



# Comprehensive Station Plan *16<sup>th</sup> Street Mission*

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**June 2004**

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# What Is a Comprehensive Station Plan?

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BART stations are both transit hubs and valued community resources. Recognizing this, the BART Board of Directors in 2001 directed the Planning Department to undertake a thorough and integrated analysis of planning issues at every station. Called Comprehensive Station Plans, these documents are guided by BART's Strategic Plan, with recommendations reflecting the Strategic Plan's focus areas. Each Comprehensive Station Plan brings together the work of many BART staff, agency partners and members of the public.

Each Comprehensive Station Plan examines how effectively a station meets the present and future needs of its passengers and surrounding community. The Comprehensive Station Plan does this by examining three key station elements:

- **Station Structure and Architecture**--how the station works and fits in its surrounding neighborhood
- **Station Access**--how passengers get to the station
- **Station Capacity and Functionality**--how the physical and operational components of the station function

BART staff use Comprehensive Station Plans to evaluate the scope and timing of a proposed station project or initiative, to seek grant funds, and to communicate with the public and other agencies. Partners and potential partners use the plans to evaluate the most effective way to work toward common goals.

A Comprehensive Station Plan can be updated or expanded as needed. As planning documents, they are living and flexible works, meant to be revised by section or overall as new information or direction becomes available. A Comprehensive Station Plan allows for revisions while it retains the station's collectively defined vision.

## **1.0 Executive Summary**

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The 16th Street Mission BART Station, the ninth busiest station in the system, has great potential for substantial increases in ridership given significant new development in the neighborhood and enhanced transit accessibility associated with implementation of a recently funded Bus Rapid Transit/Transit Preferential Streets program which will connect the station to the densely developed Van Ness residential corridor to the north and to the Mission Bay development to the east. While the recently renovated Southwest Plaza has created a unique urban amenity and contributed to neighborhood vitality, the Northeast Plaza still needs to be renovated. Plaza activities, safety, and maintenance remain issues in the community. Vendors and community-sponsored activities on the plaza are to be encouraged.

Over time, significant access improvements at the station are needed both to minimize inconvenience to patrons, and to provide emergency egress to accommodate ridership levels projected for 2025. To realize the ambitious plans for improved access and station capacity, significant resources will have to be identified which will require the partnership and support of BART staff, partner agencies, and our active community partners and patrons.

The 16th Street Mission BART Station Comprehensive Plan describes the station's current conditions, neighborhood planning context, future capacity and access needs. The plan is intended to advise implementation of anticipated citywide transportation improvements, community planning efforts, and to embrace the principles identified by the community in the 16th Street BART Community Design Plan. The major elements of the Comprehensive Station Plan are: Station Structure and Architecture, Station and Neighborhood Planning, Station Access, and Station Capacity. Key findings from the Plan are summarized below.

### **Station Structure and Architecture**

The 16th Street Mission BART Station, part of the original core system recently was the focus a community planning effort sponsored by BART, the Metro Transportation Commission and the San Francisco County Transportation Authority and prepared by community partner Mission Housing and Development Corporation working with Urban Ecology. The issues of most concern to the community were public safety and a lack of identity and orientation to the station area. The following principles guided plan preparation:

- Diversity of Uses and Users
- Accessibility and Choices
- Visibility and Connectivity

The plan encourages commercial and cultural activity, evening and weekend uses, and creation of a unique urban space that will attract new users to the plazas. Improved transit accessibility and choices are provided through an increased usable plaza area, improved access and visibility to the BART entries and with the provision of seating areas which create a level of comfort, safety and sense of orientation for plaza users. Together the plan elements add up to create a safe, vibrant space that works well as a transit center and as a public gathering place identifiable as part of the Mission District community.

The Southwest Plaza improvements were completed in 2003, and the Northeast Plaza improvements should be completed in 2005. Plaza art elements including decorative railings, community art board, and a mural reflect the vibrant Mission community.

### **Station Access**

Over 90% of people using the 16th Street Mission BART Station walk to the Station or use public transit. A major deficiency at the station is that each plaza has only one escalator with the Northeast Plaza escalator providing downward movement and the Southwest Plaza providing upward service. People who are mobility impaired often must take a circuitous route to use the elevator or find an escalator moving in the appropriate direction. Similarly, there is only one escalator between the concourse and platform. The inconvenience of having to use stairs will be exacerbated with development to the Bus Rapid Transit/Transit Preferential Streets (BRT/TPS) program intended to provide increase service and reliability.

Key access recommendations are as follows:

- Add a "down" escalator between the concourse level and the Southwest Plaza and an "up" escalator to the Northeast Plaza, as ridership grows and funding is identified
- Add an additional escalator between the concourse and the platform
- Work with MUNI and agency partners implementing the BRT/TPS program to ensure adequate loading and waiting areas and to minimize inconvenience time and inconvenience associated with transfers between modes
- Install a new faregate array at the base of stairs, elevator and escalator that connect the Northeast Plaza to the concourse

### **Station Capacity and Functionality**

The 16th Street Mission BART Station was analyzed as part of a systemwide assessment completed in early 2003 of BART station capacity needs in 2025. The analysis of 2025 capacity needs resulted in the following recommendations:



## 16<sup>th</sup> Street Mission Comprehensive Station Plan

- Reconfigure the station paid area, relocate the agent booth, and add fare gates and ticket vending machine equipment at the entrance from the Northeast Plaza
- Expand the paid area on the concourse level and add new north platform stairs
- Add new emergency stairs from the platform to the sidewalk at both the north and south ends of the platform
- Replace street elevator
- Install platform screen doors

The conceptual cost to implement the proposed plan is approximately \$24 million. The cost estimate includes all elements described above plus new staff facilities, a bicycle storage facility, and potentially another entrance on Mission.



## 2.0 Introduction

### 2.1 Vision

This Comprehensive Station Plan sets out a vision for the 16th Street Mission BART Station. It outlines proposals that will alleviate overcrowding, improve safety, and enhance access for all users. Above all, the vision is to firmly establish the station as a key intermodal transportation node for the neighborhood, providing for a neighborhood connection between the regional BART system, the Mission/Van Ness Street Bus Rapid Transit and Muni's 16th Street/Fillmore Transit Preferential Street Corridors.

This plan addresses capacity improvements needed for BART to accommodate projected systemwide growth over the next 20 years. It also references proposed plans from partner agencies in San Francisco, such as the San Francisco Planning Department, the Transportation Authority and MUNI. The aim is to create an integrated, holistic plan that recognizes BART's important contribution to the area's economic and community vitality by providing residents with rapid transit access to the region and by bringing in people from the region to work, shop, eat and be entertained in the neighborhood. The plan also seeks to improve the environments of the Station's two plazas, so they are safe and convenient places for people to transfer between BART and MUNI or to simply hang out and watch the world go by.

Unlike the first generation of Comprehensive Plans at BART, this plan focuses mainly on BART station and system capacity improvements anticipated to be needed to accommodate daily ridership of 500,000, currently projected to occur in about 20 years. While the San Francisco Department of City Planning has prepared a map of "soft sites" in the vicinity of the station identifying underdeveloped sites, it has not yet



prepared a comprehensive strategy for what can be done in the public realm. Both the private development that can be built and how the public realm of streets and roadways will be improved will affect future ridership. Several sites adjacent to BART could potentially be developed in a way that would provide new opportunities for access to the station. To this extent, this Comprehensive Station Plan should be regarded as a 'snapshot in time' and a living, breathing document, rather than a blueprint to be followed religiously.

Comprehensive Station Plans help stimulate and realize opportunities for access improvements and transit-oriented development that might otherwise go to waste. The Plans also help to avoid problems that might emerge with an unplanned approach—such as failing to recognize capacity constraints when planning joint development—and to coordinate construction so that passengers and local residents experience minimal disruption. While the plans are intended to supplement and not replace detailed engineering studies, they do provide cost estimates to support grant applications.

## 2.2 Goals

### 2.2.1 BART's Strategic Plan

BART's Strategic Plan, adopted in 1999 with a renewed commitment and added new focus on implementation presented in 2003, outlines a clear vision to guide the organization into the 21st century. The plan sets out specific goals and strategies in seven broad focus areas:

#### *The BART customer experience*

Customer satisfaction, and the seamlessness of connections from BART to other transit agencies, are important here.



*Building partnerships for support*

This area focuses on public and political support for BART, encouraging public input, and strengthening partnerships with other transit operators.

*Transit travel demand*

Transit oriented development, better access to BART stations, maintaining station capacity to meet demand and closing gaps in regional services are all ways to boost ridership on BART.

*Land use and quality of life*

This area covers support for transit oriented development within walking distance of BART, and making the best use of BART-owned land to first maximize transit ridership and then balance transit-oriented development goals with community desires.

*People of BART*

BART aims to foster a welcoming and supportive work environment, empower its employees, and provide good training opportunities.

*Physical infrastructure*

This area focuses on maintenance and repair, and system modernizations.  
Financial health.

BART needs to provide value for money, maintain a stable financial base, and secure funding to expand while sustaining existing services.

While this Comprehensive Station Plan addresses all focus areas, some stand out as particularly crucial. The major issues addressed here involve transit travel demand, through improving access and increasing capacity to meet growing ridership, and by promoting transit-oriented development to maximize ridership and quality of life in the neighborhood.

## **2.3 CSP Process--Development of Plaza Plans**

From the community perspective, neighborhood planning in the station area has been ongoing since the

## 16<sup>th</sup> Street Mission Comprehensive Station Plan

BART lines were installed in 1969-71. In 1995, Mission District community members came together through the Federal Transportation Administration's Livable Communities initiative to discuss how to improve transit use along Mission Street. Crime on MUNI Lines and narcotic-related crime in the neighborhood were major issues in this effort. Because of the complex jurisdictional issues that exist at intermodal stations, it took considerable effort to coordinate all of the agencies that needed to be involved. These efforts coincided with the emergence of the Metropolitan Transportation Commission's Transportation for Livable Communities (TLC) program and corresponding commitments from BART and the San Francisco County Transportation Authority (SFCTA).



Beginning in 1997, over 100 people and organizations have participated actively in the development of a Community Design Plan. Outreach efforts specifically targeted Spanish-speaking people, youth, physically and mentally challenged individuals, senior citizens, artists, occupants of residential hotels, and business owners.

