

FINAL REPORT

Capacity Implementation Strategy and Modernization Concept Plan for Embarcadero and Montgomery Stations

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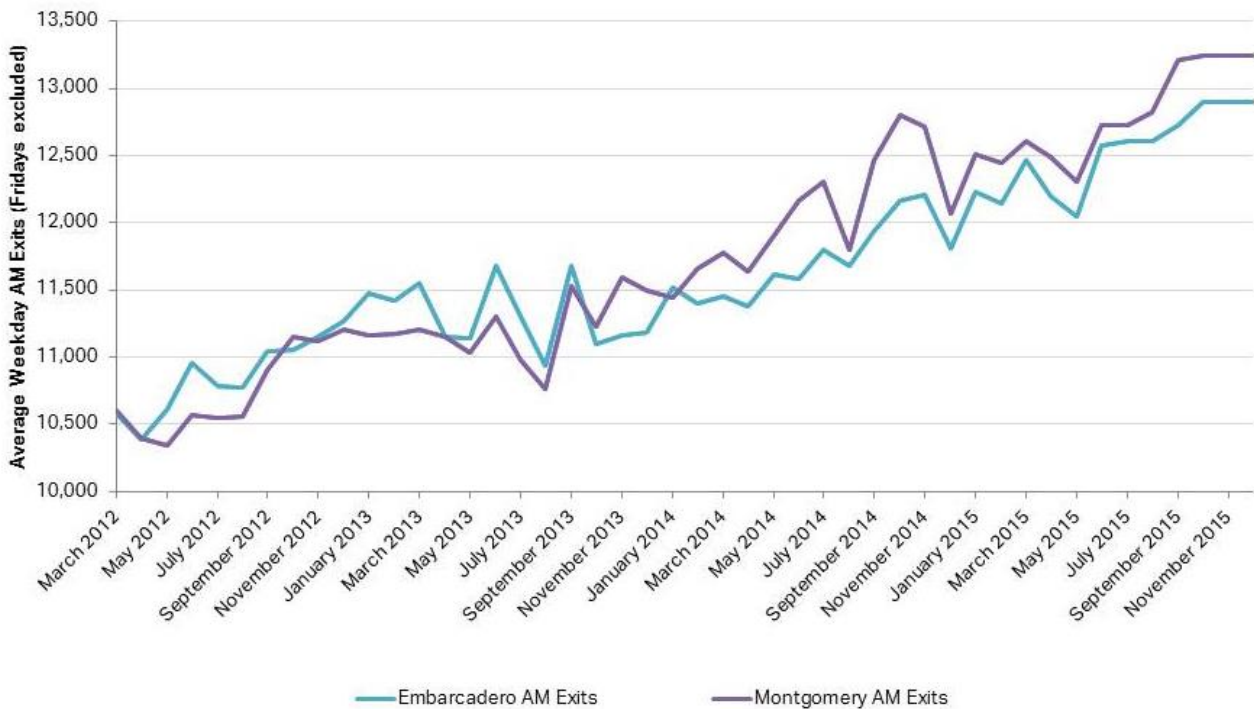
1.0 Executive Summary

Embarcadero and Montgomery are the two busiest stations in the San Francisco Bay Area Rapid Transit District (BART) system. Located in Downtown San Francisco, they serve thousands of commuters working in the Financial District and South of Market, tourists heading for the Embarcadero, and special events such as Giants games, parades, and New Year’s Eve fireworks. As BART ridership has grown at the two stations (**Figure 1**), the platforms have become more crowded; and as the stations age, components need to be replaced and updated.

This comprehensive Capacity Implementation Strategy and Modernization Concept Plan lays out a phased program for expanding and upgrading the stations to handle the current and future ridership in a safe and efficient manner. Previous studies have defined future capacity needs and identified projects to meet those needs. One purpose of the present study was to identify a configuration for each station incorporating these projects that was feasible from an operating perspective. The other purpose was to develop an implementation plan with a logical sequencing of projects that incrementally addresses the need for additional capacity.

Figure 1: Embarcadero and Montgomery Peak Period Ridership Growth

Peak period ridership at BART’s two busiest stations has been increasing at over six percent annually in recent years



Source: BART, 2016

1.1 Need

Development of the Capacity Implementation Strategy and Modernization Concept Plan was prompted by anticipated future crowding in the stations and the accumulated wear and tear of 40 years of use. Capacity implementation and station modernization were integrated to achieve synergies and increase the Plan's overall value. A key consideration in the process was to ensure that capacity and modernization projects would not conflict with plans under consideration or in development by the City or stakeholder agencies.

1.1.1 Capacity Needs

Previous studies have defined future capacity needs at Embarcadero and Montgomery and have identified projects to meet those needs. The SVRT Core Stations Modifications Study found that, for both stations, existing vertical circulation capacity would fail to meet the performance targets in the AM peak hour, and existing platform capacity would fail to meet performance targets in the PM peak hour.

Though current conditions at the stations do not exceed performance targets, they offer insight into anticipated future crowding. On weekday mornings, escalators and stairways from the platform level are frequently unable to clear queues of passengers before the arrival of subsequent trains. Crowding at the stations is even more noticeable during weekday afternoons and evenings, as passengers stand in queues as they wait for their trains, making circulation along the platform difficult.

Embarcadero and Montgomery serve crowds headed for San Francisco Giants games and other events at AT&T Park. They also serve passengers attending festivals, parades, and other events in Downtown San Francisco and along the city's waterfront. Crowding at both stations during special events can be particularly severe and require special accommodations.

1.1.2 Modernization Needs

The goal of BART's Station Modernization Program for key stations is to improve the customer experience. Modernization needs at Embarcadero and Montgomery include:

- State of good repair – maintaining elements and systems that are essential to providing reliable and attractive service
- Clean and orderly appearance – removing clutter and introducing coordinated approaches to station operation
- Operational efficiencies – implementing procedures and technology to increase efficiency, security, and sustainability

1.2 Previous Capacity Studies

Several past studies evaluated capacity needs at the two stations:

- Silicon Valley Rapid Transit (SVRT) Core Stations Modifications Study and Constructability and Construction Staging Analysis (2009)
- Sustainable Communities Operations Analysis (2013)
- Transportation Sustainability Program (2014)

The SVRT Core Stations Modifications Study evaluated 2030 ridership forecasts with respect to performance targets for platforms, queue sizes, queue wait times, and emergency evacuation, based on industry-wide standards. As noted above, the analysis determined that in the 2030 AM peak hour, existing vertical circulation would fail to meet the performance targets in the AM peak hour, and existing platform capacity would fail to provide the minimum area per passenger in the PM peak hour.

These studies recommended a range of capacity improvements to meet the specified demands for additional platform space and vertical circulation to accommodate future ridership, which include the installation of new platforms outside the existing tracks. Portions of the load-bearing walls at each station would be removed to accommodate door openings. Portions of the concourse roof and floor would be removed to accommodate new escalators, elevators, and stairwells. The new side platforms would be compatible with trains of BART's existing two-door cars as well future trains of three-door cars. Platform doors would maximize passenger safety.

Embarcadero's platform is narrower than other Downtown San Francisco stations because the platform must fit within the taper of the tracks leading into the Transbay Tube. Therefore, Embarcadero has less circulation and queuing space at platform level, and less ability to accommodate additional vertical circulation.

The SVRT Core Stations Modifications Study recommended that two new side platforms be added to Embarcadero, one serving each direction of travel. The eastbound side platform would be built first because platform crowding is more severe in the eastbound direction. The wider platform at Montgomery has slightly less crowding during the weekday PM peak period. Therefore, the Study recommended only adding an eastbound side platform at Montgomery.

This plan advances the SVRT Core Stations Modifications Study recommendations for each station, developing specific concourse layouts and platform operating schemes, vetting them with the City and stakeholders, and identifying a reasonable capacity implementation strategy.

The analysis considered potential operating schemes for the (existing) center and (new) side platforms. Through a performance analysis, the schemes were rated with respect to how evenly they distributed passengers and resulted in the least crowded escalators and platforms. The preferred operating scheme provided the basis for pedestrian flow models that confirmed the operational feasibility of the recommended alternative concept.

Several options for modifying or redesigning the concourse layout to accommodate the new side platforms and associated vertical circulation were considered. With input from BART staff, stakeholders, and TAC members, the "unified paid area" concept was ultimately selected as the recommended alternative concept for each station. This concourse layout would best facilitate navigation and orientation and minimize labor and equipment requirements.

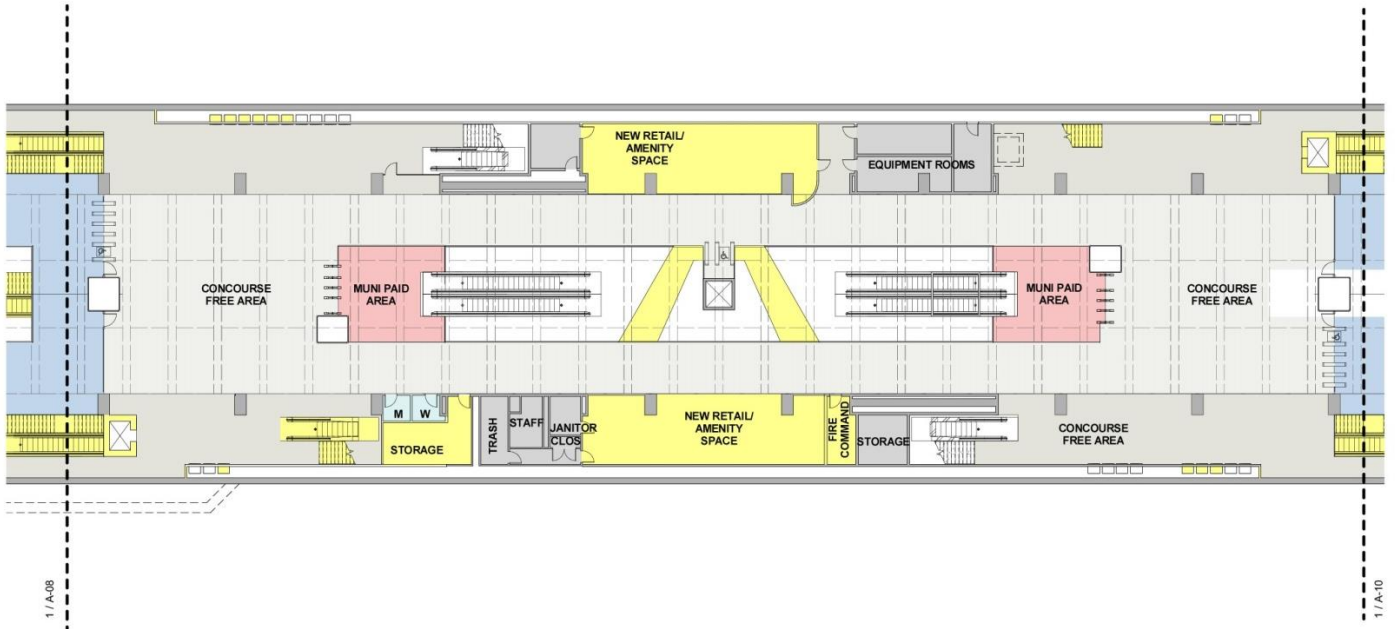
1.3 Development of Modernization Concepts

Starting with a master list of improvement items previously developed under BART's Station Modernization Program, a field inventory of existing conditions and input from BART staff were used to determine what is needed to bring the stations up to BART standards and current codes. Needs were identified in station walk-through meetings and interviews with maintenance and operations staff.

Next, the overall qualities and potential of the stations were assessed and various ideas were developed to address the problems found. Initially, two alternate modernization concepts were developed for each station. After review for compatibility with the capacity projects, the two modernization concepts were integrated into a single modernization concept plan for each station. This approach allows flexibility with respect to phasing and recognizes that individual projects will require their own design processes. Coordination of the various projects will be an ongoing effort as they are planned and designed, with implications that cannot be completely anticipated at this time.

Plan drawings of the Modernization Concept Plans are presented in Section 6.0. An excerpt from the plans is shown as an example in **Figure 2**. A Master Project List has been developed for each station that includes all projects in the Modernization Concept Plan. Each Master Project List is organized into twelve areas of concern. The complete Master Project List is provided in the Appendix.

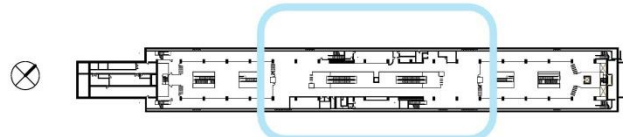
Figure 2: Modernization Concept Plan (Sample)



1 EMBARCADERO STATION (CAPACITY SCOPE) CONCOURSE - SECTOR B
A-09 Scale: 1/16" = 1'-0"

PLAN LEGEND - COLOR SCHEMES

CONCOURSE "FREE" AREA	PROPOSED MODERNIZATION SCOPE
BART "PAID" AREA	PROPOSED CAPACITY SCOPE
MUNI "PAID" AREA	
MECHANICAL/ UTILITY AREAS	



Source: Robin Chiang & Co., 2015

1.4 Capacity and Modernization Projects

Projects are the basic building blocks for the implementation plans at both stations. The recommended phasing strategy organizes projects into three timeframes: near term (0–10 years), middle term (5–15 years), and long term (10–20 years), as shown in **Figure 3**.

“Early Wins” projects include basic clean up, maintenance and quick low-cost repairs. Standing space will be increased by removing, relocating or replacing objects that clutter the platforms, including new seating. Signage, handrails, and detection devices will be upgraded to be ADA-compliant. Vending, ATM and change machines will be added to the concourse ticketing areas.

Other early win projects address safety, security and fare evasion, such lighting maintenance and relocating objects to improve sightlines across the concourse. Decision making for passengers will be made easier with better wayfinding signage, less signage clutter, better-organized station advertising, an improved public address (PA) system, and better display of real-time information.

Figure 3: Recommended Phasing Strategy



Source: AECOM, 2015

Beyond the “Early Wins,” accessibility improvements will focus on adding a new elevator between the concourse and the platform and replacing the old concourse to platform elevators with larger models that also have more glass walls for visibility. New security cameras will be installed. Station-specific retail guidelines will be prepared to better define physical requirements for retail establishments. Station agent booths will be renovated or replaced, and design changes will be developed to address security concerns, allowing BART to re-open public restrooms.

As capacity constraints become more critical, a series of expansion projects will be implemented as needed, starting with additional escalator and stair capacity between the concourse and the BART platforms. Next, platform screen doors will be added. Finally, new side platforms will be added along with a reconfigured concourse to serve them.

The SVRT Core Stations Modifications Study introduced in Section 1.2 considered a number of alternatives to meet future capacity needs. The preferred alternatives – two new side platforms at Embarcadero and one new side platform at Montgomery – were found to be the only options that provide sufficient platform area and easily accommodate new vertical circulation elements, while minimizing disruptions to street traffic during construction. Costs for the side platforms were estimated at \$280 million for Embarcadero and \$175 million for Montgomery (both escalated to 2015 dollars).

The Constructability and Construction Staging Analysis introduced in Section 1.2 identified two potential solutions for construction of the new side platforms – using either the perimeter soil mix wall or mined tunneling method. Both approaches are feasible and compatible with the SVRT Core Stations Modifications preferred alternatives.

The following subsections highlight capacity and modernization projects that are unique to each station.

1.4.1 Embarcadero Projects

From a placemaking perspective, Embarcadero has a number of key assets, including its clear-span symmetry, intuitive configuration and visual connectivity aided by three tiers of ceiling heights. Enhancing this hierarchy presents a significant opportunity to create a grand station. The Embarcadero Modernization Concept Plan envisions a new visual and functional concept for the station, returning facilities and systems to a state of good repair, and replacing elements and components at the end of their useful life.

Near-term (within 10 years) projects at Embarcadero include repair or replacement of damaged glass partitions and installing a new elevator and stair between the concourse and platform levels at the east end of the station. The existing end-of-platform stairway at the east end of the platform would be relocated to the east, flush against the wall of the east vent shaft. A new platform elevator would be installed at the existing location of the stairway. This new elevator would serve as the primary platform elevator for BART and the secondary platform elevator for Muni Metro, while the existing platform elevator in the center of the station would be converted for primary Muni Metro use and secondary BART use.

Middle-term projects (5-15 years out) include a new ceiling at the concourse level with improved lighting, redesign or relocation of fire command center, and installation of a new elevator machine room for the existing concourse to platform elevator. To enhance the experience of entering the station, the entrances and ticketing areas will receive a new wall design, flooring, lighting and ceiling finishes. The new design will integrate better transit information signage and real-time information.

As the need for additional capacity increased, the first improvements would be made on the existing (center) platform, where the two escalator-only wells would be upgraded into shared escalator/stairway wells. As more capacity was needed, platform doors would be installed on the existing platform edges. The next level of capacity enhancement would be construction of the eastbound side platform, followed by the westbound side platform.

The recommended side platform concept for Embarcadero is presented in **Figure 4** and **Figure 5**, showing both potential construction techniques. At the concourse level, the existing paid areas would be expanded to provide access to the new side platforms, shown in **Figure 6** and **Figure 7**. For redundancy, two elevators would connect the concourse to each side platform.

Free-area corridors would be maintained around the perimeter of the concourse level. The width of these corridors would be substantially reduced from current conditions in order to accommodate the vertical circulation serving the side platforms. However, the study recognized that the corridor width shown in **Figure 6** is not adequate. It appears that wider corridors could be built by expanding outside the station box at the most constricted pinch points, but confirming the feasibility of this approach was beyond the scope of this study. A more detailed engineering and constructability assessment is needed.

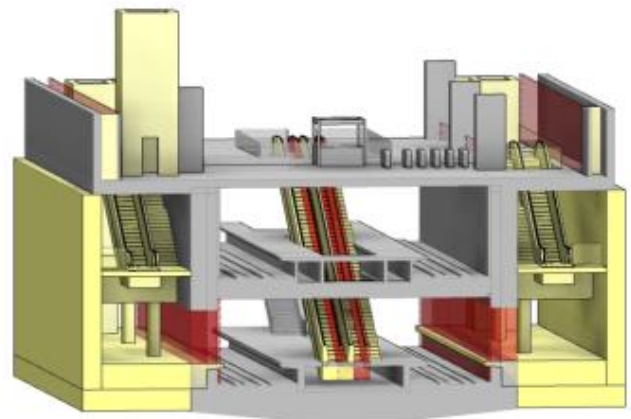
At the platform level, platform doors on the side platforms would separate passengers from the trackway until a train had arrived, as shown in **Figure 8**. This would require removal of portions of the load-bearing station box walls to accommodate openings for the doors.

