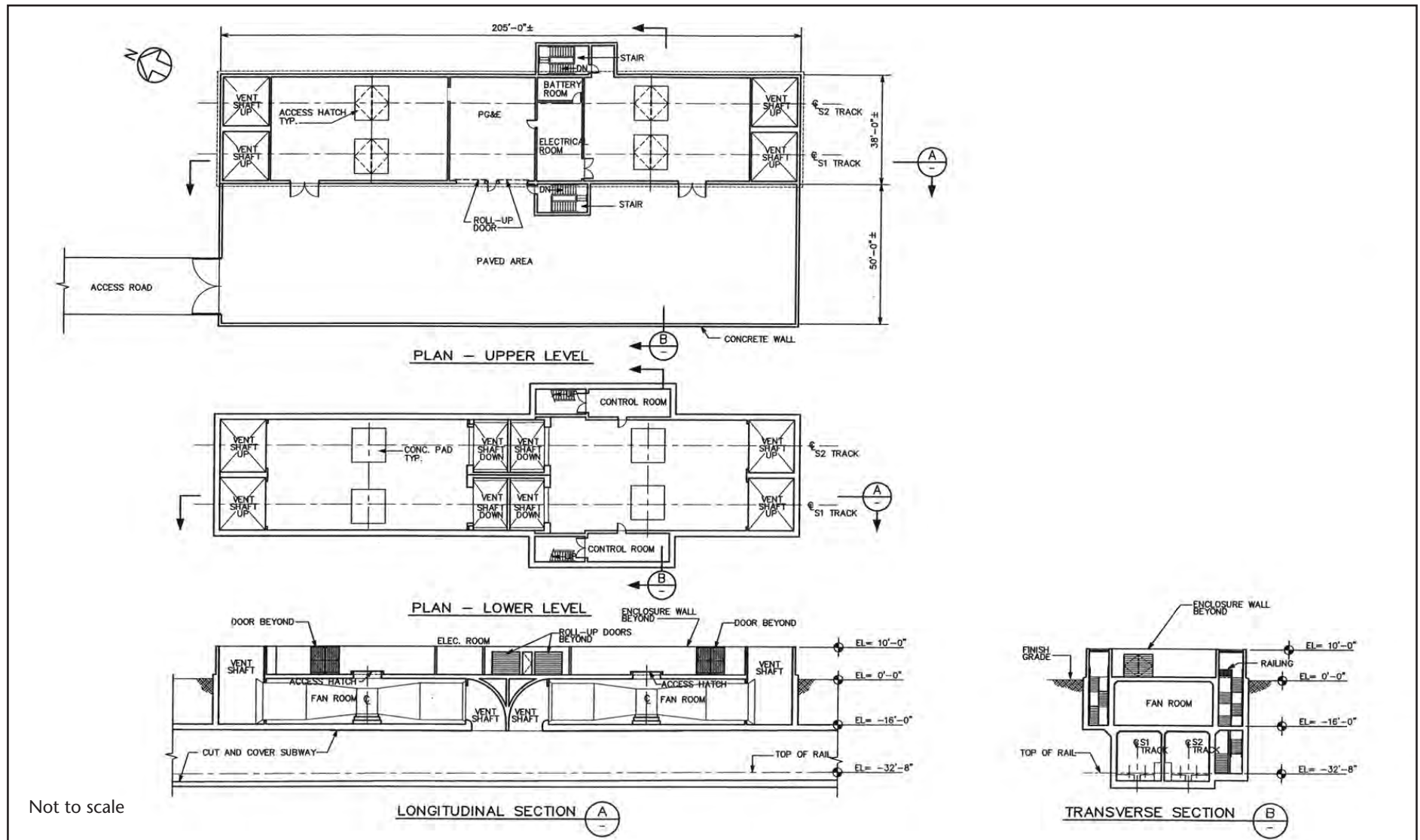


Figure 2-7e  
Proposed Ventilation Structure Option 1 Typical Layout

Source: Parsons Brinckerhoff 2003.

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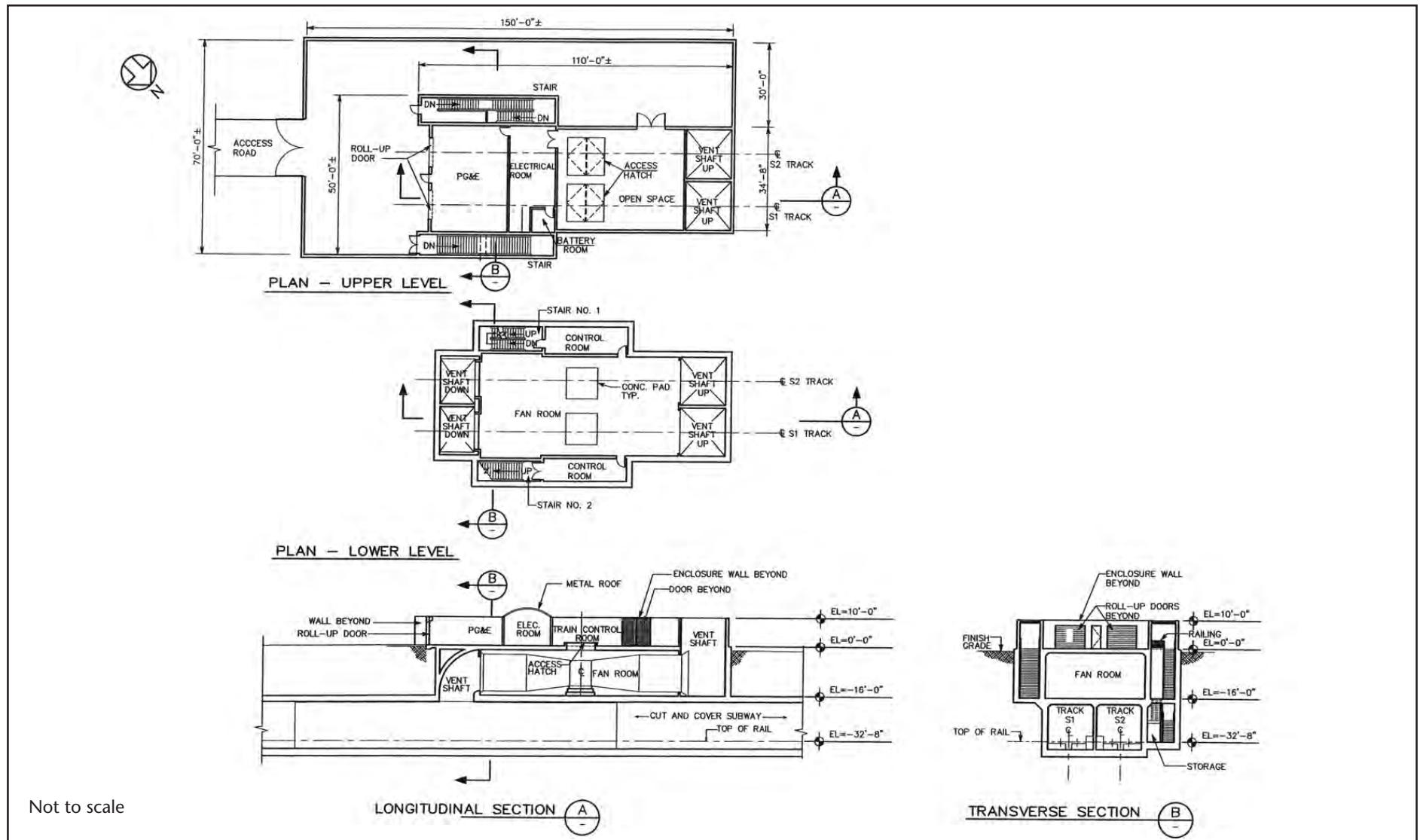


Figure 2-7f  
Proposed Ventilation Structure Option 2 Typical Layout

Source: Parsons Brinckerhoff 2003.