The support of key public agency stakeholders has been crucial to developing and implementing improvements to the station and neighborhood. Public agency stakeholders include:

- San Francisco County Transportation Authority (SFCTA)
- San Francisco Department of Parking and Traffic (SFDPT)
- San Francisco Department of Public Works (SFDPW)
- MUNI
- San Francisco Planning Department
- San Francisco Police Department
- The Metropolitan Transportation Commission (MTC)

Additionally the importance of neighborhood groups who have acted as advocates and working partners to bring about positive change cannot be underestimated. These groups include:

- Mission Housing Development Corporation (MHDC)

- Urban Ecology
- Mission Economic Development Association (MEDA)
- Mission Merchants Association
- 16th Street/North Mission Neighborhood Association
- St. John's Education Thresholds Center

## 2.4 CSP Process--Development of the Station Capacity Plan

This Comprehensive Station Plan has incorporated the outcome of the community and agency planning efforts that focused on the plazas and on development of the station access plan. The capacity components of this plan were prepared by consultants to BART and reviewed internally by the following departments:

- Transit System Development
- Capitol Development and Control
- Government and Community Relations
- Customer Access
- Maintenance and Engineering
- Police
- Real Estate
- Operations Liaisons
- Station Area Working Group
- System Capacity Group
- System Safety
- Transportation

The Comprehensive Station Plan reflects BART's current strategy to accommodate ridership growth to 2025 and will be used to advise future planning efforts for transit and neighborhood improvements. These planning efforts will provide a forum for a broader public review of the Comprehensive Plan and can then be modified, as appropriate, to reflect the circumstances of the time. These projects will be lead by the City and require coordination MUNI, BART, SFDPT, SFDPW, the SF Planning Department and the SFCTA.

## 3.0 Existing Conditions

### 3.1 Station Setting

The 16th Street Mission Station is the first BART facility in San Francisco's Mission District after the Market Street stations along the M-line, heading south toward the San Francisco Airport Station and Millbrae Station which connects to Caltrain and the Peninsula. This urban subway station is an important intermodal transfer point between BART and MUNI. Three major MUNI Trolley Coach Lines serve the station area, two of which MUNI identifies as Major Rapid Transit Corridors. BART commuters who use the station are primarily residents of the Mission District, Eureka Valley/Upper Market/Castro to the west, and Potrero Hill/Mission Bay to the east.



The area surrounding the station is characterized by neighborhood-serving retail; higher density apartments; affordable housing; residential hotels; and light industrial activities such as car repair, printing, food preparation and distribution (also collectively known as Production, Distribution and Repair, or "PDR"). PDR land uses provide relatively higher paid jobs for neighborhood residents when compared to minimum wage service jobs. PDR jobs are often located in older one or two story buildings, which in recent years have been vulnerable to redevelopment as live-work units. Nearby, along 16th Street and Valencia Street are many restaurants, bars, and nighttime entertainment activities such as theatres, performance spaces, and galleries. The Station is also within half-mile of the oldest European settlement in the region--the Mission Dolores, a major tourist attraction in San Francisco.

Regarding nearby housing, renters occupy over 85% of the housing units in the Mission; the residential vacancy rate is estimated to be less than 5%, compared to a citywide average of 7%. A significant exception

to the low vacancy rate is found in some of the area's 56 Single Room Occupancy (SRO) hotels where vacancy rates can be as high as 40%. Twenty-eight SRO hotels, with over 1100 units of housing, can be found within a two-block radius of the station. Most new residential housing in the vicinity has been below market, affordable housing built by Mission Housing Development Corporation specifically targeting special needs groups such as the elderly, low-income families, and the disabled, particularly people with AIDS.



In the 1990s, the Mission District was directly impacted by the "dot-com" boom when buildings which previously housed non-profit uses or PDR activities were converted to offices for dot-com businesses or redeveloped as loft-style housing for San Francisco's newest immigrants who worked in a wide range of jobs associated with the Internet industry. Gentrification has been an issue in the Mission, an area made especially attractive by its sunny weather and supply of historic homes and flats at relatively affordable prices. The desirability of the Mission for those seeking an urban lifestyle is further enhanced by excellent public transit access to both BART and MUNI and a proliferation of new restaurants, bars, and entertainment activities.

## 3.2 Existing Ridership

The 16th Street Mission Station is one of the most heavily used in the BART system, ranking ninth in overall ridership volume. The higher volume stations are the Market Street Stations, Balboa Park and 24th Street Mission in San Francisco, and 12th Street/Oakland City Center in Oakland. The two stations that rank behind 16th street in ridership volumes are Daly City and 19th Street in Oakland. Most of the highest volume stations serve regional employment centers, while the 16th Street Mission



Station, by contrast, is used predominantly as a morning home origin station.

Currently, about 83 percent of the 16th Street Mission patrons *who enter before 10 am* are headed for one of the four downtown San Francisco stations. Not surprisingly, about 50 percent of riders at the station use a Muni Fast Pass as their fare medium on BART. A significant share of *daily* riders (36%) are bound for downtown Oakland and Berkeley.

The map below shows the home origins of BART riders using the 16th Street Mission station.

Map 1: Origins of BART riders using the 16<sup>th</sup> Street Mission Station



While average weekday exits at 16th peaked at 9,186 in FY 01, representing a nearly 40% increase over less than 5 years, it dropped to 7,903 average weekday exits in FY 03 reflecting both the economic downturn and two years of construction of the Southwest Plaza. Today, as of the 3rd quarter of FY 04, average weekday exits are 8,488, just 7.6% below the peak year. Ridership is trending upward in FY 04.

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The following is an overview of 16th Street Mission demographic information for the AM peak based on the 1998 Station Profile Study, with comparison to data from the 2000 Census.

Table 1: 16th Street Mission Demographic Information for A.M. Peak

	1998 BART Riders <i>(AM Peak)</i>		2000 Station Neighborhood <i>(1 mile radius from the Station)</i>	
	16 <sup>th</sup> Street Station	Systemwide	16 <sup>th</sup> Street Station	Systemwide
<b>Race and Ethnicity</b>				
<b>White</b>	81%	58%	59%	45%
<b>Black</b>	5%	15%	6%	13%
<b>Asian or Pacific Islander</b>	9%	23%	11%	25%
<b>American Indian, Eskimo or Aleut</b>	1%	1%	1%	1%
<b>Other Race</b>	6%	5%	23%	16%
<b>Hispanic Origin*</b>	16%	12%	36%	22%
<b>Gender</b>				
<b>Female</b>	52%	57%	43%	49%
<b>Male</b>	48%	43%	57%	51%
<b>Household Income</b>	<b>1998 BART Riders <i>(AM Peak)</i></b>			
	<b>16<sup>th</sup> Street Station</b>		<b>Systemwide</b>	
<b>\$30,000 or Less</b>	36%		21%	
<b>\$30,001 to \$60,000</b>	35%		34%	
<b>\$60,001 to \$100,000</b>	21%		30%	
<b>Over \$100,000</b>	8%		17%	

## 3.3 Mode Split

With no parking at the station, comparatively few patrons arrive by car; only the Powell Street Station has a lower auto access share. Almost two-thirds of patrons arrive on foot (the highest share in the system), which is not surprising given the station's location in the heart of a dense urban neighborhood.

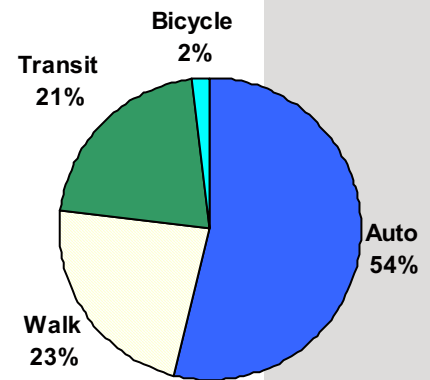
Transit carries less than a quarter of all trips that access the 16th Street Mission Station, slightly below the systemwide average. While the area is rich in MUNI transit service, many local MUNI riders are bound for downtown San Francisco instead of the closest BART station.

The relatively high bike access share is likely due to several factors. The station is situated near roadways that connect adjacent residential neighborhoods to the station, and the relatively flat terrain on these roadways provides a more conducive environment to bicycling. Recent efforts by BART to provide bike-parking facilities at the station and the City of San Francisco's effort to develop the Valencia Street bike lanes provide additional opportunities to increase bicycle access. However, BART policy does not allow bikes on any train from 16th Street Mission Station in either the morning or evening peak period.

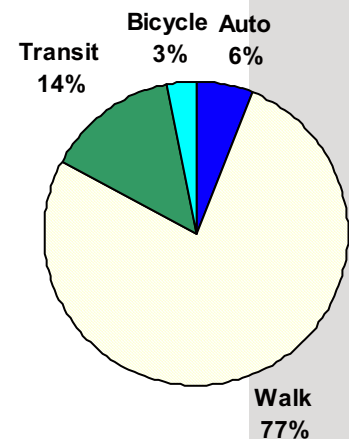
## 3.4 Station Structure and Architecture

The Station facility consists two Plazas (Northeast and Southwest), the concourse level below Mission Street and the platform and tracks below. Vertical circulation from each plaza is provided by two sets of stairs and a single escalator. The Northeast Plaza escalator is generally in the down direction and the Southwest Plaza the escalator goes up. It appears that the stairways were designed so that an additional escalator could be accommodated on each plaza, with stairs in the center. The Northeast Plaza also has an elevator to the concourse level.

Figure 1: Mode Split  
Systemwide



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## 16<sup>th</sup> Street Mission Comprehensive Station Plan

The architectural firm of Hertzka and Knowles designed both the 16th Street Mission and 24th Street Mission BART Stations. The original landscape architect for the two stations was Douglas Bayliss. Tom Richman & Associates (now Catalyst) in conjunction with Carter & Burgess designed the renovated Southwest Plaza.

The station structure extends some 700 feet in length under Mission Street and situated such that the north end of the structure extends almost to 15th street while the south end of the structure reaches mid-block between 16th and 17th. The interior is characterized by large unpainted concrete structural elements accented by distinctively colored tiles. The color pallet at 16th contrasts off-white tiles with pale blue, drab olive green and turquoise reflecting a unique color palette characteristic of the late 1960's and early 1970's when BART was constructed.



The concourse level has a barrel-vaulted ceiling broken up by concrete arches with a hanging false ceiling of dark redwood slats and indirect lighting. The curvature of the ceiling is reflected in the wall treatment which slopes outward from the floor, using up floor area that could be reclaimed with straight walls.

There is one station agent booth located at the base of the stairs from the Southwest Plaza, where the faregate array exits. Ticket machines are located on the walls near both entrances, although there are no entry gates on the concourse from the Northeast Plaza entrance.

The station structure also accommodates emergency exit stairs to the surface with doors in the sidewalk.

One elevator, located in the paid area provides access from the concourse to the platform. There is one escalator between the platform and the elevator. This escalator generally runs in the downward direction in the AM commute and upward in the PM.

The paid area on the concourse contains bike racks.

The concourse level also contains public restrooms (currently closed), staff facilities, as well as fan rooms and other facilities needed to operate the system.