Figure 4: Conceptual Embarcadero Station Cross-Section
Reflecting mined tunnel construction technique



Source: PGH Wong Engineering, Inc., 2009

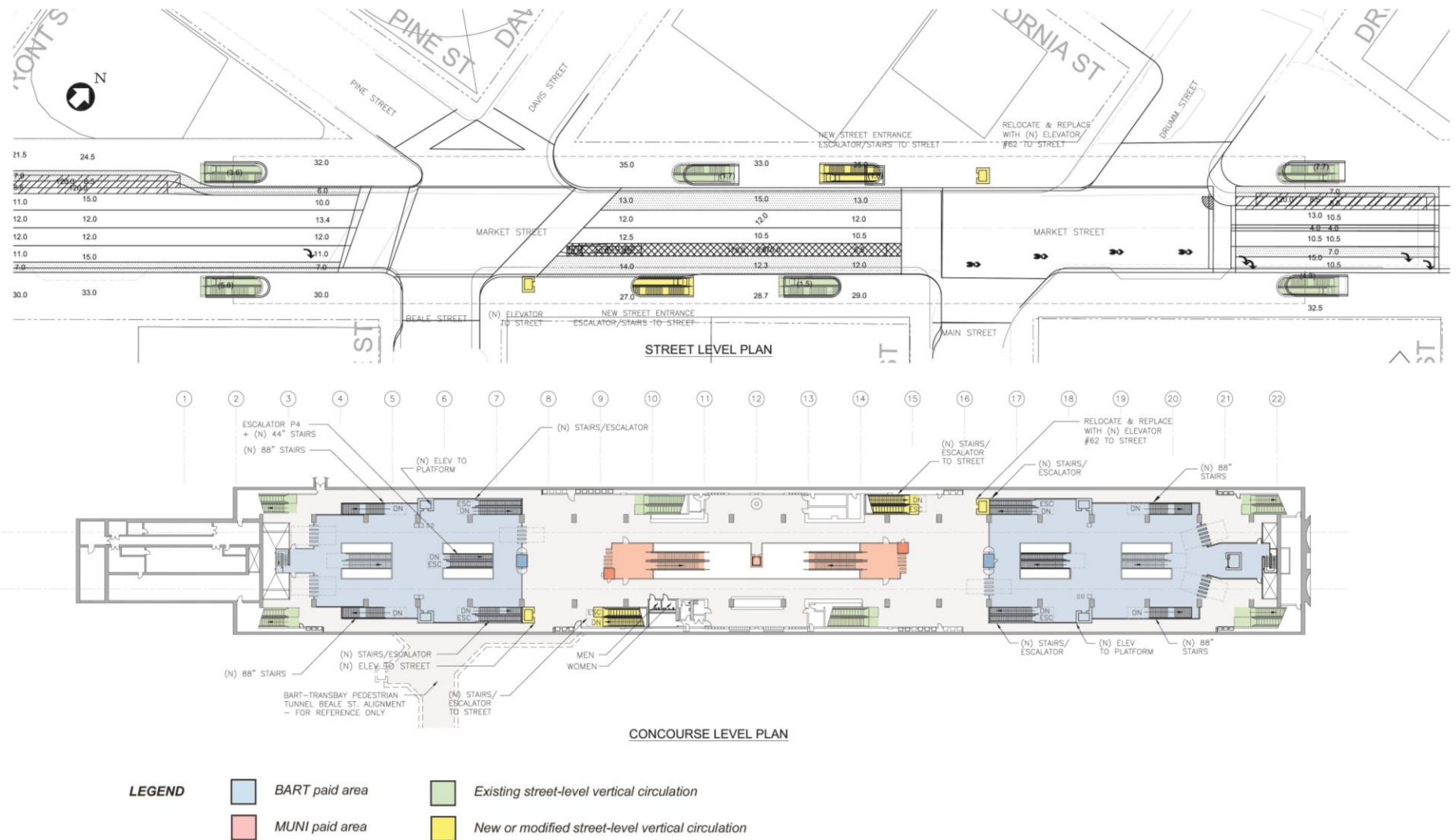
Figure 5: Conceptual Embarcadero Side Platform Access
Reflecting soil mix wall construction technique



Source: Robin Chiang & Co., 2015

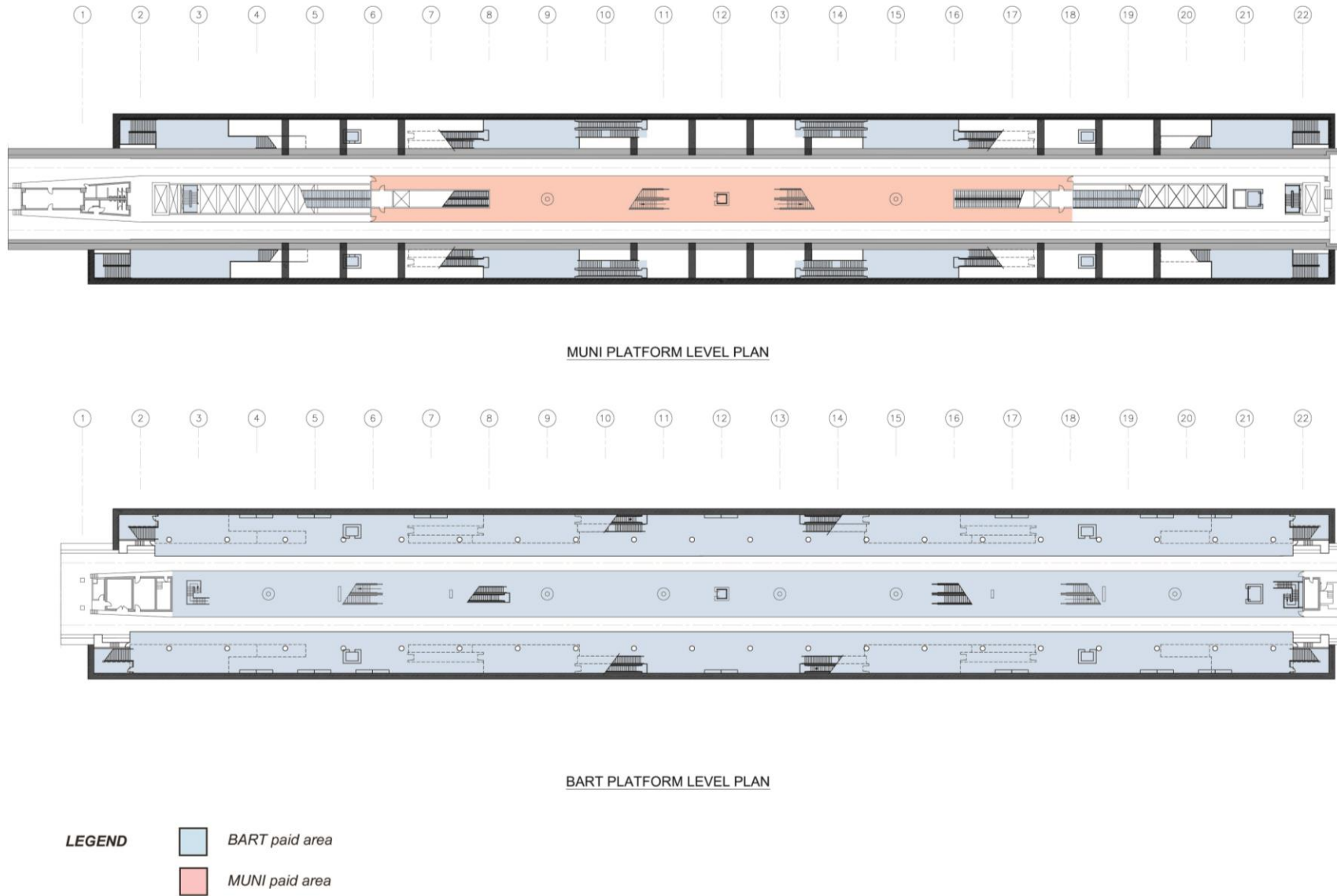
At the concourse level, two additional entrances would be constructed from street level between Beale Street / Davis Street and Main Street / Drumm Street (one entrance each on the north and south sides of Market Street). The existing street elevator would be relocated to the east, while a second street elevator would be installed at the southeast corner of the Market Street / Beale Street / Davis Street / Pine Street intersection.

Figure 6: Embarcadero Capacity Plan – Street and Concourse Levels



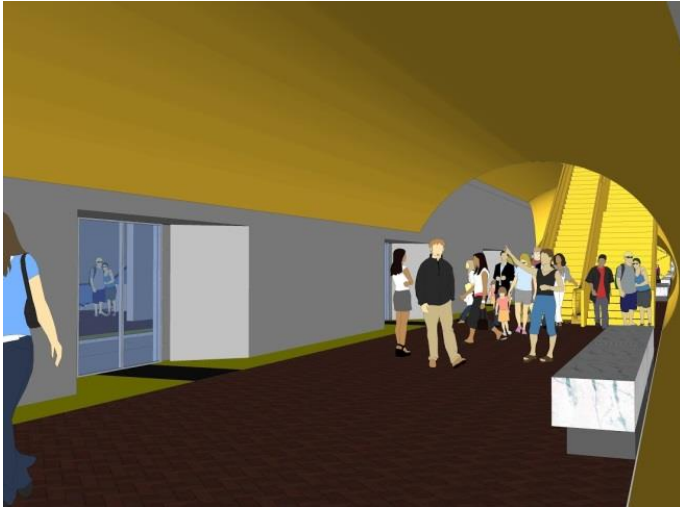
Source: Robin Chiang & Co., 2015

Figure 7: Embarcadero Capacity Plan – Platform Levels



Source: Robin Chiang & Co., 2015

Figure 8: Conceptual Side Platform with Platform Doors
Reflecting mined tunnel construction technique



Source: PGH Wong Engineering, Inc., 2009

1.4.2 Montgomery Projects

From an architectural perspective, Montgomery lacks a general sense of spatial organization, partly due to monotonous finishes and lighting that does not differentiate space or use. New functions have been added in an uncoordinated manner due to lack of guiding principles. The Montgomery Modernization Concept Plan envisions a new visual and functional concept for the station, providing a station experience befitting a major financial district, and returning facilities and systems to a state of good repair.

On the platform level, new features will be developed that better differentiate the station from Powell and identify it as Montgomery. Over time, the platform space will be made more inviting by replacing the dark-colored flooring, drab ceiling finish, and the too-bright lighting over the trackway.

In the near term (within 10 years), underutilized corridors at the concourse level will be reprogrammed to public/staff space to improve circulation, maintenance, safety, security, and overall station appearance. The station break room also will be renovated. In the middle term (5-15 years out), station infrastructure will be upgraded to accommodate planned retail/amenity build-outs and new fan room/ventilation equipment will be installed to address station ventilation issues.

The centroid lobby spaces in front of the fare gates will be opened up by rearranging retail and removing clutter. This near-term project will improve visibility and circulation within 10 years. In the middle term (5-15 years out), the lobby areas will be upgraded and differentiated with a new ceiling design; larger real-time information displays, and better incorporation of public art.

Another middle-term effort (5-15 years out) will differentiate the side aisle ticketing and vending areas from the lobbies and entrances with new flooring and finishes, new ceilings and lighting and a new wall design. Also in the middle term, entrances will be improved and differentiated with new flooring, lighting and finishes, and better transit signage and real-time information. The pinch point between the McKesson Plaza entrance and the west end of the concourse paid area will be addressed, and the long "hallway" at the Sutter/Sansome entrance will be renovated.

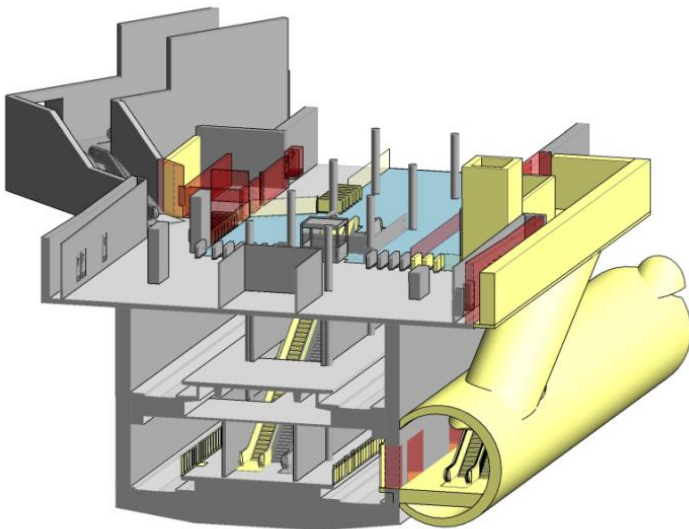
A new elevator will be installed at the west end of the existing platform. This new elevator would serve as the primary platform elevator for Muni Metro and the secondary platform elevator for BART, while the existing platform elevator at the east end of the existing platform will be converted to serve as the primary BART platform elevator and secondary Muni Metro use.

As the need for additional capacity increased, the first improvements would be made to the existing (center) platform, where a new shared escalator/stairway well and an end-of-platform stairway would be constructed in the eastern half of the platform. As more capacity was needed, platform doors would be installed on the existing platform edges. The next level of capacity enhancement would be construction of the eastbound side platform.

The recommended side platform concept for Montgomery is illustrated in **Figure 9**. For redundancy, two elevators would connect the concourse to the side platform. The existing paid areas would be expanded to provide access to the new side platform, shown in **Figure 10** and **Figure 11**, and the free-area corridor running east-west through the station would be relocated from the south side of the station spine to the north side.

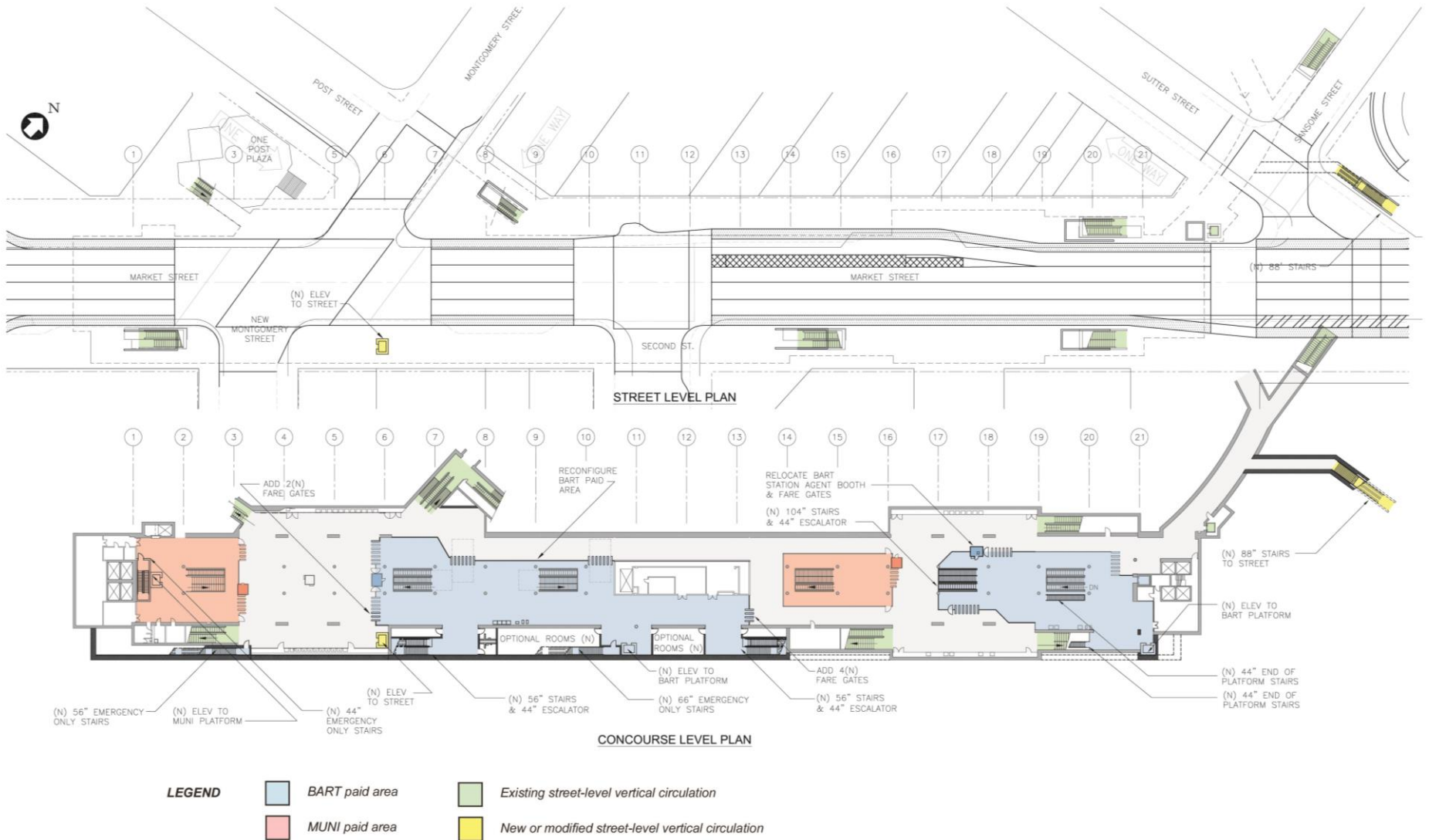
At the concourse level, a new entrance would be constructed from street level, tying into the existing corridor that connects into the Citigroup Center (One Sansome Street) complex and the station entrance on the west side of Sansome Street north of Sutter Street. The new station entrance would surface as a stairway along the north side of Sutter Street, between Sansome Street and Market Street. A new street elevator would be constructed along the south side of Market Street between New Montgomery Street and Second Street.