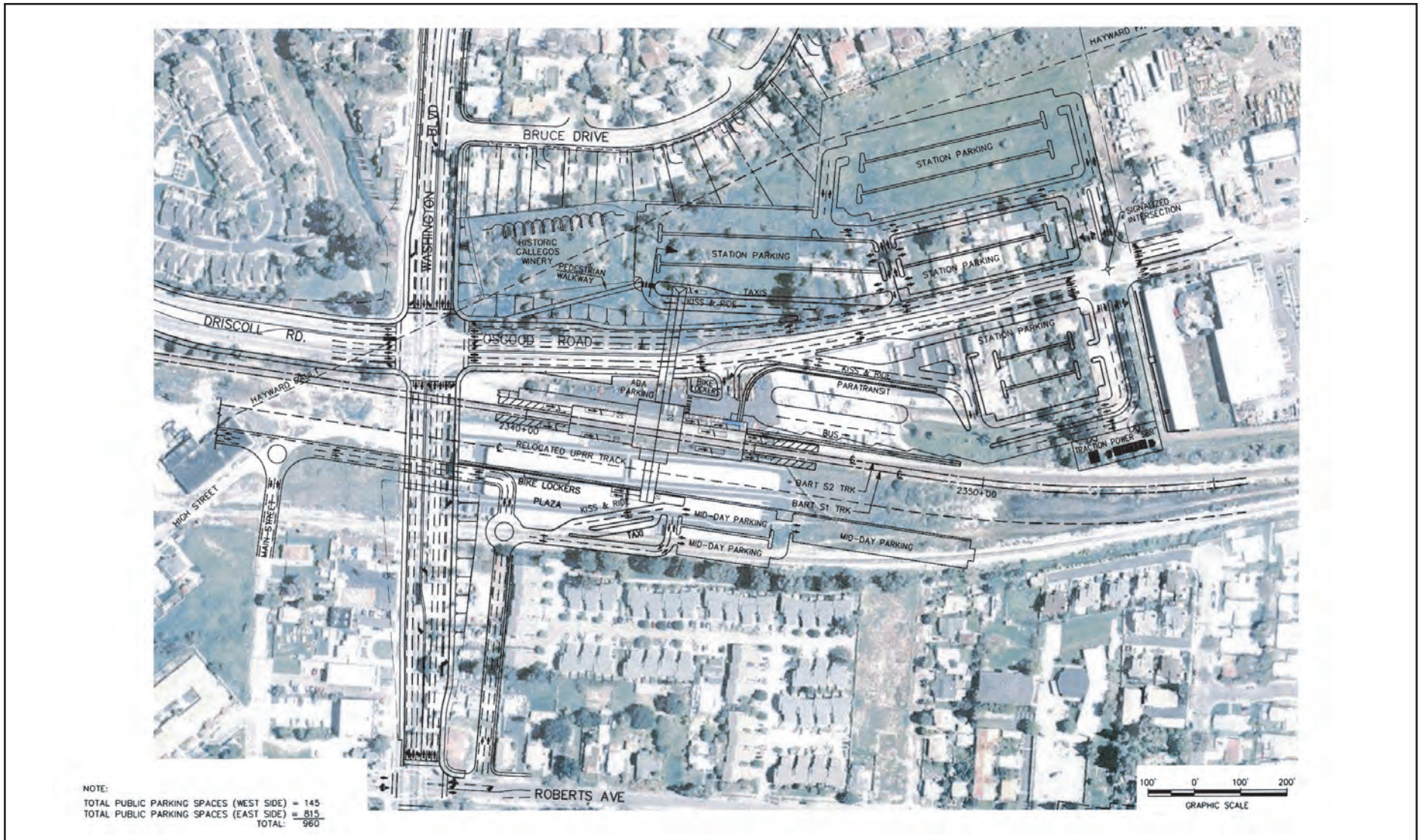
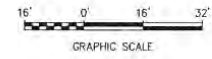
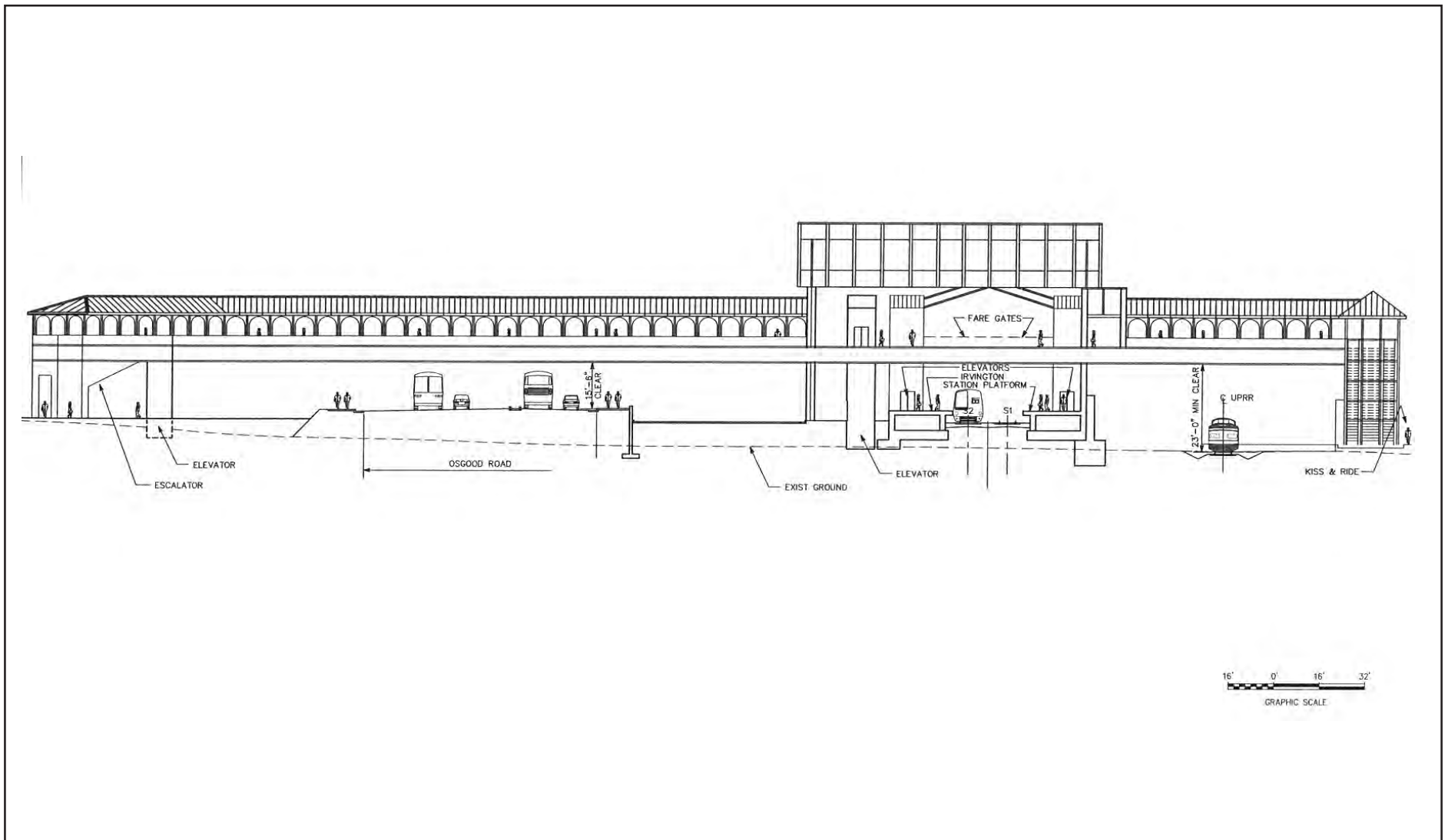


Figure 2-8a  
 Conceptual Site Plan  
 Optional Irvington Station

Source: Parsons Brinckerhoff 2003.



**Figure 2-8b**  
**Conceptual Station Section Looking South**  
**Optional Irvington Station**

Source: Parsons Brinckerhoff 2003.

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approximately 20 feet high and 150 feet wide. The embankment would have an approximately 30-foot-wide opening to maintain vehicular circulation in the southern area of the station. The number of parking spaces in the southern end of the station parking lot would be reduced by approximately 150 spaces to accommodate the embankment, but the station would retain a total of 1,876 parking spaces.

The Proposed Project alignment would cross Walnut Avenue on two 120-foot bridge structures (one for each direction of track). The structures would be supported by abutments on both sides of Walnut Avenue and center piers located in the median. Figure 2-5a shows a typical cross section of the bridge structures. To provide sufficient highway clearance under these bridges, the Walnut Avenue street grade will be permanently lowered approximately 1 foot in the vicinity of the bridges as part of the Proposed Project.

Just south of Walnut Avenue is an existing wetland area commonly known as Tule Pond. Tule Pond is hydrologically connected to a larger wetland area north of Walnut Avenue and east of the Fremont Station parking lot. This entire wetland area, both north and south of Walnut Avenue, serves the Alameda County Flood Control and Water Conservation District (ACFCD) as a flood detention basin. The Proposed Project alignment would cross the Hayward fault, which lies in an east-west direction, at Tule Pond. For seismic safety, the alignment would pass through Tule Pond on an embankment. The embankment would be approximately 175 feet wide and 30 feet high. The central portion of Tule Pond would be filled to construct the BART embankment. The remaining area of Tule Pond on both sides of the embankment would be expanded to maintain existing storage capacity and remain as a detention basin. An existing ACFCD service road would be retained but relocated. Figure 2-5b shows a typical cross section of the embankment.

The undeveloped area extending from Walnut Avenue and Tule Pond south to Stevenson Boulevard is bordered on both the east and west by multi-family residential developments. The Proposed Project alignment would extend through the undeveloped area on an embankment that would slowly descend to grade over approximately 1,000 feet. The alignment would then begin to move below grade into a retained-cut<sup>1</sup> section for approximately 1,000 feet and enter a subway portal approximately 75 feet north of Stevenson Boulevard. The portal structure would be approximately 40 feet wide. The portal area would include facilities for maintenance and emergency access/egress. Figure 2-5c shows a typical cross section of the portal area. This segment of the alignment is illustrated in Figure 2-4a.