## 3.4.1 The Plazas

The Southwest Plaza was recently renovated. Improvements include new pavers, landscaping, lighting, seating benches, a new railing system that incorporates an art element, and a community art board covered with decorative tile and incorporating stainless steel art panels. The panels on the art board were designed so that they can be removed in order to accommodate temporary displays.



## 3.4.2 The Southwest Plaza Art Elements

Perhaps the most striking features of the renovated plaza are the art elements. The decorative railings and community art board were designed by artist Victor Mario Zaballa and created with a team of collaborators including fabricator Lawrence Berk of Creative Cutting Services, Jose Rodriguez from San Juan Powder Coating Services, and Pete Mercado from Mercado Tile. Zaballa's concept was to create the Plaza del Colibri. The humming bird, the colibri, is a hard-working bird that migrates between Mexico, the United States, and Canada - the perfect symbol for the Mission District, with its changing history of immigration and migrant workers: Irish, Latino, and more recently Asian. Hummingbirds symbolize life and fertility, as it is their job to fertilize flowers and bring fruit. Likewise, the immigrant contributes to the flowering of the community. The high chroma primary and secondary colors of the railings highlight the festive aspect of the neighborhood: festivals, weddings, funerals, and all celebrations that use "papel picado" paper cutouts. The domed posts at the top of the stairs and escalator and anchoring the fence are blue enamel which reference the "BART blue" long associated with the BART's image and branding.

The central panel of the railings and repeated in the community art board is the dahlia flower, which is common in gardens



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in Mexico and San Francisco.

The second art component of the project is the mural "Future Roads" by Daniel Galvez and Jos Sances, located over the stairway. A Roman frieze was used as background to link the elaborate road system that served all corners of the Roman Empire to the way that BART links different parts of the Bay Area. Imposed over the ancient images of Roman nobles are photographic images of today's



ordinary riders, representing the wide variety of people in the Bay Area and the Mission District. For this piece, the artists created a new process to silk-screen computer photographic images with ceramic glaze onto bisque tiles and then used traditional painting methods to hand finish the mural.

### 3.4.3 The Northeast Plaza Art Elements

In June 2000, the community dedicated The Youth Voices Mural Project installed on the elevator structure located on the Northeast Plaza. These panels were created as part of a community partnership between BART and the St. John's Educational Thresholds Center (SJETC)/Urban ArtWORKS located nearby.



SJETC is a facility, which recognizes the gifts and talents of young people in the Mission District and works with youth, their families, and the community-at-large to make the Mission neighborhood a better place in which to live and grow. Urban ArtWORKS artists created four panels of ceramic tiles that illustrate the Mission District teens' hopes for peace, non-violence, and love for their community. Urban ArtWORKS Artists collaborated with 150 youth and parents from Community Bridges Beacon, SJETC's Tutoring center, and Marshall to paint the pieces for the project. As part of the creative process, neighborhood teens worked with poets, spoken word artists, and youth activists to create the dynamic energy behind the piece.

### 3.4.4 Station Concourse Art Elements

The cast concrete wall sculptures located on the walls of the concourse level at the base of the stairs were part of the original system improvements and are by British artist William Mitchell. Mitchell also did artwork for 24th Street Mission Station and the Richmond BART Station.



## 4.0 Station & Neighborhood Planning

### 4.1 Introduction

Planning efforts which affect the 16th Street Mission BART Station have included preparation of a station specific plaza plan, citywide transportation planning and neighborhood planning briefly summarized below:

- The 16th Street BART Community Design Plan, sponsored by BART, the Metropolitan Transportation Commission and the SFCTA and prepared by Mission Housing Development Corporation and Urban Ecology;
- The Countywide Transportation Plan prepared by the SFCTA; and
- The San Francisco General Plan and its Transportation Element

Implementation of any of the major capital projects called for in the various plans requires participation by a number of City agencies including the Department of Public Works and the Department of Parking and Traffic, which has responsibility for the public right of way including streets and sidewalks, and the San Francisco Planning Department, which has managed neighborhood planning studies described below.

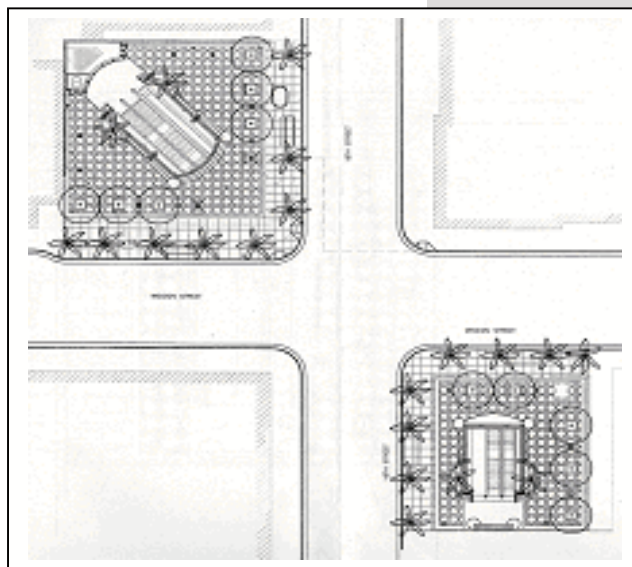
### 4.2 Community Design Plan Recommendations

The key recommendations from the Community Design Plan for improving access to the 16th Street Mission Station include:

- Increase accessibility and choices
- Improve visibility and connectivity
- Encourage a diverse range of activities and people on the plazas

The Community Design Plan addressed visibility and accessibility first by removing many of the visual and physical barriers that currently give the plazas a fortress-like quality and make pedestrian circulation difficult. Then, in order to create a vibrant, active

Map 2: Plaza Design Concept Drawing





atmosphere on the plazas, the plan provided space for new commercial and community activity on the plaza. The intent was to draw more people to the plazas in the evening and on the weekends. Lastly, the community plan proposed to eliminate the sense of disorientation and isolation experienced at the station by connecting the plazas to adjacent buildings and installing locally created public art that draws on the unique assets of the Mission District.

The Community Design Plan recommended the following physical changes:

- Increased useable plaza area
- Bus bulbs
- Bus canopies
- Public art
- Bicycle Storage
- Community information board
- Provision of choices for seating and movement between the plazas
- Improved circulation through the plaza and to the neighborhood.

Additional Plan recommendations include:

- Strategies to improve transit reliability
- Improved patron amenities
- Improved wayfinding signage
- Provisions to encourage bicycle access

On May 17, 2003, BART dedicated the reopening of the Southwest Plaza, following two years of construction. The celebration included a dragon dance, Native American blessing ceremony and a performance by the King and Queen of Carnaval. Following comments by dignitaries, artists, and ribbon cutting by the 16th Street Mission Citizen's advisory committee, the celebration of the plaza became a mercado for neighborhoods vendors and musicians.

The funding for construction of the Northeast Plaza is anticipated to be in place in the summer of 2004, with actual construction anticipated to begin in early 2005.



### **4.3 The Countywide Transportation Plan**

The Countywide Transportation Plan is the blueprint for San Francisco's transportation system and investment over the next 30 years. The investment component of the countywide plan is outlined in the Prop K Expenditure Plan, which is the main tool for implementing San Francisco's 1/2 cent transportation sales tax program. The broad funding categories of the expenditure plan include major capital projects (including Bus Rapid Transit/MUNI Metro Network), paratransit, streets and traffic safety, and transportation system management. This plan includes funding for a wide variety of projects, which benefit BART riders including pedestrian safety, and wayfinding projects that will improve accessibility to BART, improve transit reliability, and other projects that promote the City's Transit First policy.

### **4.4 Bus Rapid Transit/Transit Preferential Streets Program**

According to the Prop K Expenditure Plan, the Bus Rapid Transit/Transit Preferential Streets programs are intended to create an integrated citywide network of fast, reliable bus and surface light rail transit services connecting to services provided by MUNI rail and historic streetcar lines, BART, and Caltrain.

Bus Rapid Transit (BRT) is the creation of fast, frequent, and reliable transit services, with exclusive transit lanes and dedicated station, on Geary Boulevard, Van Ness, and Potrero Avenue.

The Transit Preferential Streets (TPS) program includes improvements to key transit corridors, including Mission and 16th Street. TPS improvements are intended to improve speed and reliability at lower cost than BRT. TPS Improvements include sidewalk bulb-outs at bus stops, transit-priority lanes, traffic signal modifications and relocation of bus stops.

BRT and TPS projects may include traffic signal modification to speed up service, and real time



passenger information systems to improve transit reliability and reinforce and sense of permanence of improved service, as well as associated landscaping, lighting and signage improvements.

#### **4.4.1 Van Ness Mission Rapid Transit Corridor**

The proposed rapid transit corridor would connect the high volume public transit arteries of Van Ness Avenue and Mission Street. Together, these two arteries have a total ridership of almost 100,000 daily riders. Ultimately, this corridor will connect Fort Mason to the Daly City BART Station and serve City Hall, Civic Center, the Mission District and the residential and commercial corridors along Van Ness and Mission Street. Much of the corridor is composed of relatively dense, low-income residential areas with a high percentage of transit dependent residents. The 49 Van Ness/Mission, an electric trolley coach service, has 8-minute peak headways and carries an average 19,490 weekday rides. MUNI's 14 Mission, also an electric trolley coach service, runs every 5 minutes and carries 37,310 weekday riders. Additionally, the 14 Mission Limited provides 8-minute peak service and carries an average of 6,052 weekday riders. The 14 Mission Express, which operates during peak hours in the peak direction, carries 2,572 riders each weekday. Buses on Mission Street experience delays due to high levels of congestion, making reliability an issue. In the last ten years, the scheduled PM peak run time for the 14 Mission has increased 20.4%.

#### **4.4.2 Fillmore-16th Street Rapid Transit Corridor**

The 22 Fillmore, an electric trolley coach service, serves the Fillmore-16th Street corridor. This is a major crosstown route, with almost 25,000 passengers each weekday. It serves the Fillmore commercial district and the residential neighborhoods of Pacific Heights, Western Addition, Mission, and Potrero with six-minute headways during the PM peak. This route is a demonstration for a real-time passenger information system, which informs passengers at selected stops when the next two buses are expected to arrive. The route experiences more delays in the Fillmore district due to its higher ridership and because there is only

one lane in each direction and parking and turning movements block transit. This route is scheduled to be rerouted as Mission Bay develops to continue on 16th to the Third Street light rail. MUNI's plans call for BRT-type service on 16th where there could be an exclusive lane for buses and TPS improvements on Fillmore such as signal priority, bus bulbs, and left turn restrictions.