Figure 9: Conceptual Montgomery Side Platform Access
Reflecting mined tunnel construction technique



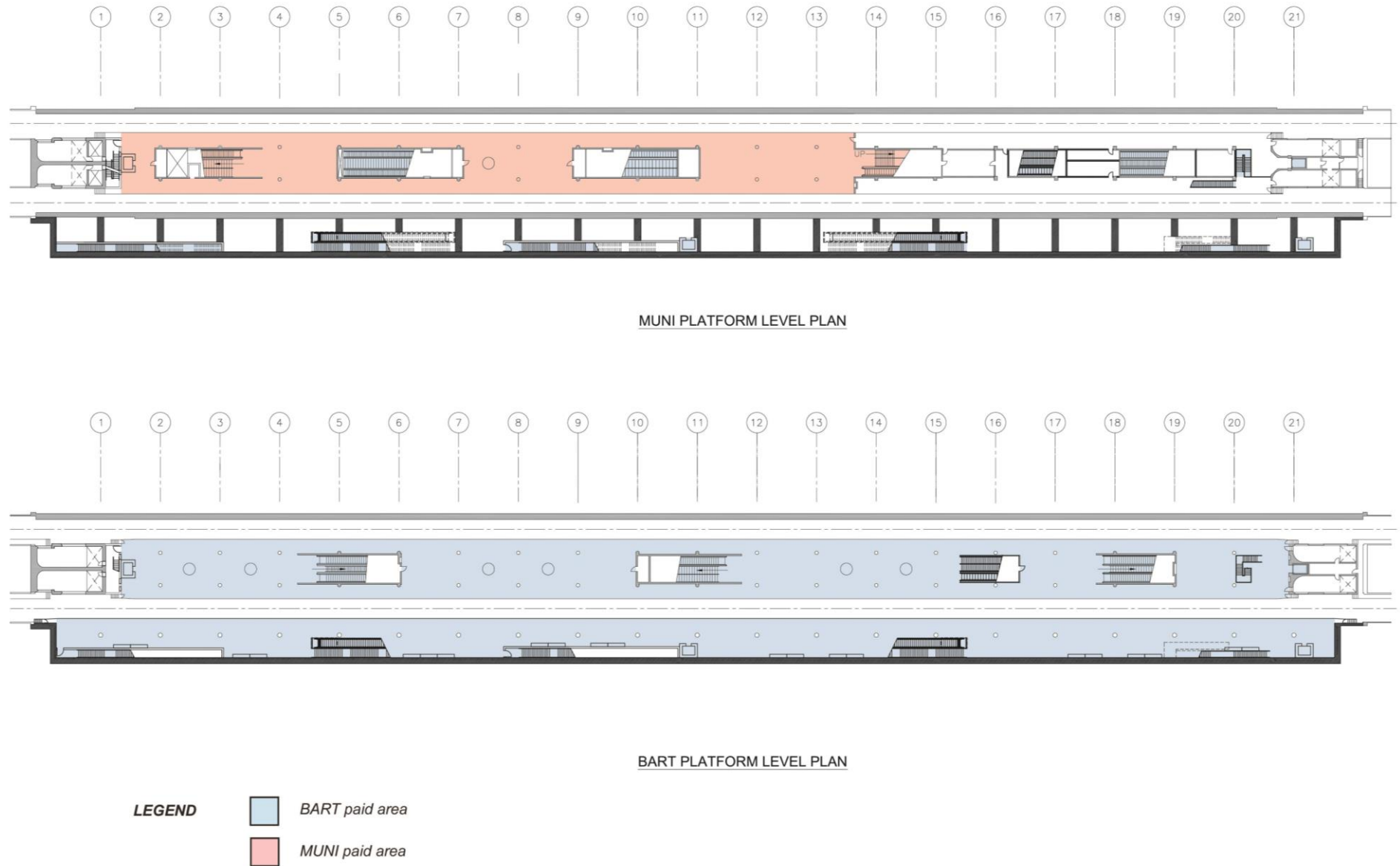
Source: Robin Chiang & Co., 2015

Figure 10: Montgomery Capacity Plan – Street and Concourse Levels



Source: Robin Chiang & Co., 2015

Figure 11: Montgomery Capacity Plan – Platform Levels



Source: Robin Chiang & Co., 2015

1.5 Implementation Plans

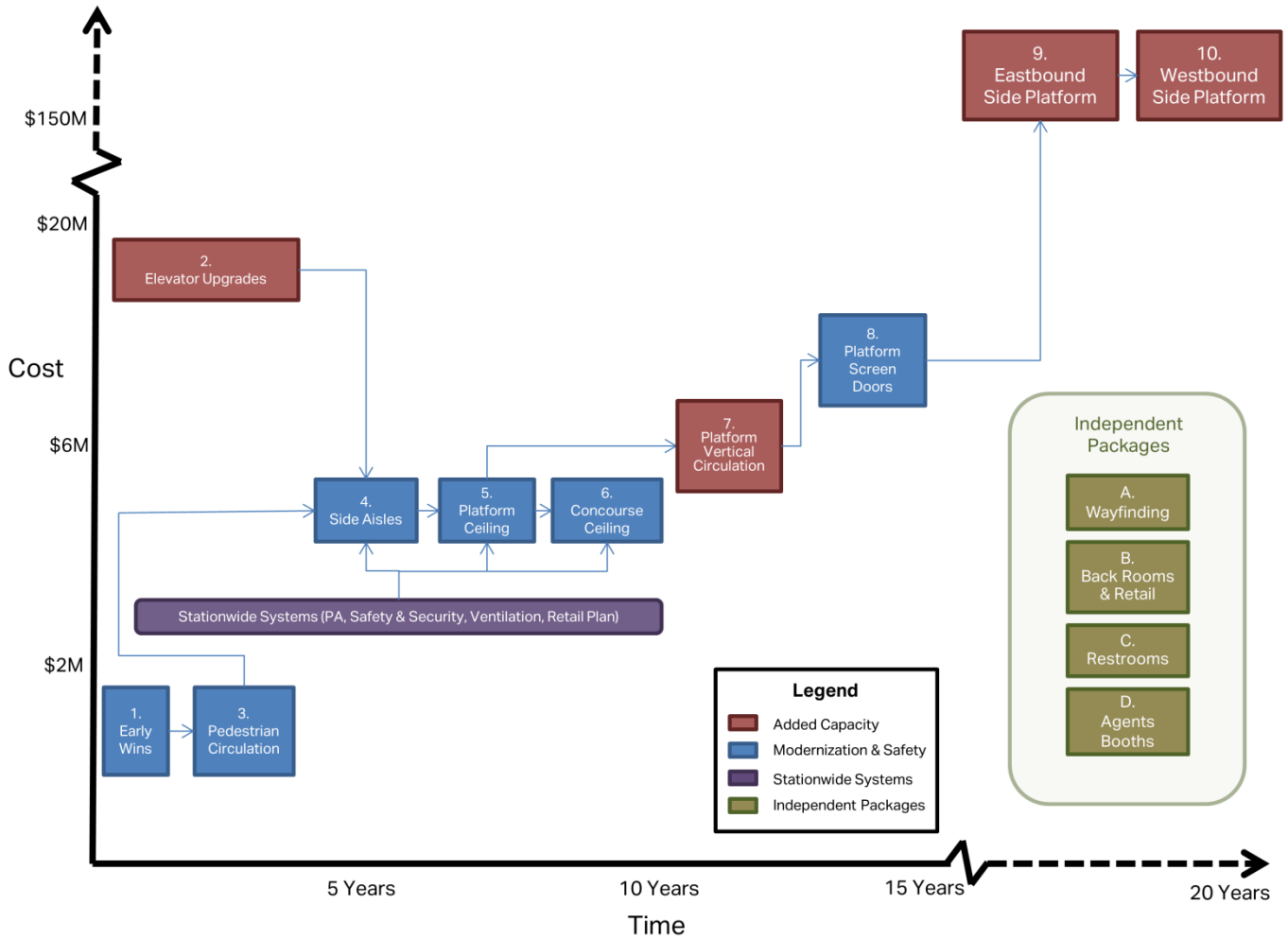
The capacity and modernization implementation plans are made up of the project packages illustrated in **Figure 12** and **Figure 13**. These figures provide a graphical indication of relative cost, timing and sequence of the packages. The projects making up each package, their relation to other projects, and their relative cost are described in Section 7.0. Early wins projects were grouped together, as were projects with similar components such as railings, handrails, etc. Some packages are projects grouped together by priority, timing, or cost. Other projects were packaged because they would be constructed more efficiently together, such as replacing the platform floor at the same time platform screen doors were installed.

Most of the packages at each station were arranged in a logical sequence for implementation, and these were given numbers in the order of their intended construction. Four packages appeared to be independent of any other package, meaning that they could either be constructed at any time (such as remodeled restrooms), or be part of a systemwide or regionwide program (such as wayfinding). These independent packages are shown in their own box, and their placement is not indicative of their relative cost or timing.

Seven projects did not fit into a package because they applied to the entire station. These "stationwide system" projects would be implemented most efficiently as part of another renovation project. For example, it is more efficient to install new security cameras, upgrade electrical systems and install emergency lighting at the time the ceiling is being replaced. However, ceilings could be replaced in different areas at different times, possibly several years apart. Therefore, this approach requires that the master design for each stationwide system already be developed before the first linked renovation project starts.

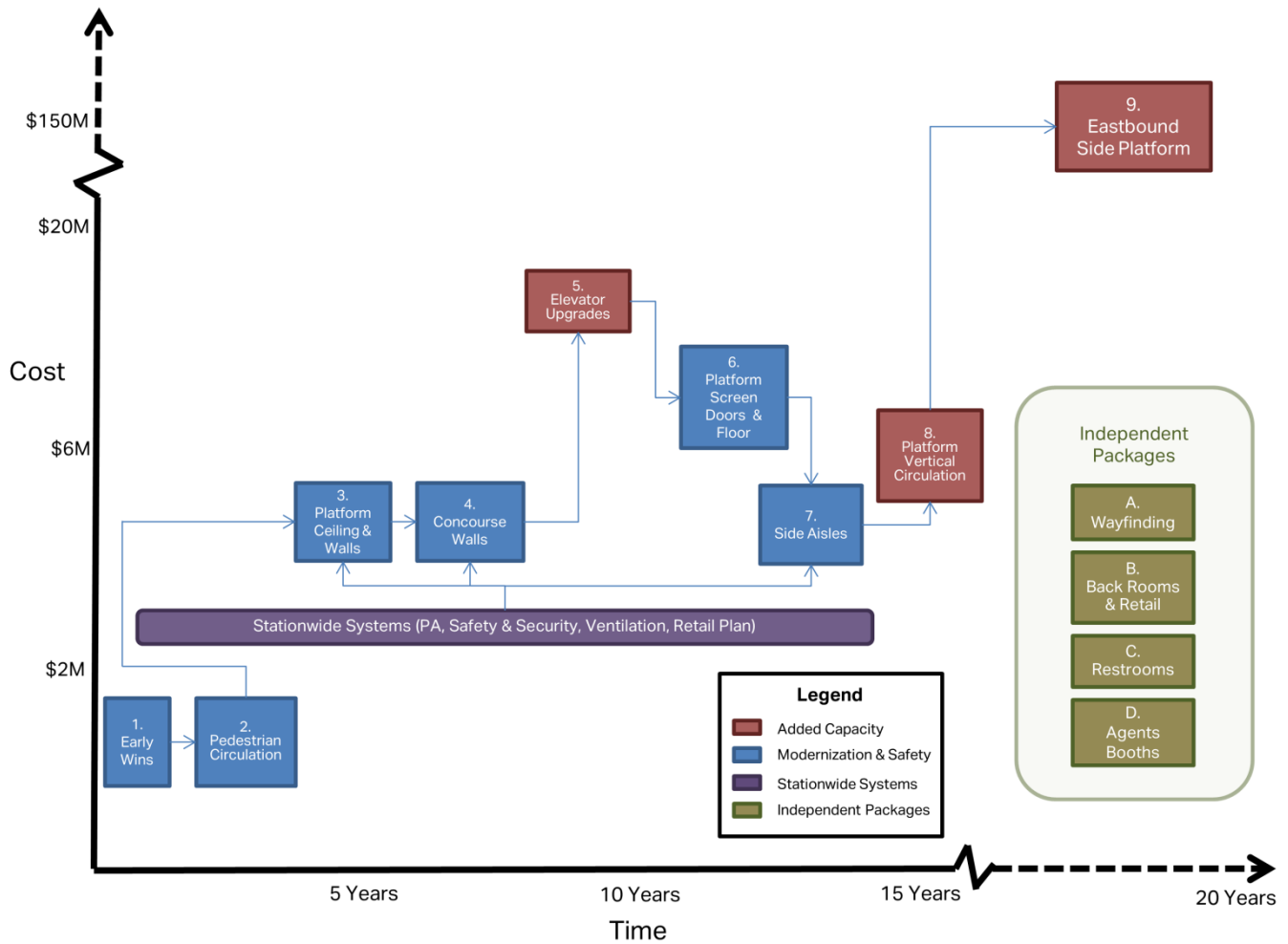
The joint capacity and modernization effort has generated a detailed project list anticipating phased implementation. With this common vision of the path forward, BART can act strategically to secure funding and expedite delivery of needed station improvements.

Figure 12: Embarcadero Implementation Plan Summary



Source: AECOM, 2016

Figure 13: Montgomery Implementation Plan Summary



Source: AECOM, 2016

1.6 Next Steps

The following additional tasks were identified as "next steps" in executing the capacity implementation strategy and modernization concept plan. In many cases, these components require additional and ongoing coordination or policy discussion.

Near-term next steps should be addressed immediately to facilitate the completion of near-term projects (within 10 years) and inform the implementation of middle-term and long-term projects. The near term next steps are the following:

- **Coordination with SFMTA:** Various agreements between BART and Muni will likely be needed as part of the planning, design / engineering, funding, construction, and operation / maintenance of the proposed capacity enhancements at both stations.
- **BART-Muni Connection:** Further study and coordination with SFMTA are recommended to better determine how a platform-to-platform connection between BART and Muni Metro might be achieved at Embarcadero Station.
- **Wayfinding:** Ongoing coordination is desirable to ensure that wayfinding systems at the two stations are compatible (and, preferably, consistent) with wayfinding systems outside of the stations at street level or at nearby transit facilities. Embarcadero Station will be directly connected to the Transbay Transit Center and within a short distance of the Ferry Terminal. Standardized wayfinding systems should reinforce these transit facilities as a single, large hub.
- **Climate Change:** Future study will be needed to identify the specific climate change impacts that may affect BART operations at Embarcadero and Montgomery, and develop appropriate adaptation strategies and projects.
- **Strategies to Influence Passenger Demand:** Given the potential benefits in terms of deferring capital investment at the two stations, demand management schemes should be explored in further detail.
- **Transbay Transit Center Pedestrian Tunnel:** Additional study is required to determine how the tunnel would be operated on a day-to-day basis, including requirements for maintenance, security, and emergency management, as well as who would be responsible for the associated duties.
- **Advertising:** Ongoing policy discussion may be necessary to determine where opportunities exist to enhance advertising at the two stations in light of capacity and modernization needs. Such discussions should be timed to occur before renewal of the advertising contract.

Middle-term next steps should be addressed 5-15 years out in conjunction with middle-term projects slated for implementation during this period. These include:

- **Station Retail:** BART would benefit from a comprehensive approach to station retail and station design, with greater focus on how to implement better-integrated and higher-quality design than has been achieved in previous retail projects. Retail can also indirectly improve crowding and passenger flow by providing attractive alternatives to waiting at platform level.
- **Free Speech:** Subsequent policy discussion may be required to determine how BART can adequately accommodate expressive activities at these stations in light of capacity and modernization needs.

Long-term next steps are related specifically to new side platforms, slated for implementation 10-20 years out. Though classified as long-term, some may be addressed sooner as part of studies to further validate the side platform concept or because of their connection to other projects, such as Better Market Street. The long-term next steps include:

- **Station Ventilation:** Performance of the emergency ventilation systems would need to be modeled in relation to major station configuration changes such as side platforms or the new stair openings. At both Montgomery and Embarcadero, the comfort ventilation fresh air supply systems are not fully functional, causing interior temperatures to rise to uncomfortable levels.
- **Side Platform Construction Method:** Given the need to coordinate with other transportation investments such as the Better Market Street project, further study is recommended to determine which construction method is preferable and whether or not some cost reduction synergies can be achieved through coordinated implementation.
- **Free-Area Corridors at Embarcadero:** In the current concept plan, the clearance width of the side corridors would be as narrow as 4'-8". Further analysis is needed to determine potential means of mitigating this deficiency through design refinement. Potential solutions could include expanding the station box outward at the concourse level to expand the free area at the most constricted pinch points.
- **Platform Doors:** Research is needed to determine a preferred door design since they can be built at various heights, ranging from half-height to full enclosure. Each design should be carefully considered with respect to cost, constructability, and other concerns such as station and tunnel ventilation. New operational procedures and protocols also would need to be established.
- **Platform Operating Schemes:** Further study will likely be necessary to determine the optimal operating scheme, particularly as more information becomes available regarding general trends in ridership growth system-wide and new ridership generated by the completion of extension projects currently underway.

2.0 Introduction and Project Purpose

This document is a capacity implementation strategy and modernization concept plan for the two busiest stations in the San Francisco Bay Area Rapid Transit District (BART) system — Embarcadero and Montgomery in Downtown San Francisco. BART has been facing unprecedented ridership growth in recent years due to the confluence of a number of factors, including a robust regional economy that is driving employment and population growth in San Francisco and the inner core of the Bay Area.

As part of the original BART system opening in the 1970s, Embarcadero and Montgomery have provided four decades of service as BART’s most heavily used stations. Modernization needs include returning the stations to a state of good repair, removing improvised additions and clutter that have accumulated over the years, and upgrading procedures and technology to increase efficiency, security, and sustainability.

Future land use development is expected to further increase ridership at the station, while planned transit investments will further establish the importance of these two stations to the local and regional transit network.

2.1 Capacity Implementation

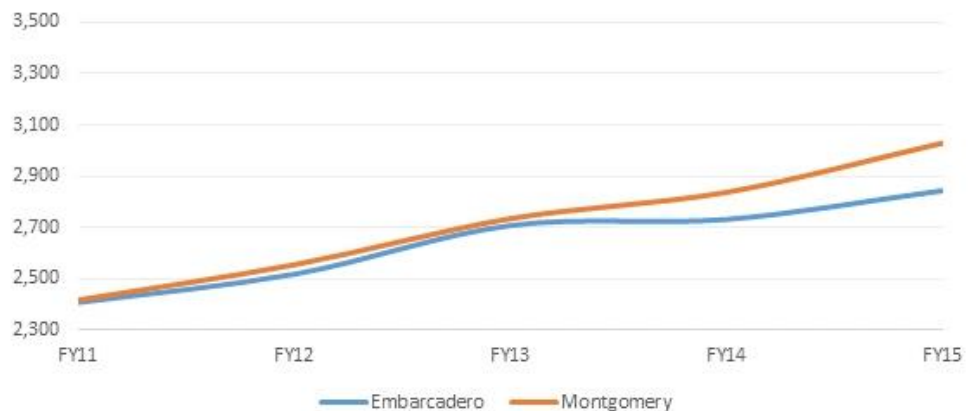
The overall goals and objectives of the capacity implementation effort, and the evaluation criteria for measuring progress and success towards achieving these goals and objectives, are described in more detail in Technical Memorandum #1 (“Goals and Objectives”) and Technical Memorandum #2 (“Evaluation Framework”).