## **Stevenson Boulevard to Former SP Railroad Right-of-Way (Fremont Central Park)**

From the portal structure, the Proposed Project alignment would proceed in a cut-and-cover subway under Stevenson Boulevard and Fremont Central Park. The Proposed Project alignment under Fremont Central Park would pass between the area of the softball playing fields and through a portion of the parking lot. It would then pass under the northeastern arm of Lake Elizabeth and cross under the former SP alignment. Following construction of the subway structure, Stevenson

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<sup>1</sup> *Retained cut* refers to a “u”-shaped, below-ground structure with concrete walls and an open top. It is used to transition an alignment from at grade to subway or vice versa.

Boulevard, Fremont Central Park, and Lake Elizabeth would be returned to their existing conditions, and all existing uses would be reinstated. This process is described below in greater detail in Section 2.7 of this chapter. Figure 2-5d shows a typical cross section of the cut-and-cover subway structure.

The proposed length of the subway is approximately 1 mile. At least one ventilation structure would be required in this segment. Any ventilation structure would provide emergency access/egress from the subway to the surface. There are two options for ventilating the subway: a single ventilation structure or two smaller ventilation structures. If the single-structure option were implemented (Option 1), the structure would be placed in Fremont Central Park approximately 125 feet south of the existing parking lot. If the two-structure option were implemented (Option 2), the first structure would be placed in the Fremont Central Park parking lot, and the second structure would be placed east of Lake Elizabeth near Mission Creek. The proposed locations of the ventilation structures under these options are shown in Figures 2-4a and 2-4b. A more detailed description of ventilation structures is provided below in Section 2.3.3. The alignment segment is shown in Figures 2-4a and 2-4b.

### **Former SP Railroad Right-of-Way to Paseo Padre Parkway**

After passing under Lake Elizabeth, the Proposed Project alignment would continue in the subway and cross under the former SP tracks and then emerge into the railroad corridor between the former WP and SP alignments, just south of Central Park Golf Course. The southern subway portal would be located in an undeveloped parcel approximately 100 feet east of the current location of the former SP alignment. Similar to the northern portal, the southern portal would include facilities for maintenance and emergency access/egress. The Proposed Project alignment would emerge from the southern portal toward Paseo Padre Parkway in a retained-cut section for approximately 800 feet, transitioning to grade where it would lie between the former SP and WP alignments. In the approach to Paseo Padre Parkway, the alignment would cross over two Hetch Hetchy water pipelines that run parallel to and approximately 140 feet north of Paseo Padre Parkway. The Hetch Hetchy pipelines are part of the Hetch Hetchy Aqueduct water system, which provides water from the Sierra Nevada to the San Francisco peninsula. Although the Proposed Project alignment would not disturb the Hetch Hetchy water pipelines, the existing structures at the Irvington Pump Station, which is also a part of the Hetch Hetchy water system, would be removed. The structures at this site consist of the main pump station, various small ancillary buildings (including a garage, storehouse, transfer banks, and chlorinator building) and associated piping, all of which were constructed between 1947 and 1955. These facilities ceased operations in the late 1970s. The entire alignment segment is shown in Figure 2-4b.

A traction power substation<sup>2</sup> would be constructed approximately 650 feet north of Paseo Padre Parkway near the southern subway portal (Figure 2-4b). A train control bungalow<sup>3</sup> would be located approximately 200 feet north of Paseo Padre Parkway. The portal and associated facilities would be accessed via a maintenance road from Paseo Padre Parkway.

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<sup>2</sup> A *traction power substation* is a facility that transforms 34.5 kilovolt AC distribution power to 1000 volts DC power, which is then transmitted to the BART third rail to power the trains.

<sup>3</sup> A *train control bungalow* is a prefabricated structure that houses equipment for the train control system.



As part of the Proposed Project, the former SP track, which will be moved to in an interim location by the city's grade separations project, would be placed in its final location. (For a more detailed description, see Section 2.7.)

## **Paseo Padre Parkway to Washington Boulevard**

As described above in Section 2.2.2, both Paseo Padre Parkway and Washington Boulevard will be modified as part of the city's grade separations project. Paseo Padre Parkway will be lowered to pass under the realigned railroad track and BART alignment, and Washington Boulevard will be raised to pass over the realigned railroad track and BART alignment. The former SP alignment will be relocated closer to and parallel to the former WP alignment.

Between Paseo Padre Parkway and Washington Boulevard, approaching the optional Irvington Station site, the alignment would shift to the east, moving from roughly midway between the former SP and WP alignments to the location of the former WP right-of-way, as shown in Figure 2-4c. The Proposed Project alignment would transition from a moderate embankment to slightly depressed in this segment.

The Proposed Project alignment would cross the lowered Paseo Padre Parkway on a double-track guideway<sup>4</sup> approximately 32 feet wide. The bridge structure would be supported by abutments on both sides of Paseo Padre Parkway and center piers in the roadway median (see Figure 2-5e).

Approximately 225 feet north of Washington Boulevard, the Proposed Project alignment would cross the Hayward fault a second time. Because the alignment would be at grade at this point, no special structures would be necessary. This segment of the alignment is shown in Figures 2-4b and 2-4c.

## **Washington Boulevard to End of Proposed Project Alignment**

From Washington Boulevard south to Prune Avenue, the Proposed Project alignment would continue at grade along the former WP alignment. The existing former WP track would be replaced in this segment by BART tracks. Near Prune Avenue, the alignment would bear to the east and continue south, crossing over South Grimmer Boulevard, to the end of the Proposed Project (just south of the Warm Springs Station).

At the Washington Boulevard vehicular overpass created by the city's grade separations project, the Proposed Project alignment would pass between the easternmost abutment of the overpass and its first set of supporting piers, a distance of approximately 70 feet. The alignment would pass the site proposed for the optional Irvington Station, which is immediately south of Washington Boulevard.

In the northern portion of this segment, three optional locations are proposed for a traction power substation. Two of these locations are adjacent to the optional Irvington Station site, and one is adjacent to and south of Blacow Road just east of the Proposed Project alignment (Figures 2-4c and 2-4d). In addition, a traction power substation and train control bungalow are proposed on the

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<sup>4</sup> *Double-track guideway* refers to a BART bridge on which two tracks are located.

eastern side of the right-of-way immediately north of Auto Mall Parkway. A gap breaker station<sup>5</sup> is proposed on the eastern side of the right-of-way between Auto Mall Parkway and Prune Avenue (Figure 2-4e).

Continuing at grade, the alignment would cross under the vehicular overpass at Auto Mall Parkway. South of Auto Mall Parkway, the Proposed Project alignment would continue at grade to just north of South Grimmer Boulevard.

Two new BART bridge structures (one for the northbound BART track, and one for the southbound track) would be constructed slightly to the east of the current location of the former WP bridge site at South Grimmer Boulevard. The bridge structures would be supported by abutments on both the north and south sides of South Grimmer Boulevard and center piers in the roadway median. Figure 2-5f shows a typical cross section of this feature. After crossing over South Grimmer Boulevard, the Proposed Project alignment would leave the former WP right-of-way and continue at grade into the Warm Springs Station site.

South of the Warm Springs Station, the Proposed Project alignment would proceed at grade for approximately 3,000 feet to provide tail tracks. In this stretch, the tail tracks would be located on the east side and adjacent to the UP Warm Springs yard tracks<sup>6</sup> that serve the New United Motors Manufacturing, Inc. (NUMMI) plant. The tail track segment would consist of extensions of the two mainline tracks and associated crossovers to facilitate the temporary storage of BART trains, train turn back, and access to the maintenance facility. The tail tracks may later be converted to two through tracks in conjunction with the proposed SVRTC project if it is adopted, or with any other future BART extension to the south. The alignment would end approximately 2,000 feet north of Mission Boulevard. This final segment of the alignment is shown in Figures 2-4d through 2-4f.

### 2.3.2 Warm Springs Station

The proposed Warm Springs Station would be the new terminus of BART's Fremont line. The station, trackway, ancillary buildings, service and intermodal facilities and parking areas would occupy the approximate 34 acre site designated for the Warm Springs BART Station. The site is located between Grimmer Boulevard to the north, Warm Springs Boulevard to the east, the northernmost portion of Warm Springs Court to the south, and the UP Warm Springs railroad yard to the west.

Grimmer Boulevard would provide east-west vehicular access to the station area. Direct site access would be provided from two signalized intersections along Osgood Road/Warm Springs Boulevard, which provide principal north-south access to the station area. This road is known as Osgood Road to the north of the station site; to the south of the station the road is known as Warm Springs Boulevard. The primary access to the station would be from two new signalized intersections on Warm Springs Boulevard and a two-lane road extension from Warm Springs Court (currently a cul-de-sac). Also as part of the Proposed Project, Warm Springs Boulevard is proposed to be

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<sup>5</sup> A gap breaker station is a facility that houses gap breakers, which are used to sectionalize the third rail in case of track emergencies or wayside work, effectively maintaining power to one track while removing it from the other.

<sup>6</sup> *Yard track* refers to track used for train storage. The yard track is located in a train yard off the main line.

widened from South Grimmer Boulevard to the southern end of the station parking lot to accommodate the additional traffic lanes and turning movements. A new station access road would be constructed at this site. The existing Warm Springs Court cul-de-sac would be extended as a roadway along the western edge of the station site. The two-lane roadway would extend from Warm Springs Court approximately 200 feet to intersect the internal station roadway and auto traffic would be directed to the east, into the main parking lot circulation. Beyond this point, to the north of the intersection, restricted parking for emergency and maintenance vehicles would be provided along the east side of the station platform. A signalized intersection at Warm Springs Boulevard and Warm Springs Court is proposed to facilitate the proposed Warm Springs Court access. The conceptual site plan for the Warm Springs Station is presented in Figure 2-6a.