### **4.4.3 18th Street-Castro-Potrero Corridor**

The third transit corridor providing service to 16th Street Mission is the 33 Stanyan, an electric trolley coach service. This is a crosstown route with weekday ridership of 6,800 and 20-minute headways during the PM peak. This route connects the Haight, Castro/Eureka Valley neighborhoods and commercial centers with the Mission and Potrero Hill neighborhoods and terminates at San Francisco General Hospital. This line was recently rerouted to provide direct service to the 16th Street BART plaza in both directions, rather than only westbound.

The 53 Southern Heights is a feeder service serving the Southern Heights neighborhood on the eastern slope of Potrero Hill.

## **4.5 San Francisco General Plan**

The Countywide Transportation Plan was developed within the overall policy framework of the San Francisco General Plan and its Transportation Element. The Transportation Element establishes the transportation goals, policies, and objectives that guide transportation planning and investments. A fundamental assumption of the city plans is that the demand for auto travel must be managed in order to sustain a desirable living and working environment in San Francisco, and that transit should be developed as the primary response to future transportation demand in San Francisco.

## 4.6 Neighborhood Planning

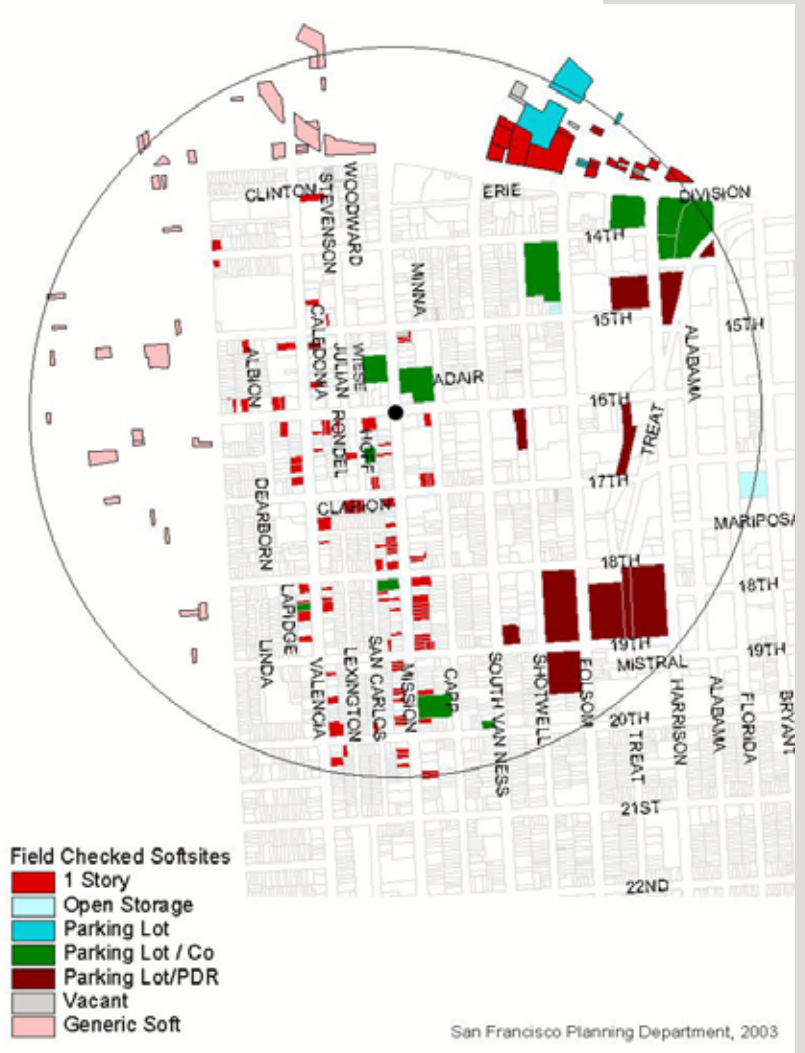
Although there has not been a neighborhood specific plan for the Inner Mission, the planning Department has been working on a zoning study and recently completed a survey of historic properties in the area.

Residential and commercial development activity is expected to increase considerably within the next ten years in the station area. According to the San Francisco Planning Department, there is potential for over 2.3 million square feet of development within a quarter mile of the station. The map below identifies underdeveloped sites (also known as "soft sites") in the vicinity of the 16th Street Mission BART Station.

In the area known as NEMIZ (Northeast Mission Industrial Zone), eight to ten sites are currently in development for uses ranging from residential lofts to office space. Outside of the NEMIZ, four to six other sites are being developed within walking distance of the 16th Street Mission station. These projects include a 60-unit market-rate mixed-use building at 17th and Hoff completed in 2001, as well as two potential mixed-use affordable housing developments adjacent to and across from the BART Station plazas.

Beyond the immediate station area, there is the 315-acre Mission Bay development. The nearest portion, located along the 16th Street Corridor, is Mission Bay South and will include 3,000 new units of housing; a 44-acre campus of the University of California - San Francisco; 5 million square feet of private biotech, research & development, multimedia and office space;

Map 3: San Francisco Planning Department "Soft Sites"



38 acres of parks; and up to 500,000 square feet of retail space. According to plans 30,000 people will be employed at Mission Bay.

This project has the potential over time to generate substantial new intermodal transfer ridership at the 16th Street Mission Station, depending on the rate of development and the implementation of the 16th Street MUNI Transit Preferential Streets project, since this corridor may provide a quicker connection to BART than the Third Street light rail that is currently under construction.

## 5.0 Station Access

### 5.1 Purpose

In response to peak period access constraints primarily at home-origin BART stations, the BART Board asked staff to develop Access Plans consistent with BART's Strategic Plan and its "Access Management and Improvement Policy Framework" which focuses on:

- Enhancing customer satisfaction
- Increasing ridership by enhancing access to the BART system
- Creating access programs in partnership with communities
- Managing access programs and parking assets in an efficient, productive, environmentally sensitive and equitable manner



Access Plans are intended to balance the use of automobile and other access modes while focusing primarily on peak period access constraints. These plans may also address access issues outside the formal scope of home-based AM trips and are expected to benefit all trips to and from BART. A key goal of the Access Plans is to ensure that access planning for BART stations will both consider and guide other capital investments, such as those promoting station area development and increasing station capacity.

The proposed access targets, as described in the Access Management and Improvement Policy Framework, include a systemwide reduction in the share of AM peak period patrons arriving by solo driving with corresponding increases in walk, bicycle, transit, carpool, passenger drop off and taxi modes. The proposed systemwide targets shift the solo driver from 38 percent in 1998, to 33 percent in 2005, to 31 percent in 2010. Table 1 outlines both 2005 and 2010 targets. The achievement of these targets depends on availability, cost, predictability, convenience and safety of the mode.

## **5.2 Process**

The development of the Station Access Plans began with a systematic information gathering effort. Relevant data included ridership, mode split, and ongoing access activities and programmed capital improvements. The station area scan included land use, demographics, existing plans and pending local improvement projects from local stakeholders.

## **5.3 Modes**

### **5.3.1 Walking--Improvements Benefit All Modes**

The importance of walking as an access mode at 16th Street Mission is reflected in the above charts with its percentage of walkers representing more than three times the systemwide average. This high percentage reflects the dense urban character of the neighborhood, low automobile ownership and low incomes of the area. Plaza improvements currently under construction are intended to improve the pedestrian experience by making the plazas active and safe environments, particularly at night.

As discussed in the Community Design Plan, new development can also contribute to neighborhood vitality and safety, thus improving the environment for walking. Similarly, programmed plaza activities and vendors can improve the attractiveness of the station area and mitigate the influence of illegal activity (i.e. public drunkenness, the selling and use of drugs). Lastly, the community plan proposed to eliminate the sense of disorientation and isolation experienced at the station by connecting the plazas to adjacent buildings. Three properties adjacent to the BART Plazas could potentially be redeveloped so that they open onto the plaza and improve safety with increased activity and plaza visibility.

Given the popularity of the neighborhood for nighttime activity and the lack of parking in the area, BART can provide regional access to both patrons and employees of restaurants, bars, clubs and performance spaces. For both employees and patrons of late night entertainment



establishments, options for late night access to residences in the east bay are limited, are non-existent leaving driving an automobile the only reasonable option

- Complete implementation of the Community Design Plan and construct the Northeast plaza
- Create a safe and inviting environment on the Station plazas and near the Station
- Provide a sheltered waiting area with seating
- Each plaza should have both up and down escalators to facilitate intermodal transfers and eliminate the hazard and inconvenience of stairs or cross the street to use the elevator or escalator going in the desired direction. The Southwest plaza is probably a greater priority given current usage patterns. The Northeast Plaza use should increase as ridership grows with development of Mission Bay and implementation of the 16th Street corridor TPS program
- Upgrade street elevator the Northeast plaza to current standards
- Explore feasibility of an additional elevator to Southwest Plaza
- Add an additional escalator between the platform and the concourse level to facilitate movement of patrons in the non-peak direction and eliminate the hazard of using the stairs and reduce the need to use the platform to concourse elevator
- Provide late-night BART or other regional service (i.e. bus service after BART operations) for patrons and employees of late night entertainment establishments, who now have few options other than driving
- Encourage programmed activity in Station plazas such as vendors, rotational exhibits, or activities associated with neighborhood non-profit organizations
- Explore the feasibility of incorporating providing for new emergency exits with new entrances from the street or from new development so that *egress* improvements can also provide new *access* amenities

- Explore feasibility of adding an elevator to Southwest plaza

## 5.3.2 Bicycle

Bicycle usage at this station is higher than the systemwide average due to proximity of the station to major dedicated bike routes nearby and the availability of bike racks within the paid area of the station. Presently, there are 8, 5-bend wave racks at the station that can accommodate up to 42 bicycles. Additionally, BART recently relaxed its peak hour prohibitions of bikes on trains so that it is now permissible to take a bike on a train southbound in the AM peak. It is likely that the percentage of bicycle use at the station is currently higher than reflected in the 1998 Station Profile survey, given station storage facilities built since then, construction of the Valencia Street bicycle lanes, and relaxation of BART rules restricting bikes on trains.

Key recommendations to improve bicycle access are:

- Provide for additional safe and secure bicycle storage at the station to meet demand
- Provide stair channels between the street and platform to accommodate movement of bicycles
- Work with the City to improve bicycle lane infrastructure and wayfinding signage for bike lanes to and from BART
- Explore the feasibility of a bicycle station on one of the plazas, nearby, or within the station in conjunction with station expansion

## 5.3.3 Transit

Transit access to the station (based on the 1998 Station Profile survey) is one-third lower than the systemwide average. It is likely that, given other options for transit access to BART, patrons may be going to the Civic Center Station or 24th Street Mission Station instead of 16th Street Mission because of safety concerns, particularly at night. Safety may also be a concern for those using the transit lines serving the station, particularly the Mission buses.