BART’s average weekday ridership reached an all-time historic high of 420,000 passengers for the fiscal year ending June 30, 2015. The four Downtown San Francisco stations (Embarcadero, Montgomery, Powell, and Civic Center) serve over 280,000 passengers each weekday (combined total of entries and exits at each station). Embarcadero and Montgomery serve approximately 80,000 to 90,000 passengers each on an average weekday.

Embarcadero and Montgomery stations are the busiest stations in the BART system by far, with noticeable peaking during the commute periods. During these times, passenger activity at both stations exceeds 2,500 passengers every 15 minutes, as shown in **Figure 14** and **Figure 15**.

Between FY11 and FY15 the peak 15-minute period for exits at both Embarcadero and Montgomery was between 8:30 and 8:45 am. During that period exits have increased by 25% and 35%, respectively.

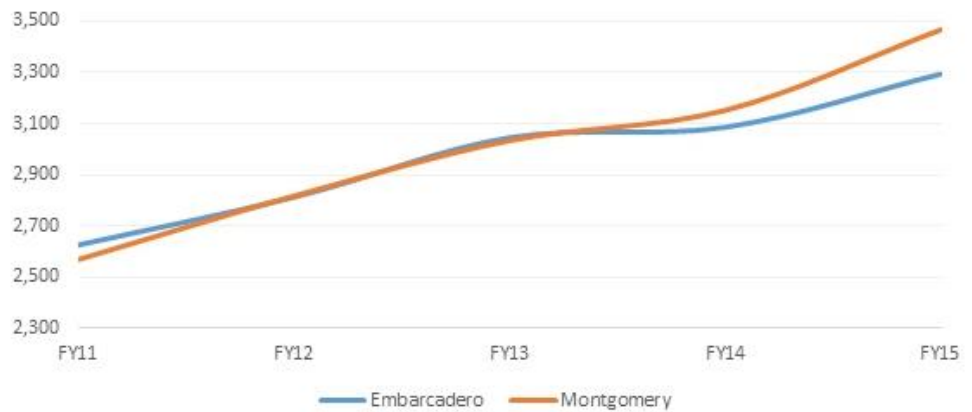
Figure 14: Average Weekday Exits During Peak 15-Minute Period



Source: BART, 2016

Between FY11 and FY15 the peak 15-minute period for entries at both Embarcadero and Montgomery was between 4:45 and 5:00 pm. During that period entries have increased by 18% and 25%, respectively.

Figure 15: Average Weekday Entries During Peak 15-Minute Period



Source: BART, 2016

Current Crowding

During weekday mornings at these two stations, escalators and stairways from the platform level are frequently unable to clear queues of passengers before the arrival of subsequent trains and the accompanying pulses of alighting passengers. Crowding at the stations (**Figure 16**) is even more severe during weekday afternoons and evenings, as passengers stand cheek-to-jowl in queues as they wait for their trains, making circulation along the platform difficult and, at times, unsafe.

This lack of adequate capacity can also jeopardize the benefits of critical systemwide initiatives already underway, including BART’s Fleet of the Future and the Train Control Modernization Project (TCMP). These initiatives will increase the concentration of passengers using these stations by increasing the carrying capacity of trains and increasing the line-haul capacity of the system by decreasing headways between trains.

Figure 16: Examples of Crowding on Vertical Circulation and Platforms

Platform-to-concourse vertical circulation: queues develop at stairs and escalators during peak morning commute times.

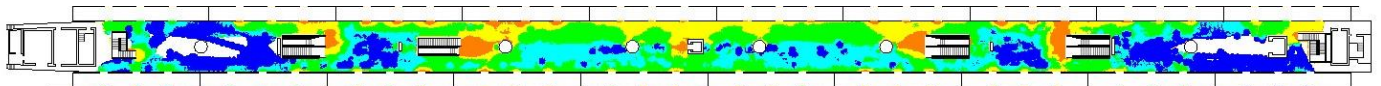


Evening commute platform crowding at Montgomery Station following a 15-minute service disruption at Powell Street in the peak direction (October 29, 2012)



Source: BART San Francisco Transportation Sustainability Program Support: Final Summary Report, 2014

Passenger flow modeling results for Embarcadero (discussed in Section 5.5) show queuing at platform level vertical circulation landings (orange areas below). As a result, passengers can be delayed as much as 30 seconds (longer if one or more escalators are out of service).



Source: AECOM, 2015

Simultaneous Large Events

Embarcadero and Montgomery serve key roles in accommodating attendees headed for San Francisco Giants home games and other events at AT&T Park in China Basin, as well as for festivals, parades, and other events in Downtown San Francisco and along the city’s waterfront. Crowding at both stations during special events can be particularly severe and require special accommodations, such as extended late-night service and temporary skip-stop service following New Year’s Eve celebrations.

Of special concern is station capacity during the late evenings after events, especially after simultaneous events throughout the city on Friday and Saturday nights. Given the timing of the ends of games and other large events, and the time required to travel to BART stations, event patrons may be using the last trains of the evening when stations and trains are already crowded.

Simultaneous events are known to significantly increase BART ridership. This includes other events occurring and ending simultaneously throughout the city and along the Market Street Corridor (i.e., concert venues), as well as the “ambient” increase in ridership on weekend late evenings.

Future Development Growth

Land use changes in the neighborhoods surrounding the two stations also generate additional additional ridership, contributing to the need for concerted efforts to increase passenger throughput during the most congested periods. The walkshed of the two stations falls entirely within Priority Development Areas (PDAs) designated by the Metropolitan Transportation Commission. The Transbay Redevelopment Program, Rincon Hill Area Plan, Transit Center District Plan, and other land use developments will create 7,000 new housing units and 5.6 million square feet of new office space within walking distance of the station.

Ongoing and planned developments slightly farther away from the stations in Mission Bay, East SoMa, the Northern and Central Waterfront, and on Treasure Island / Yerba Buena Island are also expected to make noticeable contributions to future ridership. The proposed new arena and event center by the Golden State Warriors in Mission Bay is also expected to increase crowding at Embarcadero, although this will likely be offset by the Central Subway scheduled to open in 2017, when Muni Metro transfer activity will shift to Powell.

Transit investment in the surrounding area (**Figure 17**), including the Transbay Transit Center Caltrain Downtown Extension (DTX), statewide high-speed rail service, and the Downtown Ferry Terminal Expansion (DFTX), will also further establish this area as the key local and regional transit hub of San Francisco, especially at Embarcadero.

Uncertainty in future economic conditions, however, requires flexibility in the capacity implementation strategy. In particular, there are uncertainties surrounding the rate of ridership growth. Ridership has been strong for the past several years as a result of a favorable economic climate, but generally follows economic and real estate cycles. These cycles will affect how fast ridership grows, how much current crowding would be exacerbated, and when capacity upgrades would be warranted.

Figure 17: Transit Center District



Source: Transbay Joint Powers Authority, 2010

In addition, the BART Vision planning effort is looking at a second transbay crossing that could preclude (or at least defray) the need for capacity upgrades to the existing Transbay Tube and alignment through Downtown San Francisco, including Embarcadero and Montgomery stations. However, the long lead-time to get such a huge infrastructure project like a second crossing completed suggests that additional capacity on the existing alignment may be needed in the meantime.

2.2 Modernization

This Plan is part of BART’s Station Modernization Program, which invests resources and efforts into the stations and surrounding areas to advance transit ridership and enhance the quality of life around the stations.

2.2.1 Need for Modernization

BART’s Station Modernization Program develops projects to improve customer experience. Embarcadero and Montgomery have provided four decades of service as BART’s most heavily used stations. Modernization needs have been identified in these areas:

- State of good repair – maintaining elements and systems that are essential to providing reliable and attractive service
- Addressing improvised additions – removing clutter and introducing coordinated approaches to station operation
- Operational efficiencies – implementing procedures and technology to increase efficiency, security, and sustainability

2.2.2 Systematic and Station-Specific Goals

BART’s overriding goals for station modernization studies seek to Make Transit Work, Connect to Community, and Create Place, as shown in **Figure 14**. The following station-specific goals relate to these systematic goals.

- Connectivity – strengthen access and promote a safe and comfortable customer environment with improvements that address the user experience, ensure universal access, and provide targeted and timely transit information.
- Vibrancy – enhance the station’s existing strengths and reflect the energy of the surrounding community to create a strong station identity, integrate context-sensitive art, and reflect San Francisco’s status as a world-class city.
- Sustainability – incorporate materials and technologies that increase the life-cycle value of the station and protect public investment to ensure efficient operations and anticipate future needs.

Figure 18: BART Modernization Goals and Objectives

Make Transit Work	Connect to Community	Create Place
Maintain Reliability	Connect BART	Enhance Customer Experience
Increase Station Capacity	Expand Universal Design	Ensure Safety & Security
Upgrade Employee Facilities	Incorporate Community Input	Leverage Partnerships
Advance Sustainability		

Source: BART, 2016

2.3 Synthesis and Phasing

A key intent of the capacity implementation study was to coordinate projects and plans of multiple agencies and develop consensus among various stakeholders. While capacity implementation and station modernization are separate activities, the opportunity was recognized to integrate the two efforts to achieve synergies and increase the Plan's overall value.

A technical advisory committee (TAC) was established to provide guidance in this process, with representatives from various BART departments and the following public agencies and stakeholders:

- San Francisco County Transportation Authority
- San Francisco Municipal Transportation Agency
- San Francisco Mayor's Office
- San Francisco Mayor's Office of Economic and Workforce Development
- San Francisco Mayor's Office on Disability
- San Francisco Public Works
- San Francisco Planning
- Port of San Francisco
- Transbay Joint Powers Authority
- Caltrans
- San Francisco Giants
- Golden State Warriors

The roles, relationships, and potential interests and concerns of individual TAC member agencies and stakeholders is described in further detail in Section D ("Institutional Setting") of Technical Memorandum #3 ("Base Information").

The joint capacity and modernization effort has generated a detailed project list anticipating phased implementation. With this common vision of the path forward, BART can act strategically to secure funding and expedite delivery of needed station improvements.

3.0 Existing Conditions and Needs Analysis

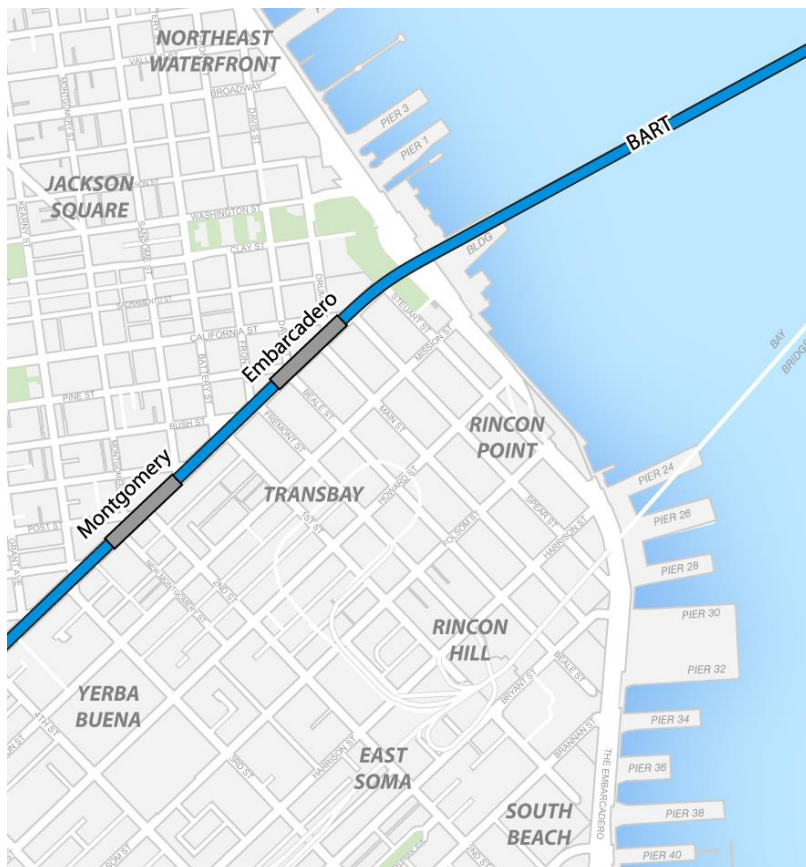
The following sections establish the existing conditions and needs at the two stations. Sections 3.1 and 3.2 describe the existing context and characteristics of the two stations, while Sections 3.3 and 3.4 characterize future capacity and modernization needs. Further detail on these topics is provided in Technical Memorandum #3 ("Base Information").

3.1 Station Location and Context

3.1.1 General Location

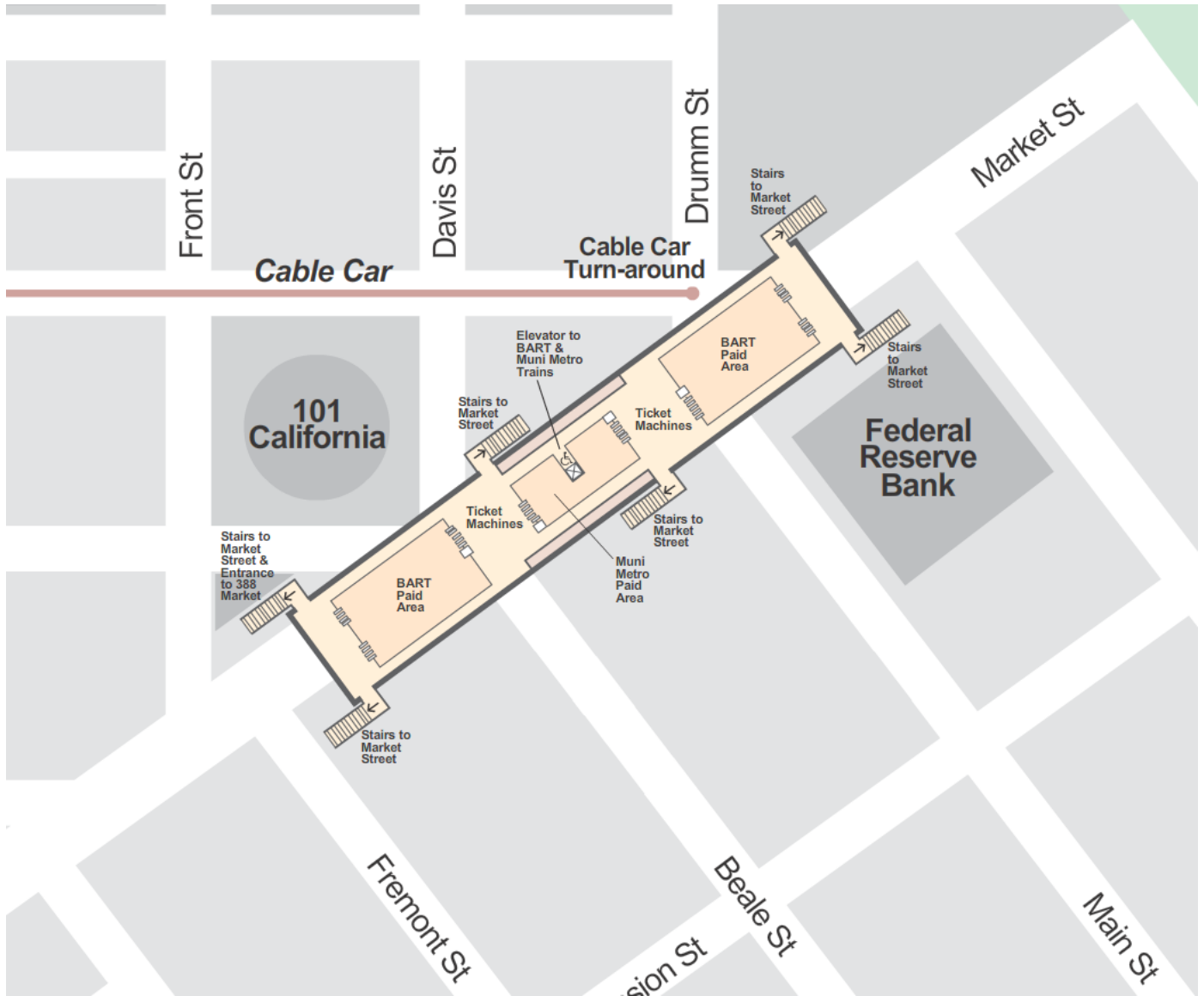
Embarcadero and Montgomery stations are located in Downtown San Francisco, centered on the traditional Financial District north of Market Street and the newer office district south of Market Street. The two stations serve a major employment center of the region and the major office employment zone of San Francisco's Central Business District (CBD). The larger geographical context of the two stations is illustrated in **Figure 19**. Focused maps showing station entrances and other features are shown in **Figure 20** and **Figure 21**.