The proposed Warm Springs BART Station would be a two-story station as shown in Figure 2-6b. The first story would be an at-grade platform between the two tracks (center-platform) that would be approximately 700 feet long to accommodate 10-car trains. The second story would be an overhead concourse providing passenger access to the platform. An entry plaza on the east side of the station would provide patron access to the stairs, escalators, and elevators leading to the concourse. The entry pavilion would be located at the focal point of pedestrian, auto drop-off, and transit activity. Transit information and retail vendors would be available here, as at other BART stations. Station agents, schedules, local street maps, BART maps, and fare collection equipment all would be located on the overhead concourse. The station would provide facilities for station agents, BART Operations personnel, and BART Police. The station would be designed to allow construction of a future pedestrian bridge to the west, over the adjacent UP tracks.

Fare collection at the proposed Warm Springs Station would be identical to the rest of the BART system. Tickets would be purchased through vending machines located at the station concourse. Entrance to station platforms would be activated by inserting the fare ticket into an entrance gate console that opens the entrance gate.

Access to the station would be provided by facilities consistent with BART's access hierarchy<sup>7</sup>, and would include the following elements.

- Pedestrian walkways, special crosswalks, and entry plazas.
- A bus intermodal center.
- Bicycle lanes linked to the city's major roadways and station bike parking facilities.
- Paratransit and private shuttle drop off.
- Auto pick up/drop off (kiss and ride).

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<sup>7</sup> The *access hierarchy* establishes the priority of station improvements in conjunction with increasing ridership; partnering with communities; and creating environmentally friendly, efficient site plans, and station area plans. Improvements must meet BART's strategic objectives related to intermodal access and transit-oriented development, and meet BART standards for American's with Disabilities Act of 1990 (ADA) compliance, maintainability, and system consistency.

- A taxi area with three spaces, per BART policy.
- Carpool, single-occupancy vehicle parking, and parking for the disabled.

The conceptual station site plan (Figure 2-6a) illustrates the location of the bus drop-off, auto pick-up/drop-off, and daily parking facilities, all of which would be located east of the station and platform area. A total of 2,040 parking spaces would be provided, including daily and short-term parking and parking for the disabled. The bulk of station auto parking would consist of daily parking spaces, clustered near Warm Springs Boulevard. Mid-day parking would be located on the west side of the parking area, near the station entry. Additional mid-day parking would be located south of the bus drop-off area. Short-term auto parking would include drop-off/pick-up and taxi parking facilities. Seven bus bays are provided for bus drop off and pick up, adjacent to the station entry plaza. Buses would access the station from either Warm Springs Boulevard or Warm Springs Court. As with automobile access, primary pedestrian and bicycle access would be from three new intersections on Warm Springs Boulevard.

The proposed Warm Springs Station site plan is designed with a flexible layout of interior “streets,” which outline the perimeter of the various parking and intermodal areas and also provide primary pedestrian access. The use of sight lines and appropriate landscaping would mark station entries.

### 2.3.3 Ancillary Facilities

In addition to the Proposed Project alignment and primary station facilities, a number of ancillary wayside facilities would be constructed as part of the Proposed Project. These would include a maintenance shop located south of the Warm Springs Station. In addition, a small supervisor’s building would be provided at the southern end of the Warm Springs Station platform to provide a reporting area for train operators and offices for BART supervisors. As discussed above in Section 2.3, traction power, gap breaker, and train control/communications facilities would be located at regular intervals along the alignment. Furthermore, the subway section under Fremont Central Park would require one or two ventilation structures. As final engineering and design progresses, BART will determine whether one or both structures will be required. For the purposes of analysis in this SEIR, a reasonable worst-case assumption was made to analyze both structures as part of the Proposed Project. Pumping and emergency access/egress facilities would be located at the ventilation structure(s) and at subway portals. Typically, all ancillary facilities would be fenced to prevent unauthorized access. The characteristics of these facilities are described below.

### Vehicle Maintenance and Storage Facilities

The two tail tracks south of the Warm Springs Station would lead past a gated maintenance yard adjacent to Warm Springs Court. The 3-acre maintenance yard would contain a vehicle maintenance shop building, a power and way maintenance shop, an open paved area, a storage track, and approximately 30 parking spaces for BART employees. The vehicle maintenance facilities would consist of rail-car lifts, and associated work areas and shop facilities. The perimeter of the facility would be fenced. A preliminary layout of the maintenance yard is shown in Figure 2-7a. A typical layout for the vehicle maintenance shop is shown in Figures 2-7b through 2-7d.

## Traction Power Facilities

Various traction power facilities, such as substations and gap breaker stations, would be required along the wayside to feed electricity to the BART third rail from either the Pacific Gas and Electric Company (PG&E) power system or the BART sub-transmission system. Each of these facilities would contain electrical equipment housed in pre-fabricated enclosures approximately 12 feet in height. The enclosures would be gated and secured by a concrete-block wall or a chain-link fence. A private access road for maintenance vehicles would be provided from the nearest public road, but public access would be restricted. A typical layout for the traction power substations and gap breaker facilities are provided in Figures 2-7c and 2-7d.

Proposed traction power facility locations are listed below and are shown in Figures 2-4c and 2-4d.

- Between the south subway portal and Paseo Padre Parkway.
- South of the optional Irvington Station area, either on the east or west side of the right-of-way; or at Blacow Road, on the east side of the right-of-way.
- North side of Auto Mall Parkway, on the east side of the right-of-way.
- South side of the Warm Springs Station site.

## Train Control and Communications Facilities

Various types of advanced train control (AATC) and communications equipment are required both at stations and along the wayside. At the proposed Warm Springs Station, communications equipment would likely be housed in a separate ancillary building located adjacent to the station building itself. Along the wayside, communications antennas less than 30 feet in height may be necessary at the optional Irvington Station and at the tunnel portals. Wayside AATC equipment would include smaller antennas, approximately 16 feet in height, located at intervals along the trackway (approximately every 2,000 feet) and data processing equipment would be enclosed in train control bungalows. Plan and elevation views of a typical train control bungalow are shown in Figure 2-7d. Depending on the outcome of radio analyses conducted during preliminary engineering, a radio communications antenna of up to 100 feet in height may be necessary at the proposed Warm Springs Station as well.

## Drainage Improvements

There are a number of existing streams or drainage lines along the Proposed Project corridor that may require improvements as part of the project. Stream and channel locations are further described in Section 3.3 (*Hydrology and Water Quality*).

- Mission Creek: The creek may be temporarily rerouted or piped during construction.
- Channel K-1: If the optional Irvington Station is built, the segment of the channel in the optional Irvington Station limits may be placed in a culvert.

- Channels K, I, J, and H: The existing UP culverted crossings will be investigated for structural adequacy and capacity and sufficient length for the BART trackway.
- Channel H-1: A segment of the channel paralleling the UP tracks north of Grimmer Boulevard may be replaced with culverts to accommodate the BART alignment curving to the east as it enters the Warm Springs Station.

### **Auto Mall Parkway Seismic Retrofit**

Depending on the outcome of a seismic vulnerability analysis, the Auto Mall Parkway vehicular overpass may require seismic retrofitting prior to the commencement of BART operations. If so, the retrofit would likely consist of strengthening abutments at both ends of the structure, the intermediate piers, pile foundations, and deck restraining devices. Although the need for this seismic retrofit work will not be certain until the study is completed, it is assumed as a reasonable worst-case assumption that the work will be necessary and will be performed as part of the Proposed Project.

### **Subway Ventilation, Pumping, and Emergency Access Facilities**

The approximately 1-mile long subway under Fremont Central Park would require ventilation. Ventilation fans would be housed in one or two structures along the subway alignment, based on the results of a detailed ventilation analysis. Figures 2-4a and 2-4b show the approximate locations of the ventilation structures and associated access road under each ventilation scenario. Ventilation structure access roads would be unpaved gravel roads, approximately 12 feet in width. Each ventilation structure would contain ventilation shafts, fan rooms, and an electrical room. While most of each ventilation structure would be primarily subterranean, some of the structure would be visible on the surface. The facilities would be enclosed by a concrete-block wall around the perimeter. Figure 2-7e shows a typical layout of the single ventilation structure, and Figure 2-7f shows a typical layout of the smaller ventilation structures used in the event two structures are required.

To provide drainage for the subway, pumping units would be located in the ventilation structure(s). The pumping units would discharge to the local storm drainage system. If the pumping activities result in discharge to any surface water body via direct or indirect conveyance, BART would be required to implement water quality measures and monitoring procedures as conditions of coverage under the NPDES General Permit for Industrial Activities. BART will ensure that the dewatering activities remain consistent with the obligations set forth in the permit. Emergency access/egress from the subway would also be incorporated into the ventilation structures(s) and would be provided at each subway portal. The access facilities would consist of pedestrian stairs and walkways from the subway structure to at-grade points of refuge.