Improvements to MUNI service and reliability will improve transit access to the station. Implementation

of the MUNI BRT/TPS network should also contribute to increased transit access. Lastly, new development near the station and at Mission Bay South should contribute significant future new ridership for the station that uses transit to access the station.

Key recommendations to improve transit access are:

- Complete plaza improvements to improve safety and provide patron amenities
- Add an additional escalator to each plaza, to minimize inconvenience associated with transfer between BART and MUNI in conjunction with implementation of the MUNI BRT/TPS network
- Work with MUNI when BRT/TPS improvements are proposed to ensure adequate loading areas for buses and to minimize inconvenience of patrons transferring between MUNI lines and between BART and MUNI
- Consider expanding the bus bulb on the Mission side of the Southwest Plaza to make it large enough to accommodate both the Mission Street buses and the 33 Stanyan line
- Provide sheltered waiting areas with seating for transit users
- Update BART's brochures to reflect changes in MUNI service and routes
- Explore the need for and feasibility of shuttles to serve employers in Mission Bay South and other new development in the area, in conjunction with MUNI representatives
- Install a new fare gate array at the base of the access stairs, escalator, and elevator on the Northeast Plaza
- Install a second escalator between the concourse and platform
- Replace the elevator on the Northeast Plaza with a larger elevator that complies with current ADA standards
- Make available real time transit information on both the plaza level and the platform or concourse level

## 5.3.4 Vehicular (Auto, Van, Shuttle and Taxi)

The automobile mode share of 6% at 16th Street Mission is very low compared to a systemwide average of 54% but still surprisingly high, given the congestion and lack of parking in the area. It is likely that most people who access 16th Street Mission by car either arrive by taxi or are dropped off by people who then access the nearby regional freeway network (Highway 101 north and south) at 13th and South Van Ness. Monthly parking is available at the public garage on Hoff for \$100 per month. There is some evidence that BART commuters park in the neighborhood and that handicapped patrons use disabled placards to park at meters near the station.

Vehicular access also includes vans, shuttles and taxis. These services require drop-areas, often in the Bus Zones. If shuttles need to dwell at the station, a designated drop off should be provided in order to minimize the potential conflict with MUNI buses.

Key recommendations to improve auto access:

- Work with the city to assure adequate drop off and pick-up areas for Taxis, which minimize conflicts with transit vehicles, especially during peak commute periods
- Work with City to restrict parking during peak periods, when congestion impairs transit access to the station

# 16<sup>th</sup> Street Mission Comprehensive Station Plan

Table 2: 16<sup>th</sup> Street Mission BART Station Access Improvement Recommendations

Mode	Description	Lead	Support	S/M/L	Funding Tier* and Source**
<b>Walking - Benefits all Modes</b>					
<i>Implementation of Community Design Plan</i>	<p>W1: Northeast Plaza Complete implementation of the Community Design Plan and construct the NE Plaza; Create a safe and inviting environment on the Station Plazas and near the Station; Provide a sheltered waiting area with seating;</p>	BART, SFCTA, MTC	Community Planning Partners	S	Tier 1
<i>BART Station Improvements</i>	<p>W2: Vertical Circulation Each plaza should have both up and down escalators to facilitate intermodal transfers and eliminate the hazard and inconvenience of stairs or cross the street to use the elevator or escalator going in the desired direction. The SW Plaza is probably a greater priority given current usage patterns. The NE plaza use should increase as ridership grows with development of Mission Bay and implementation of the 16<sup>th</sup> Street corridor TPS program; Upgrade street elevator the NE Plaza to current standards; Explore feasibility of adding an elevator to Southwest Plaza; Add an additional escalator between the platform and the concourse level to facilitate movement of patrons in the non-peak direction and eliminate the hazard of using the stairs and reduce the need to use the platform to concourse elevator</p>	BART	SFCTA	M/L	
<i>BART Late Night Service</i>	<p>W3: Late Night Service Provide late-night BART or other regional service (i.e. bus service after BART operations) for patrons and employees of late night entertainment establishments.</p>	BART			
<i>BART Plaza Activities</i>	<p>W4: Plaza Activation Encourage programmed activity in Station Plazas such as vendors, rotational exhibits, or activities associated with neighborhood non-profit organizations;</p>	BART	Vendors, Community Partners	S/M/L	
<i>Neighborhood and adjacent development</i>	<p>W5: Area Development Provide wayfinding signage within the station and between the station and neighborhood destinations; Encourage development of pedestrian friendly, mixed-use development in station area; When development occurs adjacent to the BART Plazas, encourage a design that open onto the BART Plazas and introduces new pedestrian connection, Explore the feasibility of incorporating providing for new emergency exits as new entrances incorporated into new development.</p>	SF Planning, SFDW, BART		M/L	35

# 16<sup>th</sup> Street Mission

## Comprehensive Station Plan

Mode	Description	Lead	Support	S/M/L	Funding Tier* and Source**
<b>BICYCLE</b>					
<i>Bicycle Racks</i>	<b>B1: Racks</b> Provide for additional safe and secure bicycle storage at the station to meet demand;	<b>BART</b>		S	Tier 1:
<i>Bicycle Stair Channels</i>	<b>B2: Stair Channels</b> Provide stair channels between the street and platform to accommodate movement of bicycles;	<b>BART</b>		S	Tier 1:
<i>Wayfinding Signage</i>	<b>B3: Signage</b> Work with the City to improve bicycle lane infrastructure and wayfinding signage for bike lanes to and from BART.	SFCTA, DPT		S	
<i>Bicycle Station</i>	<b>B5. Bike Station</b> Explore the feasibility of a bicycle station on one of the plazas, nearby, or within the station in conjunction with station expansion	<b>BART</b>		S & L	TBD

# 16<sup>th</sup> Street Mission Comprehensive Station Plan

Mode	Description	Lead	Support	S/M/L	Funding Tier* and Source**
<b>TRANSIT</b>					
<i>MUNI BRT/TPS Planning</i>	<p><b>T1:</b> Work with MUNI when BRT/TPS improvements are proposed to ensure adequate loading areas for buses and to minimize inconvenience of patrons transferring between MUNI lines and between BART and MUNI; Consider expanding the bus bulb on the Mission side of the Southwest Plaza to make it large enough to accommodate both the Mission Street buses and the 33 Stanyan line;</p>	SFCTA		S/M/L	All Tiers
<i>MUNI BRT/TPS Planning</i>	<p><b>T2:</b> Add an additional escalator to each plaza, to minimize inconvenience associated with transfer between BART and MUNI in conjunction with implementation of the MUNI BRT/TPS network; Install a new fare gate array at the base of the access stairs, escalator, and elevator on the Northeast Plaza;</p>	SFCTA		S/M/L	
<i>BART/MUNI Marketing</i>	<p><b>T3: Marketing</b> Update BART's brochures to reflect changes in MUNI service and routes; Include private and employer shuttles in Marketing information; Make available real time transit information on both the plaza level and the platform or concourse level</p>	BART		S/M/L	
<i>MUNI Service Planning</i>	<p><b>T4: Service Planning</b> Explore the need for and feasibility of shuttles to serve employers in Mission Bay South and other new development in the area, in conjunction with MUNI representatives;</p>				

# 16<sup>th</sup> Street Mission

## Comprehensive Station Plan

Mode	Description	Lead	Support	S/M/L	Funding
<b>VEHICULAR (Auto, Van, Shuttle, Taxi, etc.)</b> <b>Drop-Off &amp; Pick Up</b>	<p><b>V1: Adequate Drop-off and Pick Areas:</b> Work with the city to assure adequate drop off and pick-up areas for Taxis, Shuttles, which minimize conflicts with transit vehicles, especially during peak commute periods: Work with City to restrict parking during peak periods, when congestion impairs transit access to the station</p>	SFDPT		S/M	

- \* Funding Tiers:
- Tier 1 Existing Resources (or Exclusively non-BART funds)
  - Tier 2 Limited Revenue Enhancement (or Exclusively non-BART funds)
  - Tier 3 Future Revenues TBD (or Exclusively non-BART funds)

\* (S) Short Term = Up to 2005, (M) Medium Term = 2006 to 2010, (L) Long Term = 2010 and After



## **6.1 Introduction**

The capacity plan for the 16th Street Mission Station is the result of an intensive examination of capacity issues by a team of BART staff and consultants. BART's Comprehensive Station Plan process, combined with ongoing studies of station and system capacity issues, form the basis of this capacity plan. A recently completed study BART conducted in conjunction with the Valley Transportation Authority (VTA) examined future impacts to the "core" BART system by the proposed Santa Clara County BART extension. This study provided an up-to-date understanding of systemwide station capacity functionality and future improvement needs.