Figure 19: Station Location and Geographical Context



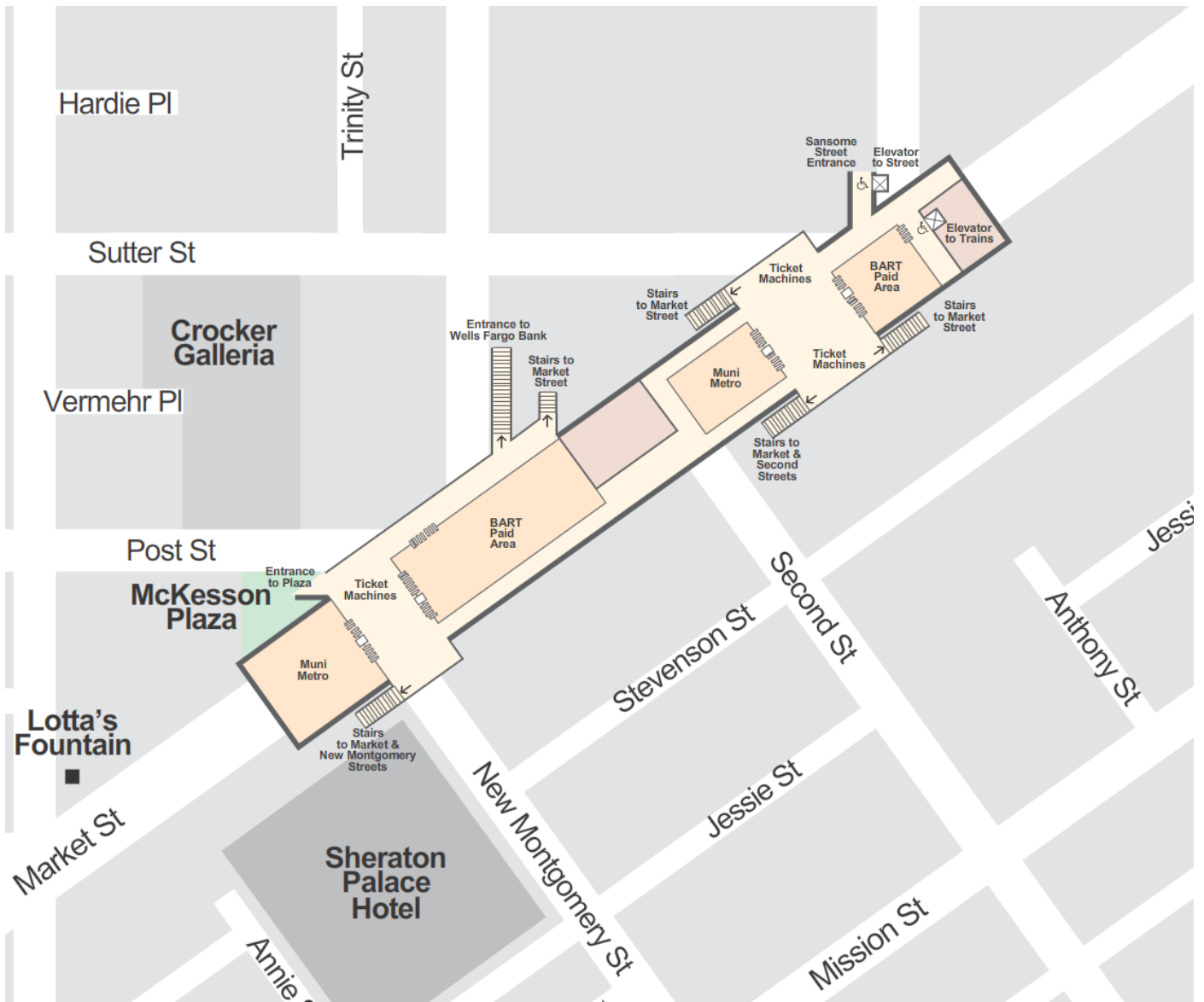
Source: AECOM, 2015; street map and base, San Francisco Planning Department

Figure 20: Embarcadero Station Map



Source: BART, 2015

Figure 21: Montgomery Station Map



Source: BART, 2015

3.1.2 Land Use Context

Existing Land Use Context

The immediate area around both stations is primarily characterized by multi-story office towers with ground-level retail and services, with high-density mixed-use residential neighborhoods including Chinatown, North Beach, Telegraph Hill, Rincon Hill, and South of Market (SoMa) located slightly further away.

Embarcadero Station is characterized by portions of Downtown that were redeveloped with contemporary office towers in the decades following World War II. The eastern end of Embarcadero Station is anchored by Justin Herman Plaza, the Ferry Building, and The Embarcadero, a landscaped boulevard and waterfront promenade.

In contrast, Montgomery Station serves as the primary gateway to the traditional Financial District, and is anchored at its west end by the continuous streetwall of pre-war office towers lining Montgomery Street / New Montgomery Street. The western end also connects to retail / entertainment, cultural / institutional, and visitor / convention uses near Union Square and Moscone Center.

Future Land Use Context

The walkshed of the two stations has been the subject of several concentrated planning efforts starting with the seminal *Downtown Plan* adopted in 1985, channeling office and retail growth away from areas with rich historical architectural resources—the Financial District and Union Square—into an expanded C-3 district south of Market Street centered on the Transbay Terminal.

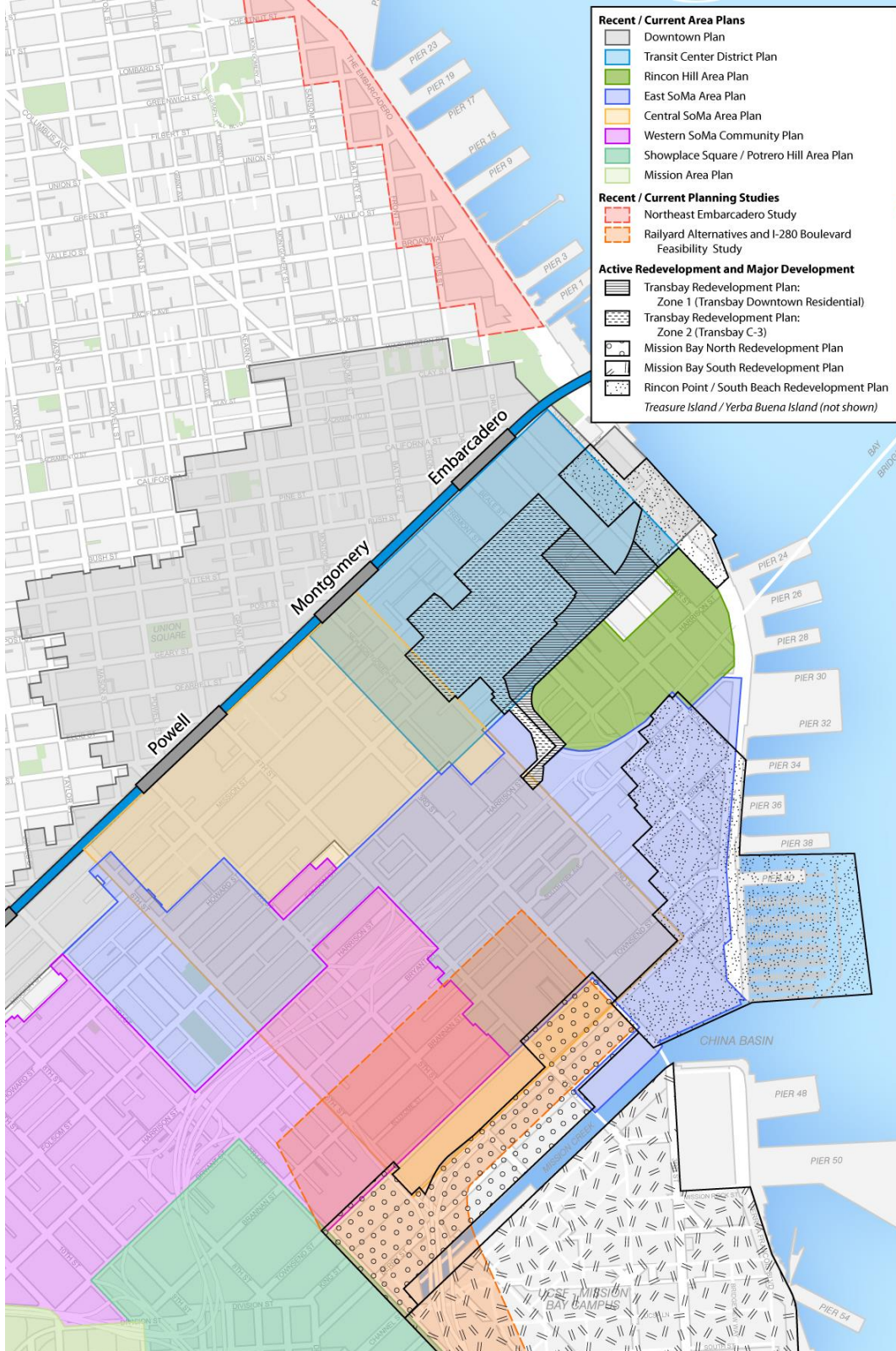
The *Transbay Redevelopment Plan* called for high-density, mixed-use redevelopment for the neighborhood surrounding the future Transbay Transit Center, complemented by the *Rincon Hill Area Plan* and its vision for a high-density residential neighborhood south of Folsom Street atop Rincon Hill.

Other efforts have studied or established planning policies and controls for areas just outside the immediate walkshed, but within the catchment area, of the two stations, including redevelopment plans for Rincon Point / South Beach and Mission Bay, the *East SoMa Area Plan*, the *Northeast Embarcadero Study*, the ongoing *Central SoMa Area Plan*, and the visionary *Railyard Alternatives and I-280 Boulevard Feasibility Study*.

Under the guidance of these planning efforts, significant portions of the catchment areas of the two stations are currently undergoing rapid transformation from vacant lots or low-density industrial uses to high-density mixed-use commercial and residential uses. This transformation is expected to continue into the near future as these neighborhoods are built out, attracting new residents, employees, and visitors—many of whom will be expected to contribute to future ridership growth at the two stations.

The land use planning context of the two stations is illustrated in **Figure 22**. A conceptual rendering showing the high-density redevelopment in the adjacent Transbay and Rincon Hill neighborhoods is shown in **Figure 23**.

Figure 22: Station Land Use Planning Context



Source: AECOM, 2015; street map and base, San Francisco Planning Department

Figure 23: Station Area Redevelopment

Rendering of redevelopment in the Transbay and Rincon Hill neighborhoods



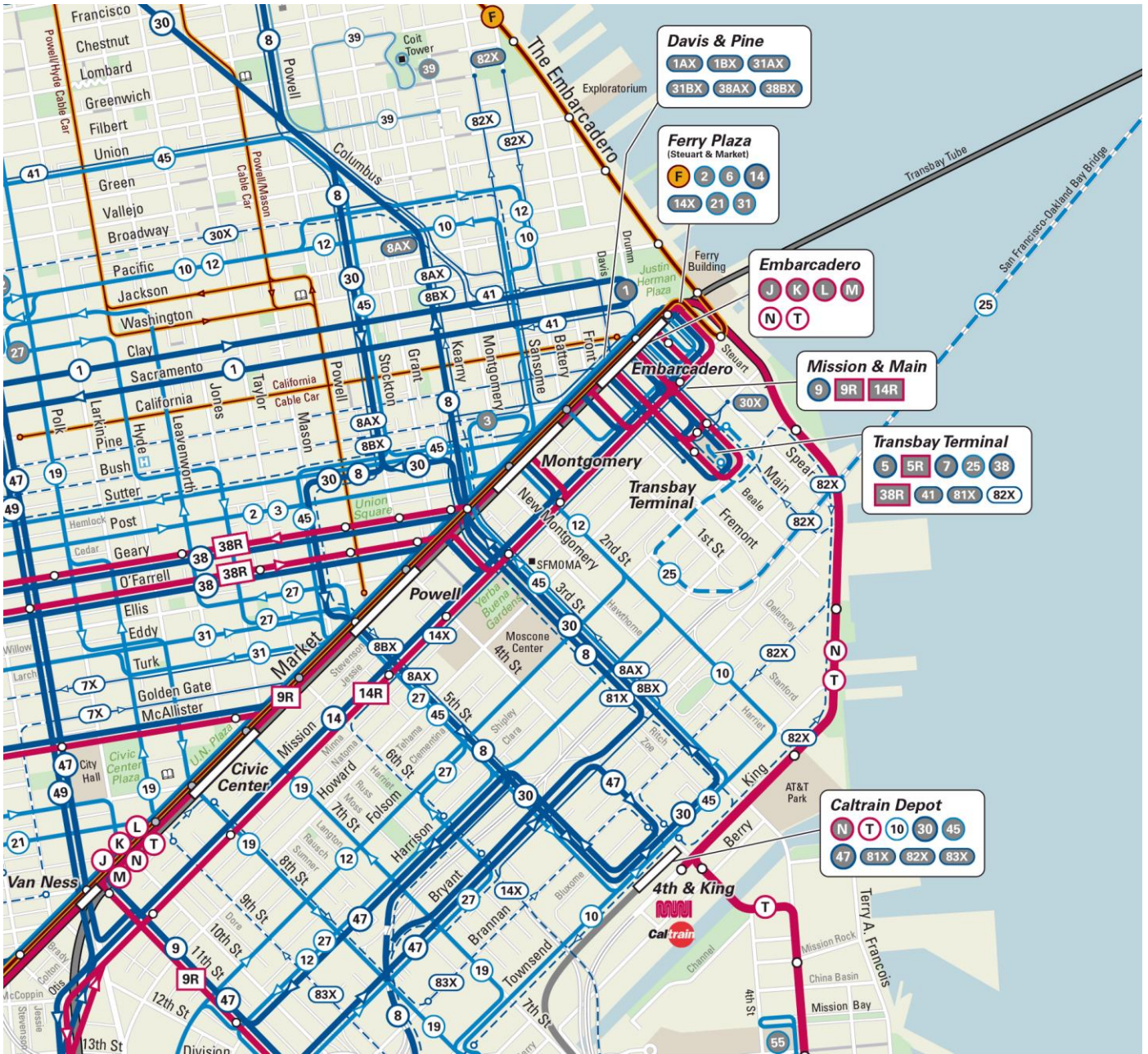
Source: Transbay Joint Powers Authority, 2015

3.1.3 Transit Context

Located within San Francisco's primary employment center, the two stations are also well connected to local and regional transit infrastructure. Local transit (Muni) and regional transit hubs in and around the two stations are illustrated in **Figure 24**.

Local transit service operated by Muni is concentrated along Market Street and Mission Street, while other regional transit services are concentrated at and around the Ferry Building and the Transbay Terminal (AC Transit, Golden Gate Transit, SamTrans, and others), currently housed in a temporary facility. Caltrain currently does not serve the area directly, but is located about one mile south of the area, with a terminal at Fourth Street and Townsend Street.

Figure 24: BART Station Transit Context – Muni and Caltrain



Source: SFMTA, 2015

Market Street Transit Context

Market Street is the primary transit artery through Downtown San Francisco, accommodating not only underground BART and Muni Metro rail service but also a wealth of surface bus and streetcar transit operated by Muni, including virtually all of Muni's trunk lines to the outer districts of the city and historic streetcar service on the F Market & Wharves line traveling along the city's waterfront to Fisherman's Wharf.

The two stations lie at the eastern end of the Market Street Subway, the set of tunnels underneath Market Street that carries Muni Metro trains on the upper track level and BART trains on the lower track level, with a shared concourse just below street level.

Embarcadero Station is the terminus for most Muni Metro lines, but trains on the N Judah and T Third Street continue beyond on the Muni Metro Extension (MMX) along The Embarcadero toward China Basin, Mission Bay, and the Third Street corridor. Additional Muni bus routes cross north-south across Market Street or travel parallel along Mission Street and the Folsom Street / Harrison Street couplet.

Transbay Transit Center

The primary connecting regional transit hub is the Transbay Terminal, currently housed at a temporary location on the block bounded Howard Street to the north, Folsom Street to the south, Main Street to the east, and Beale Street to the west. The Transbay Terminal is two blocks south of Market Street, and within walking distance of Embarcadero Station.

In addition to several Muni bus routes, the Transbay Terminal connects several other transit and transportation providers:

- Regional bus operators: AC Transit, SamTrans, Golden Gate Transit, and WestCAT Lynx;
- Express shuttle service to the Presidio operated by PresidiGo;
- Connecting Amtrak Thruway bus service to Emeryville;
- Intercity bus service operated by Greyhound; and,
- The Bay Bridge bike shuttle operated by Caltrans.

Upon completion of first phase of the Transbay Transit Center in 2017, transit providers will be relocated to new locations inside or near the terminal. Subsequent phases will bring Caltrain commuter rail service into the new transit hub as part of the Caltrain Downtown Extension (DTX), as illustrated in **Figure 25**. The extension will also provide a direct connection to the future statewide high-speed rail network.

Figure 25: Caltrain Downtown Extension

The DTX is the primary component of Phase 2 of the Transbay Program. The alignment would follow Townsend and Second Streets to reach the TTC.



Source: AECOM, 2015; street map and base, San Francisco Planning Department

Ferry Building

The Ferry Building at the foot of Market Street is located just northeast of Embarcadero Station and serves ferry routes connecting to regional destinations in the North Bay and East Bay. In addition to ferries, the Ferry Building is also served by SolTrans commuter bus routes and connecting Amtrak Thruway coaches. The Downtown Ferry Terminal Expansion (DTFX) project will construct additional ferry gates and associated improvements and allow for expanded ferry service at the Ferry Building, including routes serving Treasure Island, Berkeley, Richmond, Hercules, Martinez, Antioch, and Redwood City.

Private Transit

Several private transit services also operate in the area surrounding the two stations, including shuttles provided by Google, Williams–Sonoma, the San Francisco Bay Club, the Academy of Art University, and others for use by affiliates such as employees, club members, and students, faculty, and staff. Some property and building management firms also provide their own shuttles for building tenants. Many of these shuttle services have stops at or near Embarcadero or Montgomery stations.

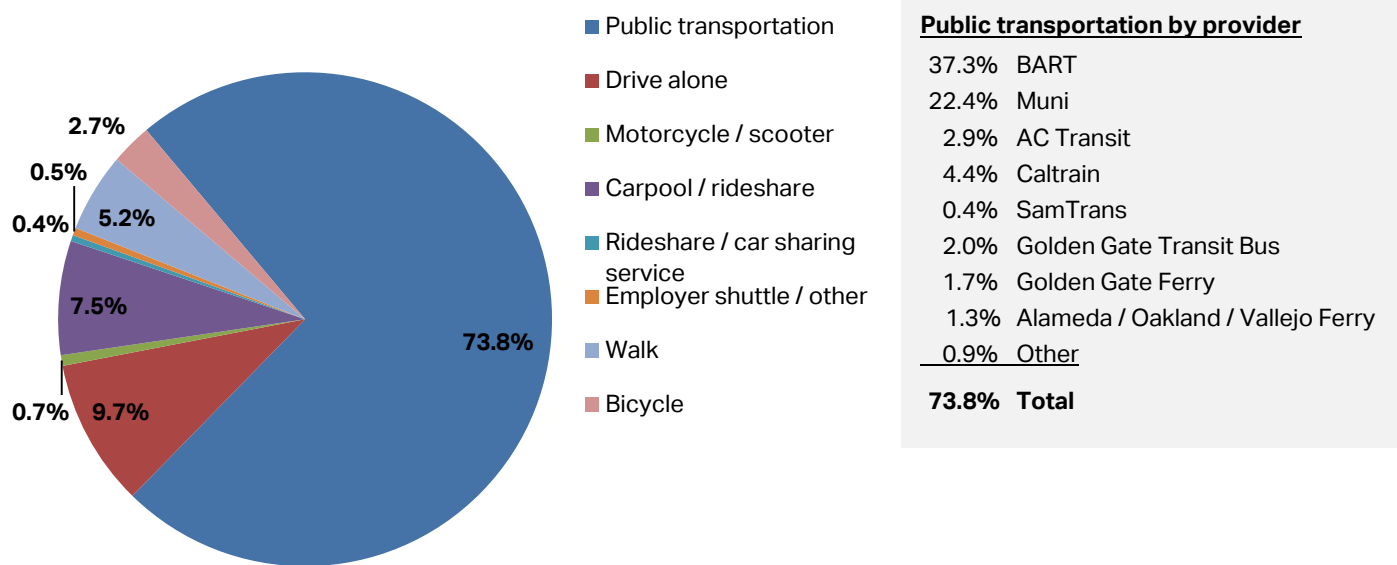
Mode Share (Station Profile Survey)

Overall, transit plays a critical role in the function of the area, and transit share for commute trips currently reaches as high as 70 percent or more for buildings in the Financial District core, as shown in **Figure 26**. Many of the historic buildings in the area lack off-street parking altogether and most buildings have only small amounts.