### **2.3.4 Optional Irvington Station**

The 2003 Proposed Project includes an optional Irvington Station. The Irvington Station is optional because funding for the station has not been secured at this time. Although BART was able to secure funds for the Warm Springs Extension primarily through the voter-approved Alameda County Measure B sales tax initiative (November 2000) and other state initiatives, funding for the Irvington BART Station has not been identified. The cost of the station is preliminarily estimated at \$76

million (2002 dollars). The City of Fremont is currently investigating an amendment to the 1998 Redevelopment Plan that could contribute funds to the construction of the Irvington Station, which is considered a significant component of the redevelopment effort for the Irvington area. As part of the 1998 Amended Redevelopment Plan, the Fremont Redevelopment Agency Board and City Council identified the construction of the Irvington BART Station as an eligible use of Redevelopment Agency funds to stimulate revitalization of the Irvington Redevelopment Project Area. The Redevelopment Agency is preparing a project-specific EIR on the Amended Redevelopment Plan.

The Irvington Station site would occupy approximately 18 acres. The site straddles the realigned rail corridor and is bounded by Washington Boulevard on the north, residences on Bruce Drive to the east, commercial development to the south, and residences west of the former SP alignment. The Hayward fault lies along the eastern perimeter of the station site, where the ground rises to a steep bluff. The fault passes through the historic Gallegos Winery ruins, located in the northeast corner of the station site. The winery ruins would be maintained unaltered as part of the Irvington Station design. A conceptual site plan for the optional Irvington Station is presented in Figure 2-8a.

As part of the city's grade separations project, Osgood Road will be widened and elevated, and Washington Boulevard will be widened and elevated to cross the realigned rail corridor. Vehicular access to the station area would be from Washington Boulevard, Fremont Boulevard, and Olive Avenue from the east and west. Driscoll Road and Osgood Road would provide the principal north-south access.

The station would be a two-story, side-platform station, with the platforms located at grade on either side of the BART tracks. The station platform would extend approximately 780 feet south of Washington Boulevard to accommodate 10-car trains. The second story, located directly overhead, would be an overhead concourse providing passenger access to the platform. Station agents, schedules, local street maps, BART maps, and fare collection equipment all would be located on the overhead concourse. The station would provide facilities for station agents, BART Operations personnel, and BART Police. The concourse level would extend to the east and to the west, providing a safe pedestrian passage way over both Osgood Road and the relocated former SP railroad tracks. Patron access to the concourse would be provided from three ground level entry plazas by stairs, escalators, and elevators. An illustration of the station section for the optional Irvington Station is shown in Figure 2-8b.

Fare collection for the optional Irvington Station would be identical to the rest of the BART system. Tickets would be purchased through vending machines located at the station concourse. Entrance to station platforms would be activated by inserting the fare ticket into an entrance gate console that opens the entrance gate.

Station access facilities would be located on both the east and west sides of the station, connected by the pedestrian concourse. Access to the station site would be provided by facilities consistent with BART's Access Hierarchy, and would include the following elements.

- Pedestrian walkways, special crosswalks, and entry plazas.
- A bus intermodal center.
- Bicycle lanes linked to the city's major roadways and station bike parking facilities.
- Paratransit and private shuttle drop off.
- Auto pick up/drop off (kiss and ride).
- A taxi area with three spaces, per BART policy.

Vehicular access to the station and parking lot on the station's east side would be provided by one new signalized intersection on Osgood Road. The station's west side would be accessed directly from a new frontage road parallel to Washington Boulevard and connected to Roberts Avenue and Main Street. Disabled parking and five bus bays would be located west of Osgood Road, close to the station platform. Daily parking would be located both east and west of Osgood Road. Mid-day parking would be located on the west side of the station. Soundwalls would be provided along the west side of the station between station facilities and adjacent residences. A total of 960 parking spaces would be provided. The pedestrian/bike paths, parking lots, taxi, and auto access areas to the east and west of the station would be connected to the station concourse by the pedestrian concourse. The use of sight lines and appropriate landscaping would mark station entries.

## 2.4 Projected Ridership

Ridership projections for the Proposed Project have been updated since the 1992 EIR was certified. Changes in regional travel patterns that would result from the Proposed Project were estimated based on travel forecast models using a modified regional travel model developed by the Metropolitan Transportation Commission (MTC) and the Santa Clara County Valley Transportation Authority (VTA), in conjunction with BART. Estimated ridership for the Proposed Project is derived from the model outputs and is presented in Table 2-2. A detailed discussion of the ridership modeling is included in Appendix N.

## 2.5 Operating Plan

### 2.5.1 Current Operating Plan

Current BART service to Fremont consists of two routes, one serving the Daly City/Fremont corridor and the other serving the Richmond/Fremont corridor. Weekday service on the Daly City/Fremont route operates from 5 a.m. to 7 p.m. Saturday service operates from 9 a.m. to 8 p.m. Service is not provided on this route on Sundays and holidays. Weekday service on the Richmond/Fremont route operates from 4 a.m. to 12 a.m. Saturday service operates from 6 a.m. to 12 a.m. Sunday/holiday service operates from 8 a.m. to 12 a.m.<sup>8</sup>

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<sup>8</sup> BART stations close at 12 a.m., although trains run until 1 a.m.



**Table 2-2.** Projected Ridership

Project	New Weekday BART Trips*
2010 Proposed Project	6,000
2010 Proposed Project (with Optional Irvington Station)	7,400
2025 Proposed Project	8,200
2025 Proposed Project (with Optional Irvington Station)	10,800

Note:

\* This table shows systemwide ridership changes (i.e., all BART stations, including those included in the Proposed Project and the Proposed Project with optional Irvington Station).

Source: DKS Associates 2002

## 2.5.2 Proposed Operating Plan

The proposed operating plan for the Proposed Project consists of two routes, one operating between Warm Springs and Richmond, and the other operating between Warm Springs and the 24th Street Station in San Francisco. The proposed operating plan assumes two service scenarios for each route, one beginning in the year 2008, when revenue service is inaugurated, and the other in the year 2025. The service scenarios for 2008 and 2025 are essentially the same, except for weekday headways.<sup>9</sup> For 2008, 15-minute weekday headways are planned, and for 2025, 12-minute weekday headways are planned. The proposed 2008/2025 operating plans for the two routes are shown in Tables 2-3 and 2-4.

**Table 2-3.** Warm Springs to Richmond Route Operating Plan

	Weekday	Saturday	Sunday/Holiday
Hours of Operation	4:00 a.m. to 12:00 a.m.	6:00 a.m. to 12:00 a.m.	8:00 a.m. to 12:00 a.m.
Headway (minutes)	15 (year 2008) 12 (year 2025)	20	20

Note: Trains would not exceed 10 cars. One-way travel time would be 70 minutes.

Source: San Francisco Bay Area Rapid Transit District

<sup>9</sup> *Headway* refers to the scheduled time interval between the arrival of a transit vehicle at a stop and the arrival of the next transit vehicle operating in the same direction at the same stop.

**Table 2-4.** Warm Springs Station to 24th Street Station Route Operating Plan

	Weekday	Saturday	Sunday/Holiday
Hours of Operation	5:00 a.m. to 7:00 p.m.	9:00 a.m. to 6:00 p.m.	9:00 a.m. to 6:00 p.m.
Headway (minutes)	15 (year 2008) 12 (year 2025)	20	20

Note: Trains would not exceed 10 cars. One-way travel time would be 61 minutes.

Source: San Francisco Bay Area Rapid Transit District

The same level of service is anticipated in both service scenarios for the Warm Springs to Richmond route. Trains could include additional cars in year 2025, but the service pattern and frequency would remain the same. For the Warm Springs to 24th Street route, there could be a need to operate more frequent service during the peak rush hour or peak periods on weekdays in year 2025.

The estimated travel time from the Warm Springs Station to any point on the existing BART system is approximately 7 minutes longer than the current travel time from the Fremont Station. A trip from the Warm Springs Station to downtown San Francisco would take approximately 50 minutes. If the optional Irvington Station is included, one minute would be added to the travel time.

Fares for trips to and from the Warm Springs and optional Irvington stations will be established consistent with the fare structure throughout the BART system. In addition, in accordance with recently adopted BART policy, fees will be charged for reserved parking<sup>10</sup> at the new stations.

### 2.5.3 Train Speeds

The Proposed Project alignment would be designed to accommodate maximum speeds of 80 miles per hour (mph). The typical operating speed is 70 mph. The 80 mph speed is only used to recover lost time following delays. Segments that would be exceptions to the 80 mph design speed include the segment between the Fremont BART Station and Stevenson Boulevard (between 50 mph and 70 mph), the Fremont Central Park subway segment (70 mph) and north of Grimmer Boulevard to Warm Springs Station (70 mph).

## 2.6 Project Costs

The estimated costs of the Proposed Project are summarized below. Preliminary cost estimates were based on the conceptual engineering being developed for the Proposed Project. These estimates are presented in year 2001 dollars.

<sup>10</sup> *Reserved parking* is up to 25% of a station's parking supply that is reserved for paid patron parking per BART Board of Director's policy as established in 2002.