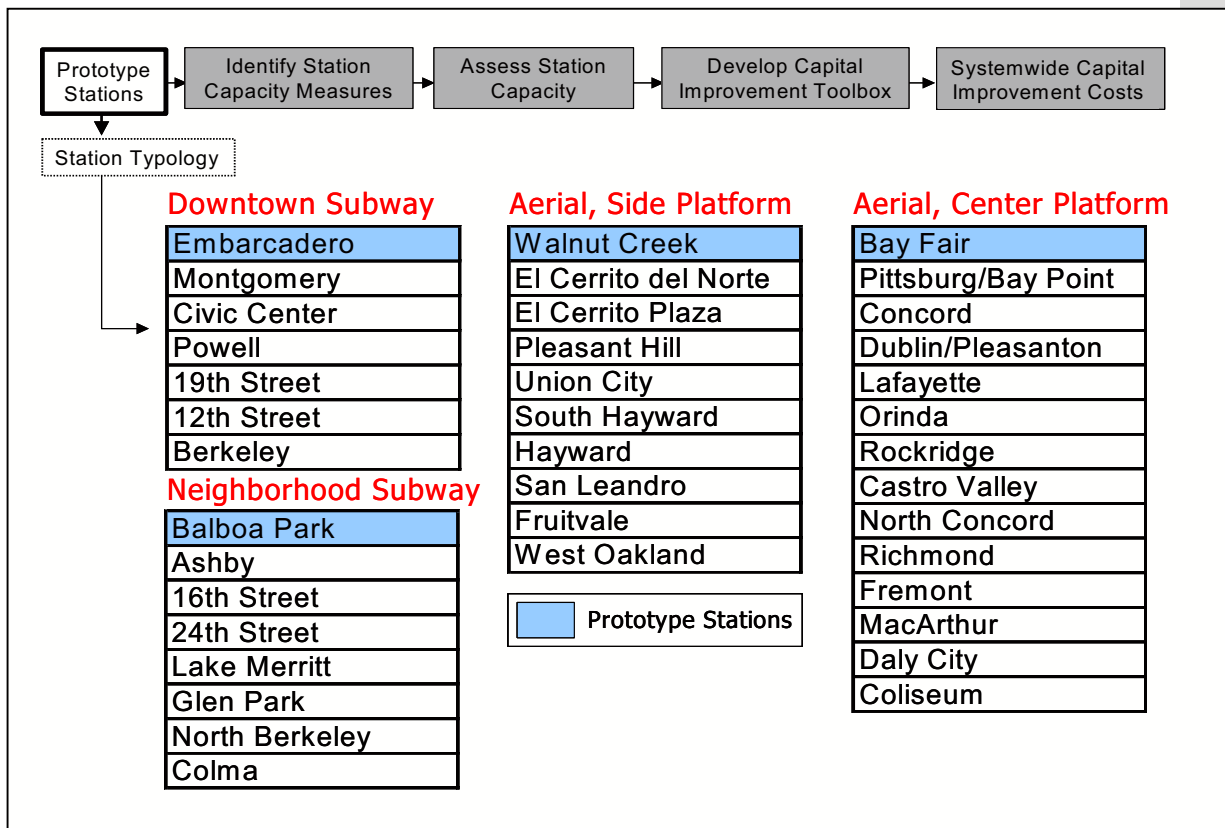
## **6.2 Core Stations Capacity Study**

In early 2003, BART completed a study of station capacity needs for the core system of 39 stations in Alameda, Contra Costa and San Francisco counties. The "Core Stations Capacity Study," conducted jointly with VTA as part of the Silicon Valley Rapid Transit Project, analyzed station capacity performance based on patronage projections for 2025 with the addition of the extension. The goal of the study was to determine station capacity performance at each of the existing 39 core stations and develop a systemwide capital improvement program to bring stations into compliance with code regulations and BART's own capacity criteria. Cost estimates for proposed capital improvements were also developed as part of the study effort.

Patronage projections for the horizon year 2025 generated specifically for the San Jose extension are higher than BART's own, trend-line based 2025 forecast. It also should be noted that the 2025 projections used in this analysis are unconstrained and do not account for limits in parking or other access conditions. As a result, the Core Stations Capacity

Study provides a conservative estimate of station capacity needs. The analysis of 2025 station capacity needs was based upon two conditions producing ridership estimates: the core system “baseline estimate” including the recently approved 5.4 mile extension to Warm Springs, and the second with the proposed Silicon Valley BART extension to Santa Clara. The extension into Santa Clara County adds approximately 80,000 passengers per average weekday to the baseline estimate using the same 2025 horizon year.

**Table 3 Core Stations Capacity Study Methodology**



When analyzing station capacity, two sets of patronage projections are necessary, “line load” and “station load.” Line load projections refer to the number of passengers on a train passing through a station. Line load volumes are important when measuring platform, stair and escalator capacity which must be sized to manage normal passenger entry and exit patterns but also be capable of accommodating passengers forced

to off-load a train or evacuate a station in the event of a delay or emergency. Station load projections are defined as the number of passengers entering and exiting a station. Station level projections are necessary to determine the size and count of Automatic Fare Collection equipment such as fare gates, addfare machines and ticket vending machines. Station level passenger volumes also contribute to calculations of platform, stair and escalator capacity based upon established performance goals.

The Core Stations Capacity Study relied upon a methodology that analyzed station capacity needs on a systemwide basis and developed in-depth capital improvement programs at four prototype stations: Embarcadero, Balboa Park, Walnut Creek and Bay Fair. Capital improvements derived from the prototype station analyses were then applied to other existing stations with similar characteristics and anticipated growth to develop a conceptual estimate of systemwide capacity impacts and costs.

**Table 4 Capacity Codes and Requirements**

Element	Guideline	Source
Vertical Circulation Required for: Maximum Total Platform Exit Time	Must exit trainload and occupant load from platforms within 4 minutes (platforms act as a corridor under an Emergency Scenario)	NFPA 130 (2000), CBC (1998)
Vertical Circulation Required for: Time from Most Remote Point to a Point of Safety	Must exit trainload and occupant load from most remote point of platform to designated point of safety within 6 minutes	NFPA 130 (2000), CBC (1998)
Platform Delay Scenario: 12 minutes delay or one missed headway (whichever is greater) plus off-load train (in peak direction track)	5 square feet per passenger (off-load of train)	Industry Standard, BART practice
AFC Gates	No more than 60-second delay at fare gate with one gate per array out of service in peak direction. No queue long enough to interfere with stair and escalator operations.	BART adopted Standard

Source: BART Planning Department 2003

## 6.3 Current and Projected Ridership

The estimation of future capacity and access needs at the 16<sup>th</sup> Street Mission station were based on forecasts of future ridership determined by the Core Stations Capacity Study. These projections (presented below) anticipate a 55.7% growth in ridership from 2004 to 2025, from approximately 17,243 average daily entries and exits in 2004 to 26,844 in 2025, assuming that the San Jose extension is built. It should be noted that this represents an “unconstrained” forecast of future growth that is not limited by parking or other access constraints.

The BART SRTP forecasts a more modest 18.8% increase in the interim year of 2014. However, for purposes of this plan, it should be noted that 2025 is considered the horizon year.

**Table 5: Projected Ridership in 2014 and 2025**

Source	BART SRTP		Cores Stations18.8 Capacity Study	
			With San Jose Extension	W/o San Jose Extension
Year	FY2004	FY2014	2025	2025
<b>Entries &amp; Exits</b>	17243	20492	21634	26844
<b>Growth over FY04</b>		18.8%	25.5%	55.7%

**Notes**

- 1) Ridership are for all day entries and exits.
- 2) Source for FY2004, FY 2014 Figures: BART’s Short Range Transit Plan (FY05 through FY14). Figures represent average weekday ridership.
- 3) Source for 2025 Ridership Figures: SVRT DEIR (October, 2004).

## **6.4 Conceptual Station Expansion Plan**

The 16th Street Mission Station is heavily used and ridership is projected to increase from the ongoing redevelopment activity in the neighborhood and development of then Mission Bay Campus. The future extension of BART to San Jose will add to the demand at this station. Projections from BART's study of the combined effects of these service expansion programs point to the need for the following capacity expansion elements, based on projected 2025 ridership:

- 2 additional escalators
- 2 additional stairs (one 66 inch wide, one 88 inch wide)
- 1 additional stair from the concourse to street level
- 6 additional fare gates, plus associated vendor and add fare equipment
- Platform screen doors

These elements were identified after performing a systematic analysis of peak load conditions and emergency egress requirements. Specifically, the study of VTA impacts projects 26,844 daily riders at the 16th Street Mission Station, a 2,557 square foot deficiency in platform area, and a 248 inch shortfall in exit capacity between the platform and concourse levels. The structure and configuration of the station do not allow complete correction of the calculated shortfalls. In underground stations, previous BART studies indicate that the most effective solutions will eventually require operational measures to supplement physical station improvements.

While these projections reflect conditions in the year 2025, certain deficiencies are already evident and will take priority in phasing the capacity expansion program proposed below:

- The platform is very narrow, and the major obstructions are fixed infrastructure elements such as vents and electrical duct banks. The additional area that could be gained by eliminating benches and other obstructions is minimal

- Available length of platform for added vertical circulation is limited. At the north end, the electrical substation extends over about 120 feet of the platform, making it impossible to add vertical circulation elements in this area
- The train control room and fan room at concourse level limit potential new stair penetrations at the south end of the station
- The existing emergency stair to street level is very narrow and requires operation of a counterbalanced sidewalk door

The configuration of the paid area and fare gates strongly favors entrance from the Southwest Plaza. This results in congestion and compounds problems with the current inadequate number of fare gates:

- No fare gates directly serve the Northeast Plaza stairs
- The free area walkway leading from the Northeast Plaza to the fare gates is very narrow—too narrow for two-way traffic when crowded
- Queuing ahead of the fare gates causes an unacceptable level of congestion in the free area and conflicts with queuing at the ticket vending machines
- Changing the interior configuration and adding a new fare gate array would make the Northeast Plaza entrance more usable and thus shift patrons to a more balanced pattern of use, especially when plaza improvements are complete

Early in the process of exploring options for this station, two possible concepts emerged, and the preferred alternative is discussed below. A second alternative would have created a transverse fare gate array with direct entry from the Southwest Plaza. A second set of gates would have created a new entrance from the Northeast Plaza. This arrangement would have permitted conversion of the existing south emergency stair to serve the paid area. Because the concourse level is quite far beneath the street, the ability to cross Mission Street via the station stairs and free area could be eliminated. Discussion focused around the relationship of the newly configured paid area to the proposed secure bicycle facility. Such

facilities function most efficiently in the free area. Damage to fare gates and other paid area amenities is reduced if stored bicycles stay outside the barrier. For this reason, the transverse paid area concept was not developed further.

## 6.5 Proposed Station Capacity Plan

One new emergency stair with direct access from the platform to the street will be added at the south end of the existing platform. Existing ridership levels support the need to construct this stair in an early phase of the Capacity Expansion Project. Once the emergency stair is in service, further modifications to the vertical circulation system can take place.

A second emergency stair will be added from the concourse level to replace the existing north emergency stair. The new exit will provide additional capacity due to its greater width. It also has the potential to become a secondary entrance during peak commuting hours when ridership increases justify providing additional fare gates. If possible, BART will negotiate with the owner of the adjoining property to locate the headhouse on the existing SFUSD parcel. This would permit a more generously sized enclosure that could function more effectively if this stair becomes a secondary station entrance in the future.

After construction of the south emergency stair, the existing north platform emergency stair can be taken out of service temporarily. Removing the stair enclosure and widening the treads will provide some additional exit capacity. By extending the existing concourse 35 feet to the north, this stair to the platform level can serve the paid area. The structure for the concourse expansion is already in place. The existing wall and doors at the north end of the concourse will be demolished. Patrons will be able to access the north portion of the platform boarding area of the station more conveniently by using the new stair.



Vicinity of Proposed South  
Emergency Exit

Providing better access to the north platform supports another major emphasis of the planning effort: to establish a more direct access to the paid area from the existing Northeast Plaza entrance. The proposed Capacity Expansion plan includes the addition of a new fare gate array on the northeast side of the concourse level, a new agent's booth with direct sight lines to the existing street access elevator, and new ticket vending machines.

The existing free area along the east side of the concourse level will be widened and enhanced. To establish a sense of security, glass railings will be positioned to maintain lines of sight to the existing station elevator and entrances from the new agent's booth. The area will be provided with new ticket vending machines, appropriate signage, and ample bicycle storage in both the paid and free areas.

Modifying the location and orientation of the street elevator will improve access to the station once the new agent's booth is complete. The existing elevator is small, and there is no direct line of sight to the agent's booth. The new location will improve both access and security, although it does not provide additional exit capacity.