The *Downtown Plan* includes policies expressly discouraging commuter parking, which has been reinforced through changes to Planning Code controls for off-street parking in C-3 zoning districts. In particular, requirements to provide at least a minimum amount of off-street parking have been abolished, and new uses are now restricted in how much off-street parking they are permitted to provide.

Figure 26: Mode Share for Commute Trips

Current transit mode share for commute trips among office workers in the Financial District exceeds 70 percent, with more than a third of all commuters using BART.



Sample size represents a minimum 1% response rate across 65 member buildings in the Downtown area, totaling 74,776 employees and 1,353 tenant companies
 Source: Transportation Management Association of San Francisco, 2015

3.1.4 Urban Design Context

Streetscape

The urban design context of the areas surrounding the two stations is defined by Market Street and its cross streets. Market Street is the primary multi-modal artery through Downtown San Francisco. Market Street is a major pedestrian thoroughfare characterized by wide, brick-paved sidewalks measuring 30 to 35 feet in width, accentuated by rows of London plane trees, historic Path of Gold light standards, open-air café seating, and other amenities. Entrances to both stations are provided within the sidewalk, but lack defining features.

Street-fronting, ground-floor retail along most segments creates a walkable, attractive public realm, although many of the post-war office buildings along Market Street closer to Embarcadero feature landscaped setbacks and a lack of street activation. Sidewalk width along cross-streets ranges from 10 to 15 feet, and several alleys provide supplementary pedestrian access through blocks.

Figure 27: Urban Design Context

Mechanics Plaza at the corner of Market and Battery Streets



Source: Better Market Street, 2015

3.2 Station Characteristics

3.2.1 Station Access and Circulation

Station Access

Access in and out of both underground stations is provided primarily by street-level entrances, as shown in **Figure 28**. Entrances are located at various locations along or near both sides of Market Street, as illustrated in **Figure 20** and **Figure 21**. Two secondary entrances at Montgomery Station connect at the concourse level to adjacent privately owned properties. Plazas are provided at three street-level entrances along the north side of Market Street. One elevator is provided at each station between the station concourse and street level.

Station Circulation

Each station features three underground levels:

- Concourse level shared by BART and Muni Metro, directly beneath street level
- Muni Metro platform level
- BART platform level

The concourse level houses ticketing / fare collection equipment and station agent booths for both BART and Muni.

Vertical circulation between levels is provided by stairs, escalators and elevators. The escalators are reversible and their direction is changed between morning and evening to better accommodate peak passenger flows. There are no direct connections between the BART and Muni platforms. Passengers transferring between systems must go up to the concourse level to exit and enter the operators' paid areas.

Though the platform levels are generally secured within the paid area of the respective transit operator, at each station, both operators currently share a single platform elevator that serves all three underground levels. At the concourse level, these elevators are located in the free area. Passengers using the elevators are supposed to process their ticket at the fare gates before or after using the elevator.

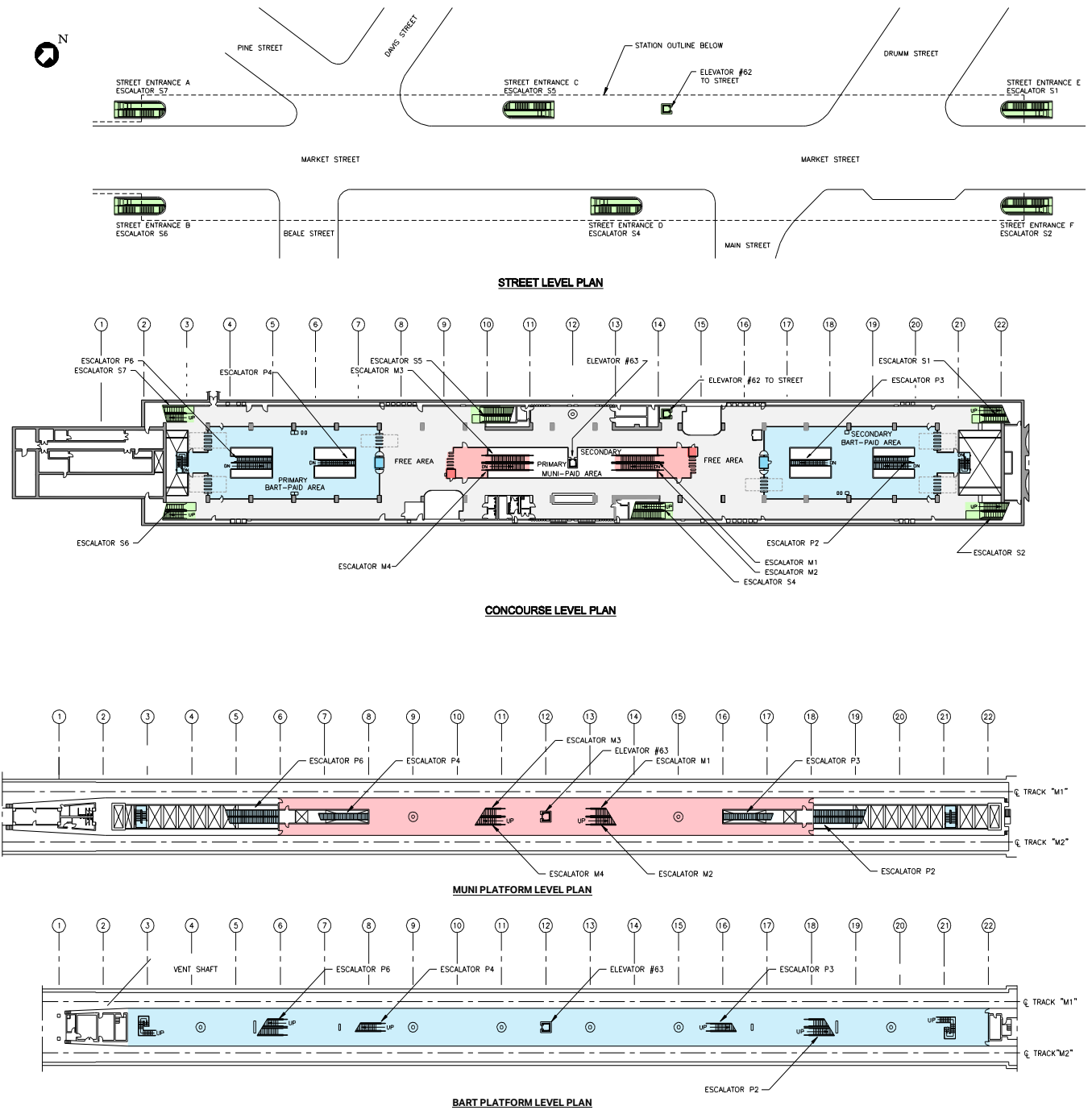
Station access and circulation at the two stations is depicted in **Figure 29** and **Figure 30**. Vertical circulation at the two stations is summarized in **Table 1**.

Figure 28: Station Entrance – Embarcadero (Market at Beale)



Source: BART, 2014

Figure 29: Station Access and Circulation (Embarcadero)

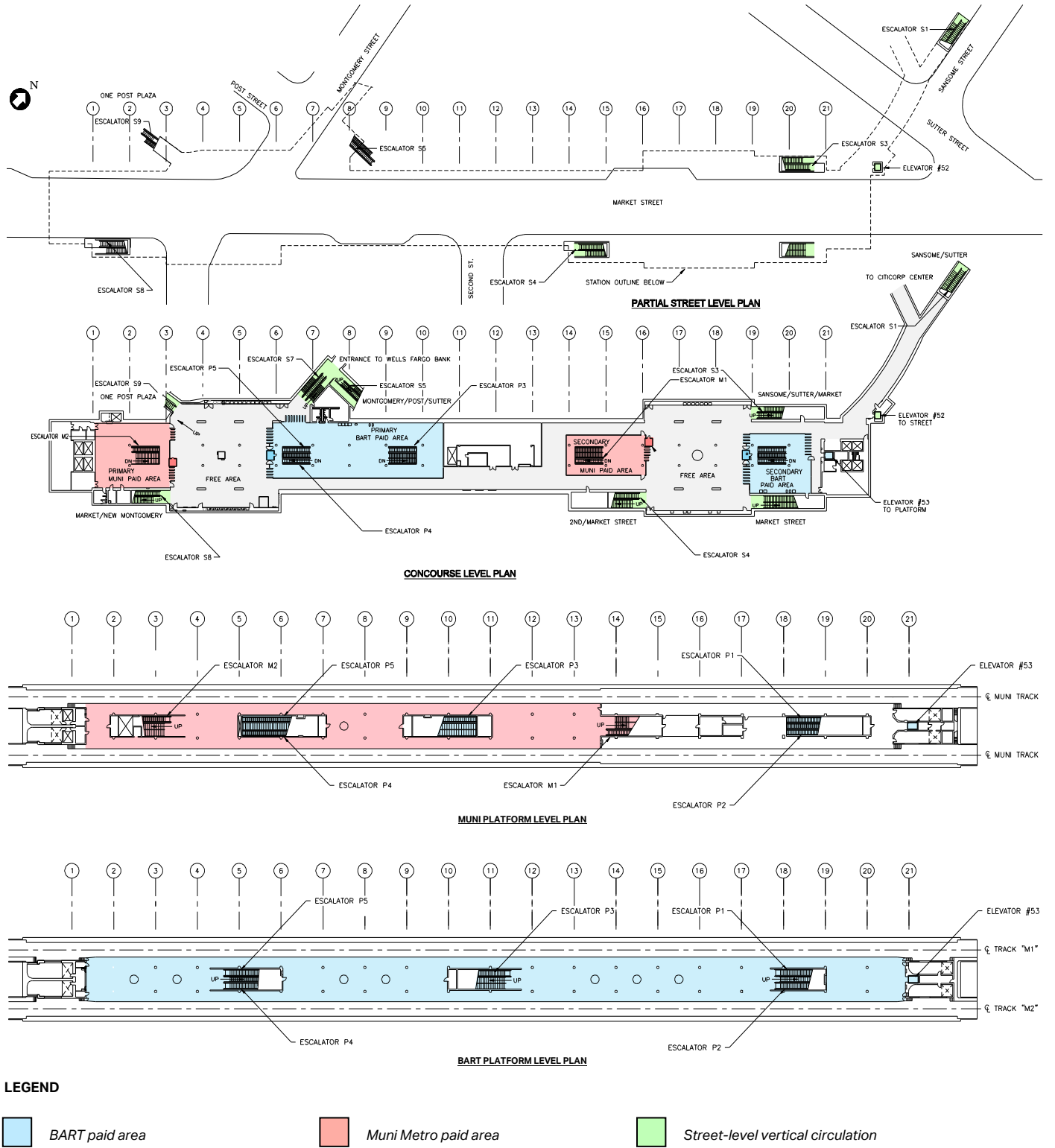


LEGEND

- BART paid area
- Muni Metro paid area
- Street-level vertical circulation

Source: BART, 2015; modified by Robin Chiang & Co.

Figure 30: Station Access and Circulation (Montgomery)



Source: BART, 2015; modified by Robin Chiang & Co.

Table 1: Vertical Circulation Inventory

Station	Connecting Levels	Escalators						Stairs		Total Width (inches)
		Number of Escalators	Total Width (inches)	Operating Direction				Number of Stairs	Total Width (inches)	
				Morning		Evening				
				Up	Down	Up	Down			
Embarcadero	Street and Concourse	6	276	6	0	4	2	6	360	636
	Concourse and Muni Platform	4	256	2	2	2	2	0	0	256
	Concourse and BART Platform	4	320	4	0	2	2	4	188	508
Montgomery	Street and Concourse	6	252	5	1	4	2	7	545	797
	Concourse and Muni Platform	2	72	2	0	2	0	2	208	280
	Concourse and BART Platform	5	180	3	2	3	2	3	156	336

Source: AECOM, 2016

3.2.2 Station Amenities

Concourses at both stations house a variety of passenger amenities and services. Both stations feature a small amount of retail, including coffee shops and florists. A staffed Clipper customer service kiosk and a self-service bike station with capacity for 96 bikes are provided at Embarcadero. MyTransitPlus staffed ticket windows and transit information displays (TIDs) are provided at both stations. Dedicated parking for automobiles is not provided at either station. Amenities at BART platform level are limited and primarily include seating and digital advertisement screens.

3.2.3 Access Mode and Trip Purpose

The 2008 BART Station Profile Study surveyed passengers throughout the BART system to characterize the overall weekday ridership profile at stations. As part of this effort, BART collected information about trip behavior among passengers, including travel mode to and from the station and trip purpose. These results are summarized in **Table 2** and **Table 3** for Embarcadero Station and in **Table 4** and **Table 5** for Montgomery Station.

As shown, the majority of passengers arrives at or departs the station on foot or by bus or other connecting transit mode. This trend was particularly strong at Montgomery Station, but less so at Embarcadero Station, where some passengers reported using carpools or biking as their primary access mode. At both stations, work and work-related activities are by far the most common trip purpose among passengers, although a sizeable share of passengers reported "other" trip purposes (sporting events, restaurants, theaters / concerts, hotels, visiting friends / family, and personal errands).

Table 2: Ridership Profile (Embarcadero) – Access Mode

Origin	Share	Access Mode to / from Station					
		Walk (only)	Bus / Transit	Drive Alone	Carpool	Dropped Off	Bicycle
Home	7%	16%	60%	4%	7%	3%	9%
Non-home	93%	88%	9%	1%	0%	1%	1%
Overall		83%	13%	1%	< 1%	1%	1%

Source: 2008 BART Station Profile Study

Table 3: Ridership Profile (Embarcadero) – Trip Purpose

Trip Type	Trip Purpose						
	Home	Work	Work-Related Activity	School	Medical	Shopping	Other
Home-based Destination	0%	70%	3%	9%	1%	2%	15%
Non-home-based Origin	0%	87%	3%	2%	1%	1%	7%
Non-home-based Destination	88%	2%	1%	1%	1%	1%	6%

Source: 2008 BART Station Profile Study

Notes:

"Other" includes sporting events, restaurants, theaters / concerts, hotels, visiting friends / family, and personal errands.

Table 4: Ridership Profile (Montgomery) – Access Mode

Origin	Share	Access Mode to / from Station					
		Walk (only)	Bus / transit	Drive alone	Carpool	Dropped off	Bicycle
Home	6%	38%	51%	4%	1%	1%	1%
Non-home	94%	94%	4%	0%	0%	1%	1%
Overall		91%	7%	< 1%	< 1%	1%	1%

Source: 2008 BART Station Profile Study

Table 5: Ridership Profile (Montgomery) – Trip Purpose

Trip Type	Trip Purpose						
	Home	Work	Work-Related Activity	School	Medical	Shopping	Other
Home-based Destination	0%	62%	4%	7%	1%	1%	25%
Non-home-based Origin	0%	83%	5%	3%	1%	1%	8%
Non-home-based Destination	86%	3%	2%	1%	1%	1%	6%

Source: 2008 BART Station Profile Study

Notes:

"Other" includes sporting events, restaurants, theaters / concerts, hotels, visiting friends / family, and personal errands.

3.3 Station Capacity

Previous studies have defined future capacity needs at Embarcadero and Montgomery and have identified projects to meet those needs. The current study begins with these earlier proposals for providing additional capacity. The study's purpose is to develop a phased program for expanding and upgrading the stations to handle the current and future ridership in a safe and efficient manner.

3.3.1 Previous Studies

Several past studies evaluated capacity needs at the two stations in some detail:

- Silicon Valley Rapid Transit (SVRT) Core Stations Modifications Study and Constructability and Construction Staging Analysis (2009)
- Sustainable Communities Operations Analysis (2013)
- Transportation Sustainability Program (2014)

These studies are described in the following sections. Further detail is provided in Section B ("Future Projects") of Technical Memorandum #3 ("Base Information").

SVRT Core Stations Modifications Study and Constructability and Construction Staging Analysis (2009)

In preparation for the extension of BART to San Jose, the Santa Clara Valley Transportation Authority (VTA) agreed in 2001 to work together with BART to identify required upgrades to BART's core stations and systems to accommodate the additional ridership and other demands on existing infrastructure. This effort and the related studies are generally referred to as the SVRT Core Stations Modifications Study, and helped identify necessary improvements at several stations across the BART system, including at Embarcadero and Montgomery stations.

An initial study (*Embarcadero Station Capacity Analysis Results and Recommendations*) concluded that additional platform capacity and vertical circulation capacity are needed at Embarcadero Station to accommodate projected ridership in 2030 as a result of expansion of the BART system and continued ridership growth in the core. The subsequent BART-VTA SVRT Core Stations Modifications Study recommended new side platforms in both directions at Embarcadero and in the eastbound (East Bay) direction at Montgomery, as well as new emergency stairways, escalators, and elevators.

BART commissioned a third study—Constructability and Construction Staging Analysis for Embarcadero and Montgomery Station Capacity Study—a two-phase effort that defined the expected impacts to train operations due to side platform construction and performed a conceptual constructability analysis for the project. The third study recommended construction of the new platforms using mined construction, as shown in **Figure 31**, with removal of portions of the load-bearing subway box walls at each station to accommodate door openings.

The new side platforms would be designed to accommodate BART's future fleet of three-door cars in formations up to ten (10) cars long, and would feature platform doors to maximize passenger safety. Openings would also be required in the roof and floor slabs at concourse level to accommodate new vertical circulation elements such as escalators, elevators, and stairwells.

Sustainable Communities Operations Analysis (2013)

In 2013, BART developed a series of three phased service plans to implement BART Metro, a vision for the BART system that seeks to tailor service to future ridership needs. BART Metro redefines the BART system into two major travel markets: the "Metro Core" (frequent, high-capacity service designed to capture trips throughout the day in the denser urban core of the system) and the "Metro Commute" (frequent, peak-period service to capture commute trips to and from regional job centers and less dense areas of the region).

Figure 31: Constructability and Construction Staging Analysis – Side Platforms Study
Reflecting mined tunnel construction technique



Source: PGH Wong Engineering, Inc., 2009

The resulting report, *BART Sustainable Communities Operations Analysis* (BART SCOA), published in 2013, considered a variety of service strategies to implement the goals of BART Metro. The BART SCOA also identified three tiers of capital investment in conjunction with the three phased service plans, including projects such as fleet expansion, modernization of the train control system (TCS), power supply upgrades, new stations, and expansion of storage and maintenance yards.