## 2.6.1 Capital Costs

The total estimated capital cost for the Proposed Project (excluding the optional Irvington Station) is approximately \$634 million, estimated in year 2001 dollars. The estimated capital costs<sup>11</sup> of the Proposed Project are summarized in Table 2-5. The table groups the costs in three categories: right-of-way, construction, and non-construction costs. Right-of-way costs include costs associated with the permanent acquisition of land or the temporary acquisition of land rights necessary to implement the Proposed Project. Construction costs comprise costs to construct or install trackway and structures, the Warm Springs Station facility and parking area, systems (electrification, communications, automatic train control equipment), and final design and construction management. Non-construction costs comprise vehicles, conceptual and preliminary engineering, design oversight, project administration, agreements, environmental mitigation, legal, insurance, BART systems engineering, and startup. All figures are provided in year 2001 dollars.<sup>12</sup>

## 2.6.2 Operating and Maintenance Costs

The estimated operating and maintenance costs of the Proposed Project total \$9.17 million. The operating and maintenance costs are based upon the service and fleet assumptions described above in Section 2.5. Projected costs are the average for the first year of service in 2008 through 2025, and are represented in year 2001 dollars.

## 2.6.3 Project Funding

A combination of revenues from Alameda County's transportation sales tax (Measure B) and state and regional funds would fund the \$634 million capital costs of the Proposed Project. As identified in MTC's Regional Transit Expansion Program, adopted as Resolution No. 3434, the Proposed Project's funding plan comprises the sources listed in Table 2-6. The largest single source of funding comes from the Alameda County 2000 Measure B transportation sales tax through the Alameda County Transportation Improvement Authority, which would provide approximately \$193 million to the Proposed Project. Additional funding partners include the California Transportation Commission, the Alameda County Congestion Management Agency, and the San Mateo County Transit District (SamTrans). The estimated cost of the optional Irvington Station is approximately \$76 million (estimated in year 2001 dollars) and is not included in the \$634 million funding plan.

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<sup>11</sup> *Capital costs* refer to costs of long-term assets of a public transit system such as property, buildings, vehicles, etc.

<sup>12</sup> The total cost of the project, escalated to the midpoint of the construction period, is \$695 million.

**Table 2-5.** Estimated Capital Costs for Proposed Project

Cost Category	Cost in 2001 Dollars (in millions)	
	Individual Costs	Totals
Right-of-Way (Total)		86
Construction		
–Trackway & Structures	146	
–Warm Springs Station and Parking	45	
–Systems	89	
–Final Design and Construction Management	34	
Construction (Total)		314
Non-Construction		
–Vehicles, including engineering	92	
–Soft Costs, including conceptual and preliminary design, agreements, environmental mitigation, design oversight, construction management oversight, legal, insurance, BART Systems Engineering, administration, start-up, etc.	142	
Non-Construction (Total)		234
<b>Total Project Cost</b>		<b>634</b>
Note:		
The total cost of any single project element would be the sum of appropriate right-of-way, construction, and non-construction components.		
Source: San Francisco Bay Area Rapid Transit District		

**Table 2-6.** Proposed Project Funding

Funding Sources	Amount in 2001 Dollars (in millions)
Alameda County 2000 Measure B Transportation Sales Tax	193
Alameda County State Transportation Improvement Program (STIP)	63
State Interregional Transportation Improvement Program (ITIP)	42
State Transportation Congestion Relief Program	111
Regional Measure 1 Bridge Tolls	68
San Mateo County Transit District (SamTrans)	145
San Francisco Bay Area Rapid Transit District (BART)	<u>12</u>
<b>Total*</b>	<b>\$634</b>

Note:  
\* The total funding for the project does not include funds for the optional Irvington Station.

Source: San Francisco Bay Area Rapid Transit District

## 2.7 Construction Scenario

The elements of the Proposed Project include trackway (at grade, bridge structures, retained cut, cut-and-cover subway box, retained fill), track work (ballast, ties, rails, special track work, electrified third rail), systems (electrification, communications, automatic train control), wayside facilities, and stations. The total design/construction and testing process is expected to last approximately 4 years.

In some cases, specific details of construction methods to be used are not yet available at the conceptual phase of engineering design, and will be determined during the final design of the project. However, reasonable worst-case assumptions as to construction methods and potential impacts are assumed throughout this document, for purposes of analyzing environmental impacts and identifying appropriate mitigation measures. Construction activities for each of the following Proposed Project segments (see Section 2.3.1 above for a description of segment locations) are described below.

- Fremont BART Station to Stevenson Boulevard.
- Stevenson Boulevard to Former SP Railroad Right-of-Way (Fremont Central Park).
- Former SP Railroad Right-of-Way to Paseo Padre Parkway.
- Paseo Padre Parkway to Washington Boulevard.
- Washington Boulevard to End of Proposed Project Alignment.

## 2.7.1 Construction Activities

### Fremont BART Station to Stevenson Boulevard

The section of the Proposed Project alignment in the existing Fremont Station parking lot would be retained fill (an embankment with low retaining walls at the toes of the embankment). Potential construction activities would begin with fencing the Proposed Project alignment and the immediately adjacent construction zone and establishing alternative traffic circulation plans for BART patrons. The construction zone would be an area approximately 250 feet wide, extending south from the existing Fremont Station; it would require the temporary removal of approximately 200 existing parking spaces in the Fremont Station parking lot. Initial construction activities would include excavating and removing existing pavement, which would require construction heavy equipment such as bulldozers, dump trucks, loaders, and backhoes. Following removal of existing pavement, grading would begin to create a subbase for the earthen fill and the retaining wall foundations. This would require trucks, graders, backhoes, bulldozers, compactors, and similar heavy equipment. Following this site preparation work, retaining walls would be constructed and earthen fill would be brought onsite and compacted. Fill material would have to be hauled to the site from adjacent subway excavations and other sources via Walnut Avenue. Retaining wall construction would require equipment such as cranes, concrete-mixer trucks, and delivery trucks; bringing in and compacting earthen fill would require construction equipment such as dump trucks, graders, water trucks, and compactors.

Once the earthen embankment is completed, the subballast, ballast,<sup>13</sup> rail, traction power, and train control systems would be installed on the top of the embankment. Construction equipment for this activity would include delivery trucks, dump trucks, backhoes, cranes, compactors, readymix trucks, and specialized track laying equipment. Ballast would be hauled in from offsite.

Construction of the approximately 30-foot-wide opening in the embankment for bus circulation would require erecting forms to construct the cast-in-place concrete structure. Reinforced concrete bridge abutments would be constructed on pile foundations. The abutments would be cast in place and would require the onsite installation of formwork and reinforcing steel. After the concrete piles have been set, pile caps and abutments would be constructed. Fill would be placed adjacent to the opening after completion of the concrete structure. A concrete roof slab would then be placed over the opening and joined to the top of the walls to form a box. Fill would be then placed on top of the concrete box. Construction equipment would include dump trucks, delivery trucks, pile drivers, backhoes, cranes, concrete trucks, and concrete pumps. An onsite concrete batch plant is not anticipated.

Construction of the Walnut Avenue overpass would require phasing of construction to maintain traffic flow on Walnut Avenue. To maintain sufficient roadway clearance under the two new BART structures, Walnut Avenue may need to be lowered approximately 1 foot. This would be accomplished in two phases, each phase closing two of the existing four lanes so that two lanes of traffic could be maintained throughout construction. Equipment required for the grade lowering would include excavators, graders, and dump trucks; paving equipment would then be required to

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<sup>13</sup> *Ballast* consists of the coarse gravel or crushed rock laid to form a bed for the purpose of holding the track in line and elevation. The *subballast* is the layer of impervious soil material under the ballast.

place Walnut Avenue at finished grade. Utility relocation requiring backhoes, dump trucks, and light compaction equipment may also be necessary.

The Proposed Project alignment would pass over Walnut Avenue on two overpass structures, each requiring center piers in the middle of the Walnut Avenue right-of-way. The piers and abutments of these overpass structures would be placed on driven piles and reinforced concrete pile caps. It is anticipated that the center piers for each structure would be cast-in-place reinforced concrete. Traffic lanes on Walnut Avenue would be temporarily narrowed from 4 lanes to 2 lanes to provide space to build the center piers. Equipment required to construct the center piers would include excavators, backhoes, trucks, dump trucks, cranes, pile drivers, concrete trucks, and concrete pumps.

Earthen embankments would be constructed on either side of the Walnut Avenue overpass. The northern embankment would be constructed as part of the embankment at the Fremont BART station. Forms would be erected at Walnut Avenue to construct a concrete abutment on which the overpass structure would rest. The southern embankment would be constructed as a component of the section south of Walnut Avenue (see following paragraphs). Constructing the embankments would require the same kind of construction equipment as that used for the Fremont BART station embankment.

After placing the abutments and center piers, cast-in-place post-tensioned bridge girders would be constructed over Walnut Avenue and connected to the abutments and center piers. Falsework, or temporary structural supports, would be erected to provide temporary support for the bridge girders during their construction. After the girders have been constructed, ballast, trackwork, and power facilities would be laid on the new structures. Equipment needed to construct the structures would include cranes, girder delivery trucks; concrete trucks, and concrete pumps would be used to construct the bridge deck. Construction equipment would access this portion of the construction site from Walnut Avenue. During construction of the bridge decks, there would be a temporary reduction in vehicle clearance height while falsework is in place. This is normal for this kind of construction, and signs would be placed to warn motorists and truck drivers of the reduction in available clearance. Each bridge would be constructed as a unit from one end to the other.