Eventually, the expansion of the platform area will have to be addressed. Ridership projections indicate a significant future deficiency in platform area. When those levels of ridership are approached, the addition of a platform screen door system will eliminate the need for the platform safety zone. Once the screen is in place, patrons may safely use the full width of the resulting enclosure for queuing. This effectively adds three feet in width to the 700 foot length of the platform. The 2,100 square feet of platform area gained comes close to meeting the projected additional area requirement.

Another future expansion element is the conversion of the north concourse-to-street stair to a functioning secondary station entrance. This would require building out fare gates, ticket vending machines and an agent's booth.



Vicinity of Proposed North  
Emergency Exit



Providing secure storage for bicycles is very important at the 16th Street Mission Station. Presently, the bicycle facilities are inside the paid area. As ridership rises, and the activity in the north portion of the concourse increases, the bicycles are a potential obstruction. There is a substantial underutilized storage area at the south end of the concourse that could easily be developed as a secure bicycle facility. Construction of such a facility can take place whenever an agreement is negotiated with a concession operator. A similar facility, recently opened at Embarcadero Station, provides a model.

The project will be constructed in several phases and conform to BART's Station Design Criteria current at the time of construction. The criteria establish a high level of engineering, quality and durability for new station construction. In addition, high quality durable materials will be used for finishes in an existing station. BART will be running trains through the station and the station will be open to the public during construction. Construction spanning the platform or trackway will be performed during limited hours.

## 6.6 Preliminary Cost Estimate

**Table 6: Summary of Project Costs**

<b>Project Phase</b>	<b>Adjusted Cost</b>
Phase 1 - New South Emergency Stair	\$ 2,210,670
Phase 2 - Paid Area Expansion and New North Platform Stairs	\$ 2,197,388
Phase 3 - New North Emergency Stair to Street Level	\$ 2,261,490
Phase 4 - Reconfigure Paid Area: New Fair Gate Array and Agent's Booth	\$ 3,366,812
Phase 5 - Replace Street Elevator	\$ 1,732,500
Future Phase 6 - Bicycle Storage Facility	\$ 796,950
Future Phase 7 - Platform Screen Doors	\$ 9,528,750
Future Phase 8 - Secondary Entrance: Faire Gate Array and Agent's Booth	\$ 2,097,641
Total	\$ 24,192,201
<b>Rounded Total</b>	<b>\$ 24.2 million</b>



# **7.0 Appendices**

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## Appendix A – Capacity Plan Methodology and Assumptions

### 1.0 Outline

1.1 The preliminary conceptual construction cost estimate (estimate) is comprised of the following integral parts:

- A. Introduction
- B. Conceptual Cost Estimate for three stations
  - 1. El Cerrito Del Norte Station
  - 2. Ashby Station
  - 3. Ashby Station – Shutdown Option
  - 4. 16<sup>th</sup> Street Station
- C. Constructibility for three stations
  - 1. El Cerrito Del Norte Station
  - 2. Ashby Station
  - 3. 16<sup>th</sup> Street Station

### 2.0 Scope of Work

2.1 The estimate has been prepared based on the following information:

- A. Conceptual floor plans for the three stations received 05/27/03.
- B. As-built drawings for El Cerrito Del Norte, Ashby and 16<sup>th</sup> Street stations (reference only).
- C. Observations during the site visits to El Cerrito Del Norte, on 05/28/03.
- D. Engineer's comments on station upgrade and enhancements (field notes from station visits).
- E. Review comments from team members.
- F. Various email information from architects.

2.2 For Ashby Station only, compare the cost of the multi-phased construction of the station expansion vs. a single phased or minimum-phased construction with station shutdown.

### 3.0 Assumptions

3.1 The estimate specifically excludes the following:

- A. Costs for existing facilities enhancement
- B. Costs for existing equipment or system upgrade
- C. New radio communication, train control and SCADA system (assumed to use existing system)
- D. Costs for right-of-ways and land acquisition if required
- E. Costs for operation/maintenance
- F. Costs for Environmental Impact Assessment if required
- G. Seismic upgrade to existing facilities
- H. ITS
- I. Legal and accounting expenses
- J. Community outreach
- K. Escalation

It is assumed that the above items, if needed, are included elsewhere in the owner's overall project budget.

3.2 The estimate is based on one general contract for one station.

- 3.3 All costs are based on present worth costs at mid-year 2003.
- 3.4 Allowances have been used for items which are required but are not able to be defined at this time.
- 3.5 It is assumed that the quality of new construction will match with the existing BART Design Criteria, NFPA 130, and California Building Codes.
- 3.6 The unit prices are composite unit prices which include costs for material, labor, equipment and subcontractor/supplier's mark-ups.
- 3.7 A mark-up of 26.5% of direct construction costs has been used for general contractor's general conditions, overhead and profit. This rate is comprised of 15% for general conditions and compounded with a 10% for overhead and profit.
- 3.8 A 25% rate has been included for design development, construction and estimating contingencies due to the conceptual nature of the scope. This is deemed to be the minimum prudent allowance considering the level of scope development and information available at the time of the estimate.
- 3.9 BART soft cost for project development has been included for at 41% of total estimated construction cost based on BART's historical record on various sizes of projects from small local projects to large extension projects. This is for design services, construction management services and BART project administration.
- 3.10 Items affecting the cost estimate include, but are not limited to, the following:  
Modifications to the scope of work included in this estimate.  
Unforeseen sub-surface conditions.  
Special phasing requirements.  
Restrictive technical specifications or excessive contract conditions.  
Any specified item of equipment, material, or product that cannot be obtained from at least three different sources.  
Any other non-competitive bid situations.
- 3.11 This estimate has been prepared using accepted practices and it represents our opinion of probable construction costs. We make no other warranties, either expressed or implied, and are not responsible for the interpretation by other of the contents herein the cost estimate.
- 3.12 Please note that the estimate has been based on very preliminary and limited information and it only serves as a general guideline for more specific and detailed studies in the future.

#### 4.0 Basis for Pricing

In pricing the estimate, we have made references to the following sources for cost data:

- A. Historical cost data for BART projects (for AFC equipment, elevators, escalators, stairways)

- B. Historical cost data of similar projects (general use for building up unit costs)
- C. 2003 RS Means Building Construction Cost Data by RS Means (general use for building up unit costs)
- D. 2003 Current Construction Costs by Saylor Publications (general use for building up unit costs)
- E. Cost Estimates for Pleasant Hill Station and Union City prepared by Manna Consultants, Inc
- F. Conceptual Construction Cost Estimate, VTA Impacts on BART Core System Stations Phase One Preliminary Study, prepared by M. Lee Corporation, dated 2/28/03 (Rev 2)

5.0 Abbreviations used in the estimate:

EA	Each
CY	Cubic Yard
LF	Linear Foot
LS	Lump Sum
N/A	Not Applicable
SF	Square Foot
AFC	Automatic Fare Collection (Equipment)

## Appendix B Constructability and Logistics

An important requirement for all of the options developed in the station planning process is that the station be kept open and service be uninterrupted during construction. Vertical circulation between the concourse and platform, and between the concourse and the street, must be maintained at least at its present capacity at all times. Construction of the south emergency stairs early in the project makes it possible to meet this requirement.

Construction of the proposed north emergency stairs involves significant structural work and street level modifications that will extend the duration of this portion of the project. Property acquisition and issues associated with modifications to the sidewalk and utilities will add complexity. By contrast, the north paid area expansion and improved platform stairs will be relatively straightforward because the floor structure is already in place. To serve as a continuous exit system, completion of these two elements should be scheduled to occur concurrently.

Train control, electrical switchgear, and other essential facilities are housed at the south end of the concourse level. The traction power substation room is aligned above the tracks at the north end of the concourse level. Cost and logistical problems are associated with relocating these facilities. Based on these constraints, the project design team considered only options that retained these facilities in place.

The structural system of the existing station will remain in place in all of the options considered by the design team. A portion of the station box wall will be removed to provide access to the two new emergency stairs. Concrete encased steel beams support both the concourse floor and ceiling. The beam spacing is 17'-6". The platform itself is constructed of concrete and is supported by the floor of the station box. The platform width is consistent along the length of the boarding area. The existing structural elements and essential equipment rooms will be major determinants of the layout of the new vertical circulation stairs.

### Concourse Expansion

Like many underground stations constructed relatively early in BART's development, 16<sup>th</sup> Street Mission has only one fare gate array. The small footprint around the single fare gate array currently results in congestion during commute hours. In emergency exit situations, the limited capacity of this area may be a choke point. Additional fare gates, vertical circulation elements, and additional emergency exits are proposed as a part of the Capacity Expansion Project.

The existing street access elevator is located outside the paid area, adjacent to the northeast entrance stair and escalator. This places it in the center of the station. However, this configuration does not allow for a direct line of sight from the existing agents booth. The platform elevator is located at the north end of the station within the paid area. This prevents lost fares from individuals bypassing the fare gates.

16<sup>th</sup> Street Mission Station is a major urban neighborhood station. The two station plazas are filled with people during commute hours. Corridors within the station centroid are quite narrow – particularly in the areas of the existing elevator and fare gate array.

### Vertical Circulation

The platform escalator and stairs are concentrated near the center of the station. Studies of passenger behavior show that trains will be more evenly loaded when platform access is distributed along the length of the boarding area. The ability to add stairs is limited by the location of the traction power substation room at the north end of the concourse paid area and by the location of the train control and electrical switchgear rooms at the south end of the concourse paid area. In addition, ventilation shafts and major conduit banks serving the under platform utility chase limit the area available to construct new vertical circulation.

### Emergency-Only Stairs

The new north stair from the paid area does not provide sufficient exit width required by the ridership projected for 2025. The addition of emergency exit stairs from the south end of the platform level and north end of the concourse level is required. The California Building Code considers not only the capacity (width) of an exit, but also the distance that must be traveled to reach it, and the time it takes to do so.

Construction of the proposed new south emergency stair can take place very early in the Capacity Expansion Project, allowing the existing north platform emergency stair to be taken out of service temporarily.

The new emergency stairs will need to be appropriately enclosed to prevent unauthorized entry. Doing so presents an opportunity to make the stair enclosure an attractive addition to the Mission Street environment. The enclosure should be designed with vertical and/or horizontal glazing to introduce natural light. Two options are suggested for the north emergency stair: The first would be a small enclosure within a widened sidewalk bulb. A second option would take advantage of an underutilized parcel of SFUSD property. If this property were to be developed, the stair enclosure could be integrated with the future development – either as part of a small sheltered plaza, or as part of a future building lobby. Having additional space to develop the enclosure would make it more usable as a functional secondary station entrance. Control and security would also be improved. There would be added costs associated with the increased amount of underground construction, but the area between the stair and the existing station box could be used to create a more generous free area expansion for the secondary entrance, with more space for fare collection equipment, maps and transit information display.