In terms of specific improvements at Embarcadero and Montgomery stations, the BART SCOA identifies additional platform elevators and automatic fare collection (AFC) equipment at Downtown San Francisco stations as part of the first phase, representing the optimization of the current system. This phase would be capable of accommodating average weekday ridership of up to 500,000 passengers with a fleet of 880 cars.

The second phase would include the new side platforms recommended in the SVRT Station Modification Study, allowing for peak-period frequency increases and accommodating average weekday ridership of up to 750,000 passengers with a fleet of 1,000 cars. The third phase, accommodating ridership beyond 750,000 passengers, would involve a second Transbay Tube.

Transportation Sustainability Program (2014)

As part of San Francisco's Transportation Sustainability Program (TSP), BART examined potential interim capacity improvements at both Embarcadero and Montgomery stations to help accommodate peak-period ridership demands in 2025 and 2040, corresponding to systemwide average weekday ridership of 560,000 and 660,000, respectively. Several potential solutions were evaluated, including the following:

- Increasing escalator speeds and optimizing escalator directions;
- Eliminating furniture, storage space, and other "unusable" space on the platforms;
- Adding platform screen doors;
- Operating skip-stop service; and,
- Increasing train frequency.

The study concluded that adjustments to escalator speed and direction during the weekday AM peak period would be able to resolve oversaturation of the vertical circulation systems at both Embarcadero and Montgomery stations. During the weekday PM peak period, removal of obstructions and unusable space at platform level and installation of platform doors would be sufficient to relieve platform crowding at Montgomery, but not at Embarcadero.

Conversely, having westbound trains skip Embarcadero would effectively shift platform-crowding issues at Embarcadero to Montgomery instead. Increasing frequency in the Transbay Tube, however, would resolve platform overcrowding at both stations during the weekday PM peak period by reducing the accumulation of passengers over time.

Conclusions

The previous studies described above identified critical capacity needs at the two stations. Specifically, the SVRT Core Stations Modifications Study evaluated 2030 ridership forecasts with respect to performance targets for platforms, queue sizes, queue wait times, and emergency evacuation, based on industry-wide standards.

The platform capacity needs are most critical at Embarcadero Station, technically an "infill" station designed after the other Downtown San Francisco stations. Embarcadero Station features a narrower platform width (27 feet, 4 inches) designed to fit within the taper of the tracks on the west approach into the Transbay Tube. As a result, it has less circulation and queuing space at platform level, and less ability to accommodate additional vertical circulation, yet it is the busiest station in the system by ridership.

For Embarcadero, the SVRT Core Stations Modifications Study analysis found that:

- In the AM peak hour, vertical circulation would be insufficient during delay conditions and would fail to meet emergency exiting requirements. Additional vertical circulation between the platform and concourse levels with a combined width of 490 inches would be needed to accommodate 2030 AM peak hour ridership (14,900 alighting passengers).
- In the PM peak hour, platform capacity would fail to provide at least seven square feet per passenger during normal conditions and five square feet per passenger during delay conditions. Additional platform area amounting to 17,900 square feet would be needed to accommodate the accumulation of passengers at platform level during the 2030 PM peak hour (14,000 boarding passengers).
- Vertical circulation between the concourse and street levels would fail to meet emergency exiting requirements, and a combined width of 132 inches of additional vertical circulation would be needed by 2030.

In contrast with Embarcadero, Montgomery features a wider platform width (35 feet, 10 inches) in line with the other Downtown San Francisco stations. Platform crowding during the weekday PM peak period is less severe than at Embarcadero Station. Nonetheless, the SVRT Core Stations Modifications Study analysis found that at Montgomery:

- In the AM peak hour, vertical circulation would be insufficient during delay conditions and would fail to meet emergency exiting requirements. Additional vertical circulation between the platform and concourse levels with a combined width of 462 inches would be needed to accommodate 2030 AM peak hour ridership (15,300 alighting passengers).
- In the PM peak hour, platform capacity would fail to provide at least seven square feet per passenger during normal conditions and five square feet per passenger during delay conditions. Additional platform area amounting to 12,700 square feet would be needed to accommodate the accumulation of passengers at platform level during the 2030 PM peak hour (14,600 boarding passengers).
- Vertical circulation between the concourse and street levels would fail to meet emergency exiting requirements, and a combined width of 88 inches of additional vertical circulation would be needed by 2030.
- Additionally, the study found that 2030 AM peak hour ridership would generate queues longer than 6 persons during normal conditions and queues longer than 8 persons during delay conditions at fare gates exiting the paid areas; two additional fare gates would be needed to reduce these queues below the target threshold.

Based on the outcome of this capacity analysis, the SVRT Core Stations Modifications Study developed a preferred alternative for each station that would meet the specified demands for additional platform space, vertical circulation, and fare gates outlined above to accommodate 2030 ridership:

- For Embarcadero, the preferred alternative proposes adding two new side platforms, new vertical circulation elements, and enlarged concourse paid areas.
- For Montgomery, the preferred alternative proposes adding a single eastbound side platform, new vertical circulation elements, and enlarged concourse paid areas.

This plan advances the preferred SVRT Core Stations Modifications alternative for each station, developing specific concourse layouts and platform operating schemes, vetting them with the City and stakeholders, and identifying a reasonable capacity implementation strategy.

3.3.2 Analysis Refinements

As part of developing a capacity implementation strategy, AECOM conducted a refined ridership and capacity analysis to confirm the conclusions of the previous work and to better quantify the capacity needs at the two stations.

Population and Employment Growth

The first task in this exercise involved revisiting ridership forecasts and investigating key assumptions used to develop those projections to determine the accuracy and any potential margins of error.

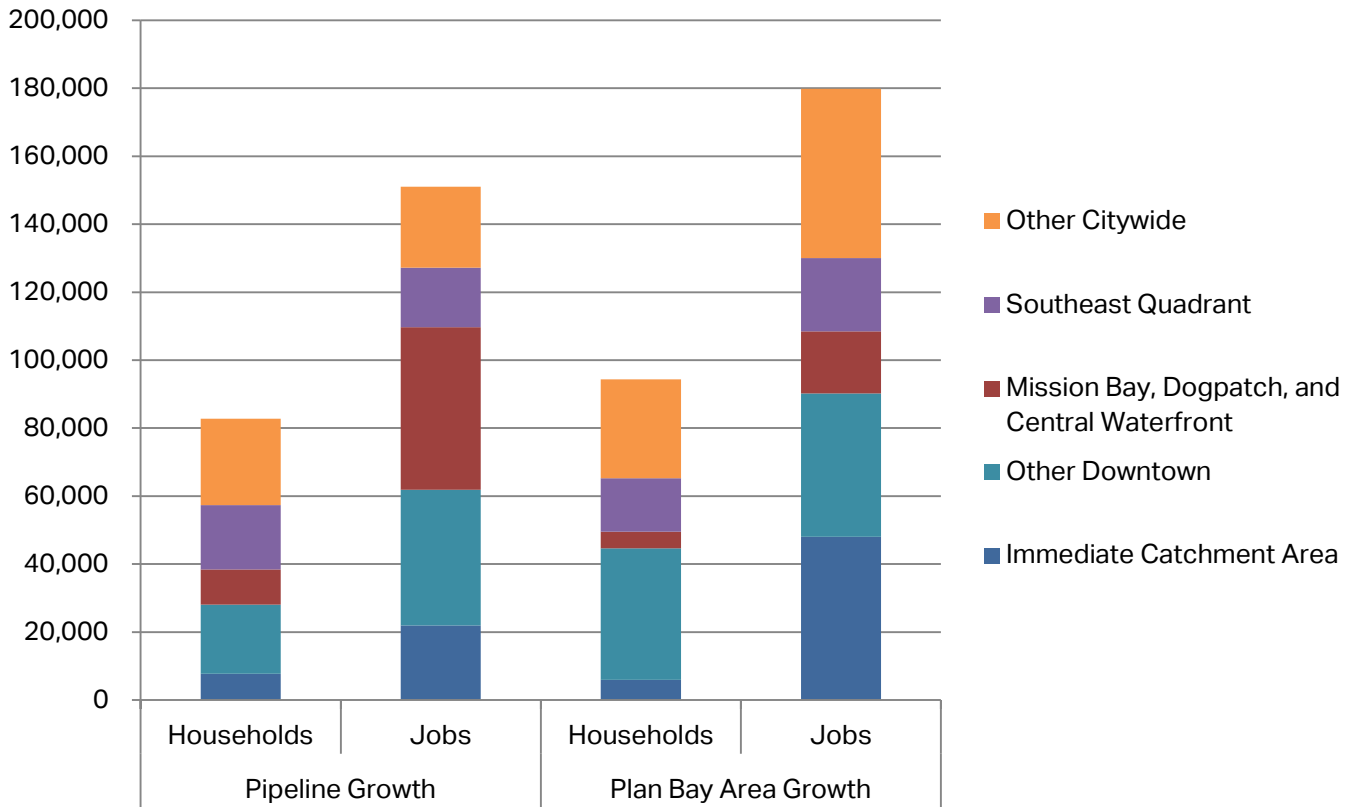
The BART Ridership Model (BRM) forecasts ridership using projections for population and employment growth for the nine-county Bay Area published by the Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission (MTC) as part of regional land use and transportation planning efforts, including Plan Bay Area and the associated travel demand forecasting model maintained by the MTC.

AECOM researched land use development trends, both within the catchment areas of the two stations and citywide, through a variety of sources including the San Francisco Planning Department's Pipeline Report to quantify and geographically identify future growth in population and employment. AECOM also consulted with staff from the SFCTA, which maintains the Chained Activity Modeling Process ("SF-CHAMP") travel demand forecasting model used for projects in the City and County of San Francisco, and the Planning Department, which maintains and regularly updates the land use projections that feed into SF-CHAMP.

A comparison of the tabulated ("pipeline") growth in population and employment against the slightly older ABAG and MTC assumptions in the BART Ridership Model (BRM) showed that the potential margin of error was small. As illustrated in **Figure 32**, the Plan Bay Area growth totals citywide are generally in line with the tabulated growth totals. The Plan Bay Area forecasts can, however, be considered somewhat conservative due to the assignment of more growth to the immediate catchment areas of both stations (roughly encompassing Transbay, Rincon Hill, and the Financial District). The BRM also produced relatively consistent results despite minor adjustments in population and employment growth, and it was determined that further adjustments were unnecessary.

Further detail on the analysis of population and employment growth is provided in Section C ("Development, Land Use and Travel Demand") of Technical Memorandum #3 ("Base Information").

Figure 32: Population and Employment Growth Comparison



Immediate catchment area includes Transbay, Rincon Hill, and the Financial District.

Southeast Quadrant includes the Bayview, India Basin, Candlestick Point, Hunters Point Shipyard, Executive Park, and Visitacion Valley.

Source: AECOM, 2015

Transit Investments

The second refinement task investigated assumptions in the BRM regarding transit connections at each of the stations to determine if any adjustments to the ridership forecasts might be warranted. The BRM assigns ridership to each station based on the same structure of transportation analysis zones (TAZs) used by the MTC’s travel demand forecasting model. Areas outside of the walkshed or bikeshed of the two stations can still generate ridership at the two stations based on the presence of connecting transit routes.

AECOM compiled a list of foreseeable changes to the future transit network⁽¹⁾ to determine whether the TAZ assignments were appropriate and what, if any, changes were warranted. A review of the station catchment areas assumed in the BRM concluded

⁽¹⁾ Future changes identified through this effort include the Central Subway, the Transbay Transit Center (TTC), the Caltrain Downtown Extension (DTX), the Caltrain Modernization (CalMod) Program, Muni’s Transit Effectiveness Project (TEP), statewide high-speed rail service, and other projects.

that no specific adjustments to the TAZ assignments were necessary, but that refinements would be necessary when distributing the ridership growth within each station to the various station entrances and exits, due primarily to the coarseness of the MTC's TAZ structure relative to the required scope of the analysis.

After confirming the conclusions of the previous work, AECOM performed a focused ridership and capacity analysis of each station, including passenger flow simulations of platform, concourse, and street levels to help identify potential "hot spots" or bottlenecks and to test various station layout alternatives. Additional information on the passenger flow simulations is discussed in Section 5.5.

3.3.3 Coordination with Other Transportation Investments

The capacity implementation strategy must also consider any necessary coordination with other planned transportation investments, including efforts being led by both BART and others. AECOM reviewed planned transportation investments for the immediate areas surrounding the two stations to determine potential opportunities and constraints for the capacity implementation strategy. Key projects requiring coordination are described below, with further detail provided in Section B ("Future Projects") of Technical Memorandum #3 ("Base Information"). Details on the analysis of potential opportunities and constraints are provided in Technical Memorandum #5 ("Opportunities and Constraints Analysis").

Better Market Street

The Better Market Street project is a coordinated multi-agency effort between various local city and county agencies. It encompasses 2.2 miles of Market Street from Octavia Boulevard to The Embarcadero and seeks to do the following:

- Increase the speed, reliability, and capacity of transit service;
- Improve accessibility, pedestrian safety, and the pedestrian experience;
- Improve bicycle safety and the capacity to accommodate bicyclists; and,
- Enhance the public realm.

The project scope includes the full right-of-way along Market Street, including sidewalks, the traveled way (curb to curb), and public spaces along Market Street such as One Post Plaza and Justin Herman Plaza. The project is currently undergoing environmental review.

Because a design option for Better Market Street has yet to be selected and refined, the exact effects of the project on Embarcadero and Montgomery stations are uncertain at this time. Although some of the proposed designs may relocate the curb line further from the center line of Market Street, reducing the sidewalk width in some locations, the proposed locations for new or relocated street elevators and new station entrances under the capacity implementation strategy would be similar to locations of existing elevators and entrances in terms of distances from building faces and the center line along Market Street.

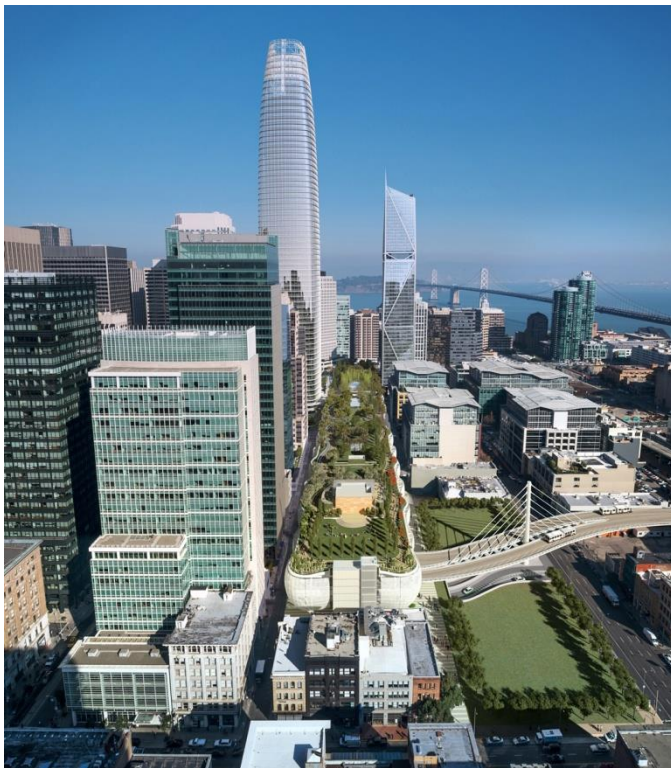
As such, no specific considerations are deemed necessary at this time, with the exception of one adjustment to a proposed widened stairway at Montgomery. Additional minor refinements may be necessary as progress is made on a recommended design for the Better Market Street project. Excavation to construct the side platforms of the capacity implementation strategy should also be coordinated with Better Market Street. Phasing and timelines for the two projects should be carefully considered to take advantage of potential synergies and avoid unnecessary construction work or rework.

Transbay Transit Center

The Transbay Transit Center (TTC), illustrated in **Figure 33**, will create a modern regional transit hub within one block of Market Street, providing good connectivity with BART and Muni Metro. As part of Phase 2 of the Transbay Program, a pedestrian tunnel is being considered between the TTC and Embarcadero Station. Coordination is needed between BART and the TJPA to ensure that capacity improvements facilitate—or, at least, do not preclude—a connection of the pedestrian tunnel directly into Embarcadero Station.

Figure 33: Transbay Transit Center

The Transbay Transit Center will span the blocks between Minna Street and Natoma Street, from approximately Main Street west to Second Street. Similar to the original Key System terminal design, buses from the East Bay will arrive onto an upper bus deck level, while Caltrain commuter rail and intercity high-speed rail services will arrive at the terminal's underground platforms. An underground pedestrian tunnel could connect the Transbay Transit Center with Embarcadero Station.



Source: Transbay Joint Powers Authority, 2015

A pedestrian tunnel is being considered as part of Phase 2 of the Transbay Program and would provide a direct and weather-protected connection to facilitate transfers between the Transbay Transit Center (TTC) and the Market Street Subway (BART and Muni Metro). The tunnel would integrate the TTC and Embarcadero Station as a single hub, reducing transfer times and alleviating congested sidewalks at street level by providing an alternative route for passengers. Alignment studies by the Transbay Joint Powers Authority (TJPA) and coordination with BART identified Beale Street as the ideal alignment for the tunnel.

Coordination is needed with the TJPA to ensure that the improvements proposed under the capacity implementation strategy facilitate—or, at least, do not preclude—a connection of the pedestrian tunnel directly into Embarcadero Station. In particular, changes to the station layout, including concourse-level free and paid areas, as part of the construction of the eastbound side platform should carefully consider how the tunnel would connect into the station.

Downtown Ferry Terminal Expansion

The Downtown Ferry Terminal Expansion (DTFX) would construct up to three new ferry gates, associated landside pedestrian improvements, and passenger amenities. It is designed to facilitate expansion of ferry service on San Francisco Bay, including the following:

- New routes serving Treasure Island, Berkeley, Richmond, Hercules, Martinez, Antioch, and Redwood City; and,
- Modest service increases by the Golden Gate Bridge, Highway & Transportation District (GGBHTD) for ferry service on its Larkspur and Sausalito routes.

Many of the new ferry routes would be concentrated in the Transbay corridor, and would likely attract some riders that might otherwise choose BART, likely helping to reduce some of the ridership demand in the Transbay Tube. In other corridors not well served by BART, such as to and from the North Bay, increased ferry service will attract additional passengers, some of whom may be expected to transfer at Embarcadero Station.

Currently, the Ferry Terminal is not directly connected to the station, and passengers walk along Market Street and across The Embarcadero to make this connection. Improved coordination, such as static and dynamic / real-time signage or pedestrian improvements, could be considered to enhance the safety, visibility, and attractiveness of this connection.