After crossing Walnut Avenue, the Proposed Project alignment would continue on an earthen embankment that would cross Tule Pond South immediately south of Walnut Avenue. Construction of this embankment would be similar to the scenario described for the embankment in the Fremont BART station parking lot except that the portion that crosses Tule Pond would require filling a portion of the existing pond. Construction activities would vary based on final-design-level soils, geotechnical, and hydrological analysis. It is likely, however, that dewatering of all or a portion of Tule Pond would be required to import fill to build up the area to match the overpass grade. The construction sequence might entail driving sheet piles (metal sheets driven into the ground to hold back the surrounding earth from the excavation zone) within the construction zones in Tule Pond and then pumping out the water in the affected portion of the pond. If the dewatering activities result in the discharge to any surface water body via direct or indirect conveyance, BART would be required to implement water quality measures and monitoring procedures as conditions of coverage under the NPDES General Permit for Industrial Activities. BART would ensure that the dewatering activities remain consistent with the obligations set forth in the permit. The equipment required to complete this task would include pile drivers, cranes, trucks, and generators to power pumps. Pumped water would be handled as specified in water quality permits that would be obtained for the Proposed

Project. Following dewatering, fill would be placed in the construction zone and surcharged (excess fill imported) to account for ground settlement. This would require compacting the fill brought to the site. Compactor, graders and trucks would be required for this task.

Once the embankment is completed, the BART trackway and systems would be installed as previously described for the Fremont BART station segment. Construction equipment would access this portion of the construction zone from Walnut Avenue and from Stevenson Boulevard.

The earthen embankment would slope downward from the Walnut Avenue overpass, becoming a retained-cut section that transitions from the embankment to the portal of the subway segment that would begin immediately north of Stevenson Boulevard. (Depending on the contractor's construction sequence, the retained cut might be constructed first to provide fill materials for the embankment sections of the alignment, and the area between Walnut Avenue and Stevenson Boulevard outside the immediate construction zone might be used to stockpile excavated materials for later use in embankments in other portions of the alignment and as a storage area for other materials.)

The retained-cut section would consist of an open trench with concrete retaining walls and a concrete base slab, which is the floor of the subway structure where the ties and rail would be placed. The retained-cut section would be constructed by excavating the site in a manner that leaves laid-back side slopes. The excavated material could be used for construction of the embankments or removed to pre-approved disposal locations. A base slab would be poured, and then forms would be erected on top of the base slab for the reinforced concrete retaining walls. Depending on the hydrology of the area, dewatering of the retained-cut section, similar to that of the Tule Pond section, may be required. Once the side walls have been poured and the concrete cured, forms would be removed and backfill would be placed behind the walls. Equipment required to build the retained-cut section would include excavators, haul trucks, front loaders, backhoes, cranes, concrete-placing equipment, and compactors. Construction vehicles would access the site from Walnut Avenue and Stevenson Boulevard. A potential contractor laydown area is located adjacent to the construction zone immediately north of Stevenson Boulevard (see Figure 2-4a).

### **Stevenson Boulevard to Former SP Railroad Right-of-Way (Fremont Central Park)**

The Proposed Project alignment would enter a subway immediately north of Stevenson Boulevard. The subway would be constructed using the cut-and-cover method. The scenario for the cut-and-cover subway would be excavation with laid-back side slopes, construction of the invert slab, followed by construction of the box walls and roof slab. Walls and roof slab may be constructed as separate operations or together as one operation at the contractor's election. Once the subway box is completed, trackwork would be installed, followed by installation of train systems. The subway box would be backfilled and the site restored to the previous grade.

Because the subway construction would use open excavation, Stevenson Boulevard would be affected. To minimize traffic disruption on Stevenson Boulevard, traffic lanes would be temporarily diverted to Fremont Central Park property, south of the existing alignment of Stevenson Boulevard. Once construction in the right-of-way is completed, Stevenson Boulevard would be restored to its



current alignment. Construction equipment for the cut-and-cover subway segment would reach the site from Stevenson Boulevard and would be the same as for the retained-cut section. Earthmoving equipment would be needed to break up and remove Stevenson Boulevard, and paving equipment would be required for the Stevenson Boulevard detour and reconstruction. Existing utilities in Stevenson Boulevard would have to be relocated or temporarily supported in place during construction. Temporary signs warning drivers of the upcoming detour would be installed and remain in place for the duration of the detour.

The Proposed Project alignment through Fremont Central Park would be a continuation of the cut-and-cover subway structure and would be constructed as described above. The segment north of Lake Elizabeth within the park would include one subway ventilation structure (there is an option for two). The ventilation structure would be built as a component of the cut-and-cover subway structure and would not require separate excavation.

The cut-and-cover subway structure, including contractor laydown areas for equipment and material storage and staging, would require temporary relocation of park facilities. Because the construction zone would divide recreational areas such as ball fields and a dog-run facility, a relocated ball field parking area and a temporary dog-run facility would be provided. A temporary pedestrian bridge would be constructed over the cut-and-cover subway construction just north of Lake Elizabeth to maintain pedestrian trails (see Figure 2-4a). The temporary bridge would consist of metal plates with concrete side barriers and fencing crossing over the excavation. Construction fencing would be installed to separate the park from the construction zone. Construction vehicles would access the site from Stevenson Boulevard.

The Proposed Project alignment under Lake Elizabeth would be constructed using the cut-and-cover method. Site preparation work would begin with construction of a temporary cofferdam, likely of earthen fill, placed at the mouth of the eastern cove of the lake (see Figure 2-4b). To provide a continuous pedestrian walkway, a pedestrian pathway detour would be placed on top of the cofferdam. When the cofferdam is in place, the area east of the cofferdam would be dewatered by pumping water into the western side of the lake. When dewatering is completed, the alignment would be excavated with laid back slopes, which means that the walls of the excavation would be at an approximately 2:1 horizontal to vertical ratio to stabilize the soil and avoid cave ins while the subway structure is being constructed. When subway construction is completed, the lake bottom would be backfilled over the subway structure; water would be pumped back into the lake's eastern cove from the western side of the lake; and the cofferdam would be removed, restoring the lake over the alignment.

Equipment required to construct the Lake Elizabeth portion of the subway would include that identified for other cut-and-cover sections. In addition, excavators with dredging (clamshell) buckets and dewatering pumps would be used. Construction access to the site would be from Stevenson Boulevard. The construction laydown sites located in the park would be used to construct the Lake Elizabeth portion of the alignment (see Figure 2-4b).

Cut-and-cover subway construction methods would also be used in the portion of the park south of Lake Elizabeth. Facilities constructed in this portion of the Proposed Project alignment may include an additional ventilation structure. Because the area south of the lake contains dense, mature riparian

forest vegetation and a segment of the old Mission Creek bed crosses the alignment, the construction zone would be as narrow as possible. It is likely that the contractor would drive sheet piles and limit construction vehicle access to only one side of the excavation. Equipment needed to construct this portion of the alignment would be the same as that needed for cut-and-cover construction in the area between Walnut Avenue and Stevenson Boulevard, with the addition of pile drivers to drive sheet piles. Access would likely be from the railroad right-of-way to the south. Following subway construction, all park, lake and existing facilities and amenities would be restored.

### **Former SP Railroad Right-of-Way to Paseo Padre Parkway**

The Proposed Project alignment would continue in a subway structure crossing under the former SP tracks. The cut-and-cover technique would be used to construct this segment. The cut-and-cover subway structure would be constructed up to the former SP tracks, which will have been moved to the east to an interim alignment by the city's grade separations project. BART would construct its subway alignment to a point just west of the interim SP alignment, and would then relocate the interim SP alignment to its final location over the Proposed Project subway. BART would complete construction of the Proposed Project alignment without further impacts to the relocated SP alignment.

After the tracks have been relocated westward to the final alignment, the cut-and-cover excavation would continue to the south to a subway portal located just east of where the interim SP tracks were located. Cut-and-cover construction techniques in this area would be the same as that described for the Walnut Avenue to Stevenson Boulevard segment of the alignment.

Where the Proposed Project alignment exits the subway portal, a retained-cut section would be excavated, transitioning to an at-grade alignment approximately 1,200 feet north of Paseo Padre Parkway. The at-grade alignment would require rise from a retained-cut alignment near the subway portal to a maximum of 8 to 10 feet above grade at Paseo Padre Parkway. This would require import of fill material and some excavation of existing material. Prior to placement of fill just north of Paseo Padre Parkway, the existing Irvington Pump Station would be removed. Construction of the retained-cut subway transition and at-grade sections would be similar to that described for the initial segment from south of Tule Pond.