### **Fare Collection**

The 2025 projections indicate a need for six new fare gates. The confined width created by the existing perimeter walls and structure limits the number of gates that can be added at the existing array. The first step will be to add four new fare gates and one accessible gate to create an entrance from the Northeast plaza. In the future, four additional fare gates can be added at the proposed secondary station entrance. The additional gates also improve the exiting capacity. Fare collection functions must also be continuously maintained during construction. The existing south fare gate array can remain in service at all times during construction.

### **Facilities for BART Staff**

16<sup>th</sup> Street Mission Station falls short of current design criteria for BART employee facilities such as restrooms and break areas. Improvement of the existing staff restroom will be part of the paid area improvements.

The restricted concourse area and structural system afford no space to expand facilities for the public. BART's current policy does not require public restrooms. Upgrading the existing public facilities to ADA requirements would necessitate relocating them to the free area. Such a location is not appropriate due to security concerns.

### **ADA Accessibility**

With the exception noted above, all improvements will meet current Station Design Criteria and ADA accessibility requirements. Extensive renovation of existing facilities will address a broad range of accessibility features. These include:

- An accessible path from the street
- A new fully accessible fare gate at each gate array
- New accessible elevators
- Signage
- Fire alarm strobes and voice annunciators

### **Bicycle Access**

The paid area of the existing concourse level includes bicycle racks. The station's location within the Mission District makes it an important station for bicyclists. The existing bicycle racks will need to be reconfigured to permit construction of the new fare gate array and paid area expansion. This is an opportunity to upgrade the racks and be consistent with BART's current guidelines. An additional vendor-



operated bicycle storage facility can be added along the existing southeast corridor as part of the proposed concourse development.

## Construction Phasing

1. **New South Emergency Stair**
  - Construct new floor opening at south end of concourse level.
  - Remove portion of existing station box wall between column lines 1 and 2. Excavate for new emergency exit stair
  - Construct new structural stair well from concourse to street level. Note: Exact location of stair termination and head house at street level to be determined.
  - Widen sidewalk and construct stair headhouse, with glazed upper enclosure and exit-only doors.
  - Prefabricate and install stairs.
  - Construct stair enclosure from platform through concourse.
  - Provide new directional signage.
  
2. **Paid Area Expansion and New North Platform Stairs**
  - New south emergency stair must be in service.
  - Maintain existing paid area in operation and emergency egress routes during construction. Existing substation remains.
  - Remove existing wall and doors on column line 29. Existing elevator shaft to remain.
  - Remove existing north emergency exit stair and associated walls.
  - Construct new concourse expansion between column lines 29 and 32 on the west side and between column lines 29 and 31 on the east side, nominally level with existing concourse paid area. Provide new floor and wall finishes, lighting, and signage in Paid Area expansion. Extend fire sprinkler system to expansion.
  - Construct new prefabricated public access stair to platform level.
  - Repair platform floor finishes.
  - Upgrade existing platform elevator to conform to current regulations and accessibility codes.
  
3. **New North Emergency Stair to Street Level**
  - Remove portion of existing station box wall between column lines 31 and 32. Excavate for new emergency exit stair.
  - Construct new structural stair well from concourse to street level. Note: Exact location of stair termination and head house at street level to be determined.
  - Widen sidewalk and construct stair headhouse, with glazed upper enclosure and exit-only doors.
  - Construct stairs.
  - Provide new directional signage.
  - Concurrent completion with the expansion of the paid area and new north platform stairs will provide a new continuous exit system from the north end of the station.
  
4. **Reconfigure Paid Area: New Fare Gate Array and Agent's Booth**
  - Maintain existing paid area in operation and emergency egress routes during construction.
  - Install new AFC equipment, four new fare gates and glass railing on column line 22 between the existing stair and East concourse wall.
  - Construct new agent's booth, accessible fare gate, and glass railing adjacent to the existing escalator.

- Construct new glass railing from existing fare gate array to existing escalator.
  - Repair floor finishes.
  - Remove existing agent's booth and glass railing along the East side of the concourse level.
  - Install new ticket vending machines along the east wall of the concourse level
  - Install new bicycle racks inside paid area and as shown in the free area.
  - Install new add-fare machines adjacent to new fare gate array.
  - Make modifications to Station Agent's restroom for ADA compliance.
5. Replace Street Elevator
- Maintain existing paid area in operation and emergency egress routes during construction.
  - Construct new street level elevator adjacent to existing elevator shaft, utilizing existing machine room if possible.
  - Remove existing street access elevator shaft.
  - Repair existing finishes.
6. Bicycle Storage Facility
- Construct new vendor operated bicycle storage between column lines 3 and 10 on the east side of the concourse level. Modify existing utility rooms adjacent to new bicycle storage area. Include new finishes, lighting, and signage.
  - Note: The sequence of this phase is independent of other work elements.
7. Platform Screen Doors
- Install platform screen doors and associated signage.
8. Secondary Entrance: Fare Gate Array and Agent's Booth
- Existing expanded paid area remains and functions during construction. Maintain emergency egress routes during construction.
  - Install new AFC equipment, four new fare gates, and glass railing on column line 27 between the existing stair and West concourse wall.
  - Construct new agent's booth and glass railing from existing elevator to new agent's booth.
  - Repair floor finishes.
  - Remove emergency exit doors on column line 31.
  - Install new ticket vending machines in wall on column line 32.

## Appendix C Cost Detail

Description	Quantity	Unit	Unit Price	Item Cost	Unadjusted Construction Cost
<b>Phase 1 - New South Emergency Stair</b>					
Traffic control and maintenance during construction	1	LS	\$ 20,000	\$ 20,000	
Restore existing sidewalk	1	LS	\$ 12,000	\$ 12,000	
Utility relocation (allow)	1	LS	\$ 100,000	\$ 100,000	
General demo/removals	1	LS	\$ 200,000	\$ 200,000	
Construct new floor opening	1	LS	\$ 10,000	\$ 10,000	
Construct new structural stair well	1	EA	\$ 75,000	\$ 75,000	
Construct stair headhouse (w/glazed upper enclosure and exit-only doors)	1	EA	\$ 25,000	\$ 25,000	
New emergency stairs	1	EA	\$ 350,000	\$ 350,000	
Construct stair finishes and handrails	1	EA	\$ 10,000	\$ 10,000	
Widen sidewalks	1	LS	\$ 5,000	\$ 5,000	
Provide new signage	1	LS	\$ 50,000	\$ 50,000	
Miscellaneous	1	LS	\$ 100,000	\$ 100,000	
				Subtotal Phase 1	\$ 957,000
<b>Phase 2 - Paid Area Expansion and New North Platform Stairs</b>					
General demo/removals	1	LS	\$ 50,000	\$ 50,000	
Remove existing stair and associated walls	1	LS	\$ 25,000	\$ 25,000	
Provide new wall/floor finishes and lighting and signage in expanded pay area	1,750	SF	\$ 100	\$ 175,000	
Extend concourse ceiling finishes	1,750	SF	\$ 50	\$ 87,500	
Extend fire sprinkler system	1,750	SF	\$ 15	\$ 26,250	
Construct prefabricated stair	1	EA	\$ 350,000	\$ 350,000	
Repair platform floor finishes	1,750	SF	\$ 50	\$ 87,500	
Upgrade existing platform elevator (current regulations and accessibility)	1	LS	\$ 50,000	\$ 50,000	
Miscellaneous	1	LS	\$ 100,000	\$ 100,000	
				Subtotal Phase 2	\$ 951,250
<b>Phase 3 - New North Emergency Stair to Street Level</b>					
Traffic control and maintenance during construction	1	LS	\$ 20,000	\$ 20,000	
Restore existing sidewalk	1	LS	\$ 12,000	\$ 12,000	
Utility relocation (allow)	1	LS	\$ 100,000	\$ 100,000	
General demo/removals	1	LS	\$ 200,000	\$ 200,000	
Construct new stair well	1	EA	\$ 100,000	\$ 100,000	
Construct stair headhouse (w/glazed upper enclosure and exit-only doors)	1	EA	\$ 25,000	\$ 25,000	
New emergency stairs	1	EA	\$ 350,000	\$ 350,000	
Construct stair finishes and handrails	1	EA	\$ 10,000	\$ 10,000	
Widen sidewalk	1	LS	\$ 12,000	\$ 12,000	
Provide new signage	1	LS	\$ 50,000	\$ 50,000	
Miscellaneous	1	LS	\$ 100,000	\$ 100,000	
				Subtotal Phase 3	\$ 979,000



<b>Construction, Unadjusted Total</b>				<b>\$ 10,472,814</b>
Mobilization @		8%		\$ 837,825
Adjusted for Mobilization				\$ 11,310,639
General Contractor's General Conditions, Overhead and Profit @		26.5%		\$ 2,997,319
Contingency on Construction @		25%		\$ 2,827,660
<b>Construction, Total</b>				<b>\$ 17,135,619</b>
Project Development @		41%		\$ 7,025,604
Design Services		(12%)		
Construction Management Services		(4%)		
Project Administration (BART)		(25%)		
<b>Total Project Budget Estimate (Present Worth)</b>				<b>\$ 24,161,222</b>
				Say <b>\$24.2 million</b>
Total of Adjustments on Unadjusted Construction Cost:				
[(100%+Mobilization)*(100%+General Contractor+Contingency)]*(100%+Project Development)				
[1.08 x 1.515] x 1.41 = 2.31				
<b>Summary of Project Costs</b>				
	<b>Phase</b>	<b>Unadjusted Costs</b>	<b>Adjustment</b>	<b>Adjusted Cost</b>
	1	\$ 957,000	2.31	\$ 2,210,670
	2	\$ 951,250	2.31	\$ 2,197,388
	3	\$ 979,000	2.31	\$ 2,261,490
	4	\$ 1,457,494	2.31	\$ 3,366,812
	5	\$ 750,000	2.31	\$ 1,732,500
	6 (Future)	\$ 345,000	2.31	\$ 796,950
	7 (Future)	\$ 4,125,000	2.31	\$ 9,528,750
	8 (Future)	\$ 908,070	2.31	\$ 2,097,641
	Total	\$ 10,472,814		\$ 24,192,201
				Say <b>\$24.2 million</b>
<b>Notes:</b>				
1. To cover Bart's request for alternative emergency exit at existing school property: cost is approximately \$250,000.				
Mike de Guzman, P.E. Manna Consultants, Inc. June 23, 2003				

## **Appendix D Architectural and Design Considerations**