A number of ancillary structures would be constructed in the segment between the former SP tracks and Paseo Padre Parkway. These facilities, shown in Figure 2-4b, would consist of the subway portal and emergency access stairways that would be built as part of the below-grade facilities and traction power and train control facilities that would be built along the alignment after it comes to grade. Construction equipment used in this segment would be the same as that used for the Fremont BART Station to Stevenson Boulevard segment. A temporary contractor laydown area could be located in the open field between the two railroad alignments (see Figure 2-4b). Access would be from Paseo Padre Parkway. A temporary rail welding facility would be set up in this area to weld rail sections into 800-foot strings ready for installation in the section between Paseo Padre and the Fremont BART Station. Rail to be welded would be trucked in 39-foot lengths or shipped in by rail using the old WP tracks (no longer in use). The rail would be stored onsite, initially in stacks of short sections, then later in stacks of 800-foot strings. This location would also be used for short-term storage of precast concrete track ties; cables for traction power; communications and train control systems;

prefabricated systems raceways; and other permanent materials including contact rail, coverboards, special trackwork, and rail clips.

## **Paseo Padre Parkway to Washington Boulevard**

A vehicular underpass will be constructed at Paseo Padre Parkway as part of the city's grade separations project. At this point the Proposed Project alignment would move onto an overpass bridge structure. It may be possible to coordinate the construction of the BART overpass with Fremont's underpass construction. A coordinated construction approach between the two projects would most likely be less disruptive to the public than constructing the BART overpass after the city's grade separations project has been completed. The overpass would be a single concrete structure supporting both the northbound and southbound BART tracks, with a center pier in the median of the parkway. A construction process similar to that described for the Walnut Avenue overpass, would be used to build the BART overpass at Paseo Padre Parkway, the roadway underpass having been completed. Construction equipment would access the construction site from Paseo Padre Parkway and would use the potential temporary construction laydown area north of the parkway described above.

Portions of the Proposed Project alignment south of Paseo Padre Parkway to Washington Boulevard would be below existing ground level, requiring excavation. Other portions of the alignment would be slightly above existing ground level, requiring placement of imported fill. Construction activities in this segment would include grading and soil compaction to create the level subbase for the tracks. It may be possible to balance soil cut and fill demands in this segment to reduce or avoid the need for dump trucks to transport soil from offsite. Scrapers would likely be used to move dirt in this section. For a portion of the former WP right-of-way, the existing ballast would be removed along with the top 12 to 24 inches of substrate.

After the subbase has been prepared, subgrade drainage, ballast, trackwork, and systems facilities would be installed. Equipment required to construct this segment of the alignment would include graders, compactors, dump trucks, concrete trucks, scrapers, cranes, and specialized track-laying equipment. Ballast would be hauled in by truck from offsite.

## **Washington Boulevard to End of Proposed Project Alignment**

The Proposed Project alignment would continue at grade under the Washington Boulevard roadway overpass, which will be completed as part of the city's grade separations project prior to BART construction. At-grade construction for this segment would be the same as that described for the at-grade portions of the Paseo Padre Parkway to Washington Boulevard segment. All along the former WP right-of-way, the existing ballast would be removed along with the top 12 to 24 inches of substrate. New subgrade material and ballast would be imported and compacted. The current track footprint would be widened to two tracks, or 35 to 40 feet. Traction power and train control facilities would be constructed in the area south of Washington Boulevard and adjacent to Auto Mall Parkway. The construction techniques for these facilities would be similar to that for the same facilities in the former SP right-of-way to Paseo Padre Parkway segment.

Crossing the ACFCD channel, which runs parallel to the alignment north of South Grimmer Boulevard, would require construction of a new box culvert. This could require altering the existing culvert and streambed to install the new culvert. Construction activities may include excavation and removal of existing drainage structures under the railroad tracks, grading of the existing channel, and installation of precast box culverts underneath the Proposed Project alignment. Equipment required for this task would include excavators such as backhoes and graders, dump trucks, cranes, and concrete-mixing and delivery vehicles.

Construction of the segment between Auto Mall Parkway and South Grimmer Boulevard would require import of fill material to elevate the tracks beginning approximately 1,500 feet north of Grimmer Boulevard to match the grade needed for a BART overpass at Grimmer Boulevard. Because of limitations on right-of-way, a low retaining wall would be constructed along the east side of the alignment.

Two BART bridge structures would be constructed over Grimmer Boulevard. The structures would be constructed using the same approach as described for the Walnut Avenue overpass in the Fremont BART Station to Stevenson Boulevard segment, although no lowering of the roadway would be required at Grimmer Boulevard. Center piers for each of the two structures would be placed in the median of Grimmer Boulevard. Construction access for this segment would be from Washington Boulevard, the dead-end streets Blacow Road and Prune Avenue, and Osgood Road/Warm Springs Boulevard (see Figure 2-4e).

Retained-fill construction would be required at the southern abutment of the Grimmer Boulevard overpass. The alignment would come to existing grade near the southern end of the BART Warm Springs Station platform. At-grade construction, with minimal need for imported fill to prepare the subbase, would continue south of the BART Warm Springs Station platform to the end of the tail track.

## **Warm Springs Station Site**

Development of the BART Warm Springs Station would require clearing the site of existing development and vegetation; grading and leveling to prepare the subbase for paving of parking areas and roadway entrances; and typical building construction activities for the station and platform, including pouring foundations, framing, and finish construction work. Equipment needed to construct the station would include backhoes, graders, cranes, concrete-placing and paving machinery, and dump trucks. Construction access would be from South Grimmer Boulevard and Warm Springs Boulevard.

Train control and traction power facilities would be installed adjacent to the Warm Springs Station. The construction techniques for these facilities would be similar to that for the same facilities in the former SP to Paseo Padre alignment segment. The station site would also be used as storage and a contractor laydown site during construction.

The maintenance facility south of the BART Warm Springs Station would require installation of ballast, trackway, and power facilities, in addition to erection of maintenance buildings using standard building construction techniques. Construction access would be from Warm Springs Court.

A temporary rail welding facility may be constructed in the Warm Springs station site. The rail welding facility is designed for welding, grinding and cutting of the rails. The rail welding facility will be approximately 1,000 feet long and 300 feet wide. It will be an open air facility with room to maneuver trucks and forklifts around the rail welding machine. The purpose of the facility is to weld 80-foot sections of steel rail into 800-foot long sections for the Proposed Project. The welding machine itself would be approximately 20 feet by 50 feet in size. The 39-foot rail sections could be shipped by freight rail on the UP alignment or, in a worst case situation, by truck via Warm Springs Court and would also be stored at this location. The finished 800-foot sections would be placed on the alignment of the Proposed Project.

Construction of the new station access roadway would involve removing the existing curb at Warm Springs Court, and grading 200 feet for the new roadway. The new roadway from Warm Springs Court would be paved with reinforced concrete to ensure durability and reduce wear and tear from buses. Construction would also involve pouring and forming new curbs for the roadway.

### **Auto Mall Parkway Seismic Retrofit**

Should the Auto Mall Parkway overpass structure require seismic retrofitting as part of the Proposed Project, it is possible that its abutments, piers, pile foundations, and deck restraining devices would require strengthening. This work could likely be performed entirely from beneath the structure with little or no disruption to traffic on the deck above. However, care would have to be taken with respect to the operating UP tracks passing between the western abutment and the center piers and would be subject to railroad work restrictions.

### **Optional Irvington Station**

Because funding has not yet been secured for the optional Irvington Station, construction would likely occur later than the construction of the Proposed Project. Should funding for the optional station become available, it is possible that the station could be constructed concurrently with the Proposed Project. Construction methods for the optional Irvington Station would be similar to those described above for the BART Warm Springs Station. Construction access would be from Osgood Road for construction on the east side of the BART alignment and from the new frontage road parallel to Washington Boulevard for the west side of the station. (Construction access would not be available from Washington Boulevard because of its future elevation as an overpass.)

Should construction of the optional Irvington Station occur after commencement of BART revenue service to Warm Springs, construction methods would be highly constrained and controlled in and around the BART trackway. Contractor work plans outlining specific personnel, equipment, materials, and timeframes required to conduct discrete tasks will be submitted to BART Operations in advance for coordination and approval. BART Operations staff will monitor all such work to ensure a safe working and operating environment. It is likely that train movements will be single-tracked through the construction zone on a temporary basis so as to increase available work areas and safety buffer zones. The side platform configuration of this station as well as the location of track crossovers to the north and south will both serve to ease the logistical challenges of a phased construction scenario.

## **2.7.2 Coordination with Utility Providers**

BART is currently working with utility providers to identify the location of those utilities in the Proposed Project corridor and coordinate any future project-related activities to minimize service disruption. BART has contacted and is coordinating with public utility providers such as the Alameda County Water District, the San Francisco Public Utilities Commission, the Alameda County Public Works Agency, and sanitation districts. In addition, BART is coordinating with telecommunications utility providers and electrical service providers.

BART is also working closely with the City of Fremont to ensure that utilities that may be affected by both the city's grade separations project and the Proposed Project are dealt with in a coordinated manner.

## **2.7.3 Coordination with Union Pacific Railroad**

BART will coordinate with UP, particularly with respect to the subway crossing of the former SP track and the general restrictions that may apply to the BART contractor working alongside the operating UP track. BART and the City of Fremont are actively coordinating the design of the former SP track alignment to minimize disruption to the operating UP line.