Station Entrance Enclosures

BART is currently designing and testing enclosures for station entrances to underground stations in the system. The enclosure consists primarily of a canopy structure intended to satisfy multiple functions, including protecting open-air escalators from exposure to the elements, closing the entrance at street level to prevent misuse overnight, and providing security cameras and better lighting to increase passenger and employee safety. The enclosure program also includes replacement and / or refurbishment of escalators. Concepts are shown in **Figure 34**.

Design and engineering of enclosures for entrances at Powell and Civic Center stations are already well underway. A discrete timeline for completing enclosures for entrances at Embarcadero and Montgomery stations has yet to be determined, but it is expected that these two stations would be high on the priority list for canopy improvements given the level of passenger use.

The canopies could be designed to integrate new real-time train arrival information, which may encourage passengers to perform errands or conduct other activities before the arrival of their train, thereby reducing congestion and queuing at the platform level. Any modifications to existing street-level entrances under the capacity implementation strategy should be coordinated with entrance enclosures program, and any new station entrances should be designed and constructed with enclosures.

Figure 34: Station Entrance Enclosures (Powell Station Concept)

Entrance enclosures, such as these conceptual designs for Powell, are also planned for Embarcadero and Montgomery



Source: VIA Architects, 2015

Other Projects

AECOM also reviewed other planned and proposed transportation investments in the areas surrounding the two stations:

- Muni initiatives including the Central Subway, Muni Forward, and the Geary Corridor Bus Rapid Transit (BRT) Project;
- Complete Streets enhancements to Second Street (Second Street Improvement Project);
- Bay Bridge West Span Bicycle / Pedestrian / Maintenance (BPM) Path;
- BART extensions and expansions (e.g., BART to San Jose and the East Contra Costa BART Extension (eBART)); and,
- BART systemwide initiatives including the Fleet of the Future (**Figure 35**) and the Train Control Modernization Project (TCMP).

These projects did not directly affect the physical components of the two stations and were determined to have primarily indirect effects, consisting primarily of potential increases in ridership (e.g., BART extensions or Muni service improvements) or changes in passenger circulation and flow at platform and concourse levels (e.g., Fleet of the Future and TCMP). Where necessary, the analysis refinements explicitly consider the potential effects of these projects.

Figure 35: Fleet of the Future (Interior Concept)

BART's new railcar fleet will feature more space for standees, increasing the carrying capacity of trains



Source: BART, 2015

3.4 Station Modernization Assessment / State of Good Repair

3.4.1 Existing Maintenance and Operations Review

Based on a master list of improvement items previously developed under BART's Capital Improvement Program and Station Modernization Program, the project team conducted a field survey of existing conditions and solicited input from BART staff to determine what is needed to bring the stations up to BART standards and current codes.

Needs were identified in station walk-through meetings and interviews with maintenance and operations staff, presented below as bullet points under each area of concern:

Embarcadero

- Capital Needs Inventory
 - Modernize and enlarge station agent booths
 - New machine room needed next to the existing platform elevator to increase reliability
 - New platform seating
 - Add station agent break room and restroom

- Security
 - Raise walls to 5' to reduce fare evasion, using standardized design for continuity throughout the system as well as ease of maintenance
- Fire and life safety
 - Move/reconfigure fire hose cabinets on platform under stairs/escalators
 - Current codes require new fire sprinkler system to be designed and installed
 - Replace platform warning edge tile
- Wayfinding
 - Add backlighting to older wayfinding signs
 - Wayfinding signage for elevator users
 - Update / remove wayfinding signs that are no longer valid
 - Information signs on station agent booths and ticket sales booths should be uniform and professional
 - Provide escalator direction signage
 - Better signage to street elevator needed
 - Replace amenity signs (phones, add fare, and ticket vending)
- Facilities Assessments
 - Functional plan review
 - Storage for dumpsters, utility closet and janitorial equipment
 - Pay phone removal or repurposing
 - Space programmed specifically for art, advertising
 - Relocate Transit Store
 - Redesign open area behind Fire Control Center for possible retail, break room or storage
 - More direct access needed to utility rooms at the west end of the station, including double doors
 - Redesign corners of concourse at portals to eliminate emergency doors, chain wall, and floor mats in conjunction with canopy installation
 - Install integrated trash/recycling bins
 - Materials and finishes review
 - Original granite walls and floors in mezzanine need to be shaved and polished
 - Clean bike station grating/wall
 - Glass partition railing walls are often broken and the repairs take a long time to manage
 - Water intrusion from street at east end of station
 - Brightening (painting) of platform walls
 - Remove graffiti on platform ceiling and address acid wash on stainless steel of janitor closet
 - Mechanical Plumbing/ HVAC /Ventilation & Emergency Ventilation
 - Infrastructure is inadequate to support non-transit functions (retail, coffee shops)
 - CCTV
 - Consolidate conduit/cabling
 - Communications/PA
 - Replace white courtesy phones; improve signage
 - Fare Gates/TVM and other systems
 - Additional fare gates if capacity studies show need

- Lighting
 - Install LED lighting
 - Replace grate ceiling and improve lighting
 - Provide lighting of transit information displays under stairs at platform level

Montgomery

- Capital Needs Inventory
 - Update station agent booths
 - Replace elevator to improve liability; specify glass doors for transparency
 - New platform seating, particularly at east end
 - Improve staff break rooms
- Security
 - Raise walls to 5' to reduce fare evasion, using standardized design for continuity throughout the system as well as ease of maintenance
 - Reconfigure fare barriers to contain elevator within paid area
- Fire and life safety
 - Current codes require new fire sprinkler system to be designed and installed
 - Replace platform warning edge tile
- Wayfinding
 - Wayfinding signage for elevator users
 - Information signs on station agent booths and ticket sales booths should be uniform and professional
 - Provide escalator direction signage
 - Better signage to street elevator needed
 - Replace amenity signs (phones, add fare, and ticket vending)
- Sustainability
- Facilities Assessments
 - Functional plan review
 - Storage for dumpsters, utility closet and janitorial equipment
 - Redesign closed off ticket vending machine area adjacent to elevator
 - Pay phone removal or repurposing
 - Remove Muni transfer machines
 - Reconfigure the concourse paid area to better serve BART functions
 - Remove advertising panels in concourse to increase sight lines
 - Remove double barrier around Muni stair/escalator to increase paid area
 - Redesign the shape of the stair/escalator elements at platform level to aid wayfinding
 - Space programmed specifically for art, advertising
 - Install integrated trash/recycling bins
 - Materials and finishes review
 - Replace platform tile floors with terrazzo, address lighting problem
 - Add lighting, art, advertising to wall above escalator/stairs between concourse and platform
 - Remove adhesive residue remaining from advertising elements
 - Address water intrusion and repaint ceiling
 - Brightening (painting) of platform walls

- Mechanical Plumbing/ HVAC /Ventilation & Emergency Ventilation
 - Infrastructure is inadequate to support non-transit functions (retail, coffee shops)
 - Address mechanical systems that have been shut down due to asbestos issues
- Fare Gates/TVM and other systems
 - Recess TVMs in walls
 - Additional fare gates if capacity studies show needed
- Lighting
 - Implement adjustable lighting system for less light on the trackway, more light on the platform
 - Install LED lighting

3.4.2 Existing Conditions Analysis

To identify potential modernization improvements at each station, an existing conditions analysis was performed based on the maintenance and operations review. The project team reviewed BART's systemwide modernization matrix and notes taken during the station walk-throughs, and then annotated station plans to organize needs and potential projects spatially. An overview of this effort is provided in **Figure 36** through **Figure 39**.

Embarcadero

Overall, Embarcadero is considered to have a number of key assets, including its clear-span symmetry, intuitive configuration and visual connectivity aided by three tiers of ceiling heights and spatial qualities. Enhancing this hierarchy presents a significant opportunity to create a grand station.

Embarcadero Concourse – key needs identified include:

- new finishes, lighting and organization of the entrance vestibules
- repairing the dropped ceilings of the side aisles and intermediate aisles and installing new light fixtures
- reorganization of TVMs and real-time information
- increased fare barrier height
- additional storage opportunities to address clutter
- lighting improvements in side aisles and dead walls and spaces
- clean-up and reprogramming of underutilized spaces with additional retail, vending or station amenities; and
- improved emphasis of the "main hall" ceiling with more appropriate materials and lighting fixtures.

Embarcadero Platform – key needs identified include:

- better real-time train arrival and Muni transfer information
- removal and relocation of free-standing items to increase queuing space
- redesign of seating elements for greater space efficiency; and
- greater elevator transparency to increase security and reduce fare evasion.

Montgomery

Montgomery Station lacks a general sense of spatial organization, in part to monotonous finishes and lighting offering little division of space or use. New functions have been added in an uncoordinated manner due to lack of guiding principles.

Montgomery Concourse – key needs identified include:

- addressing the pinch point between the McKesson Plaza entrance and the concourse paid area
- cluttered concourse “lobbies” blocking visibility and circulation and hiding attractive station features
- additional storage opportunities to address clutter
- insufficient ventilation systems, requiring maintenance and upgrades of the supporting systems
- undifferentiated side aisle and lobby materials and finishes; and
- Underutilized corridors that could be reprogrammed for public/staff space to improve circulation, maintenance, safety, security, and overall station appearance.

Montgomery Platform – key needs identified include:

- better real-time train arrival and Muni transfer information, within available sight lines
- better station identification features
- redesign of seating elements for greater space efficiency and an uninviting platform space due to dark-colored flooring, drab ceiling finish, and overlit trackway.

Figure 36: Existing Conditions Analysis – Embarcadero Concourse Level

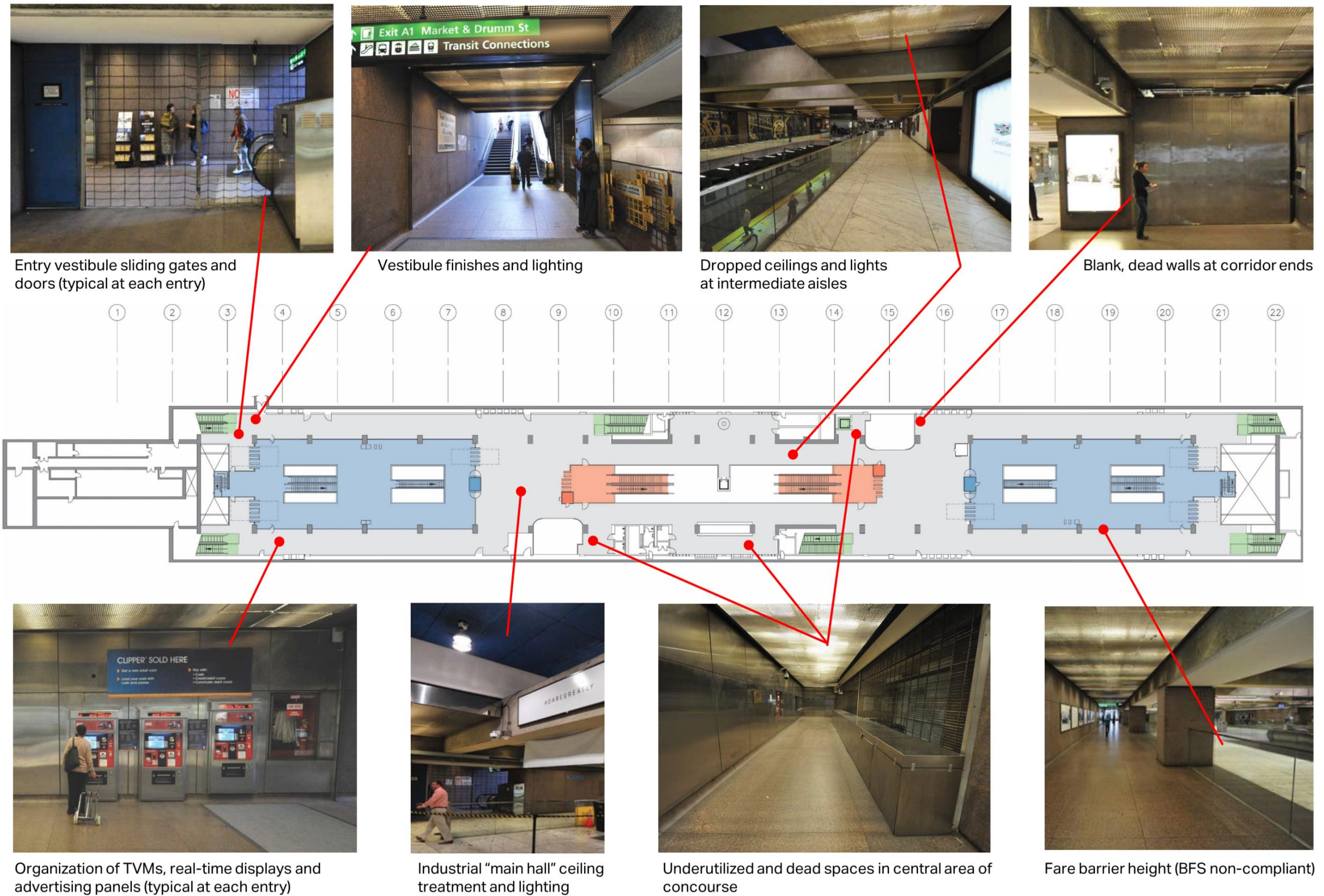
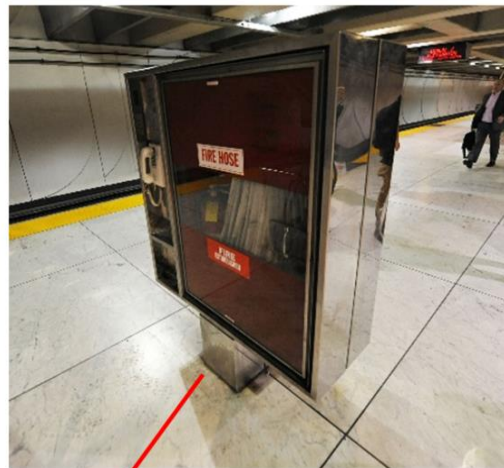


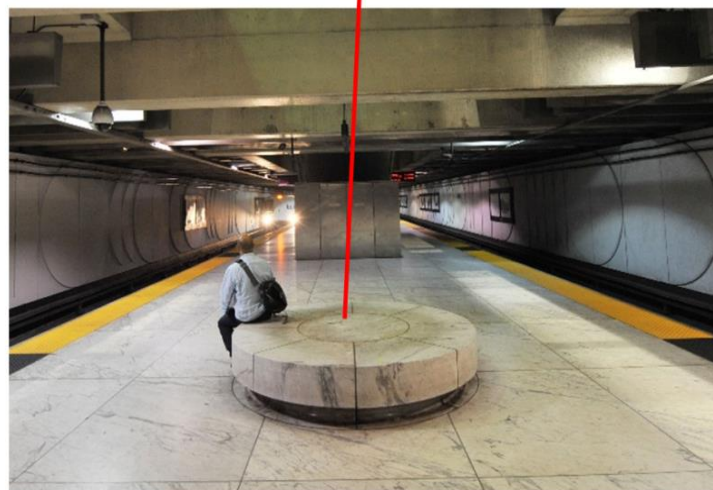
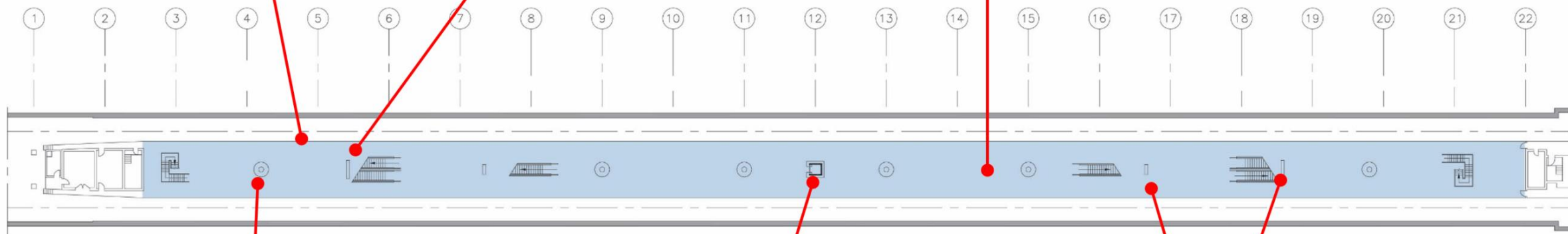
Figure 37: Existing Conditions Analysis – Embarcadero Platform Level



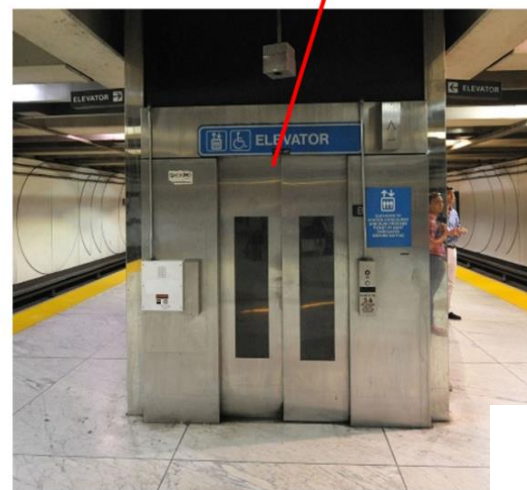
Limited provision of real-time information



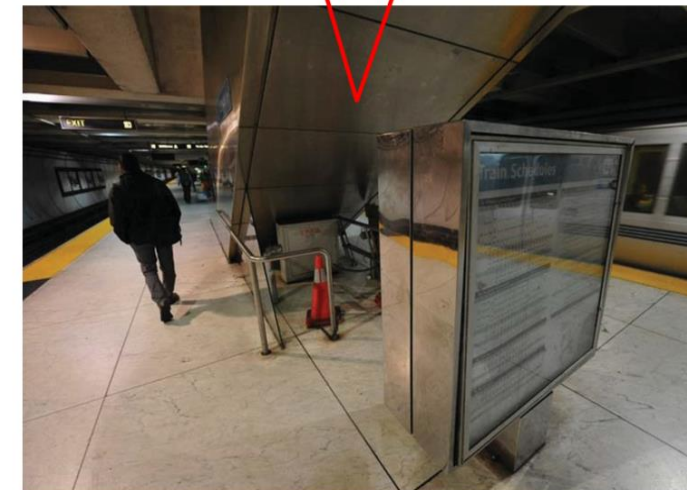
Free-standing elements limit platform queuing space



Large footprint of platform seating limits queuing space



Opaque elevator cladding and open access creates security concerns and opportunity for fare evasion



Clutter and display cases limit platform queuing space (typical of many locations)

Figure 38: Existing Conditions Analysis – Montgomery Concourse Level

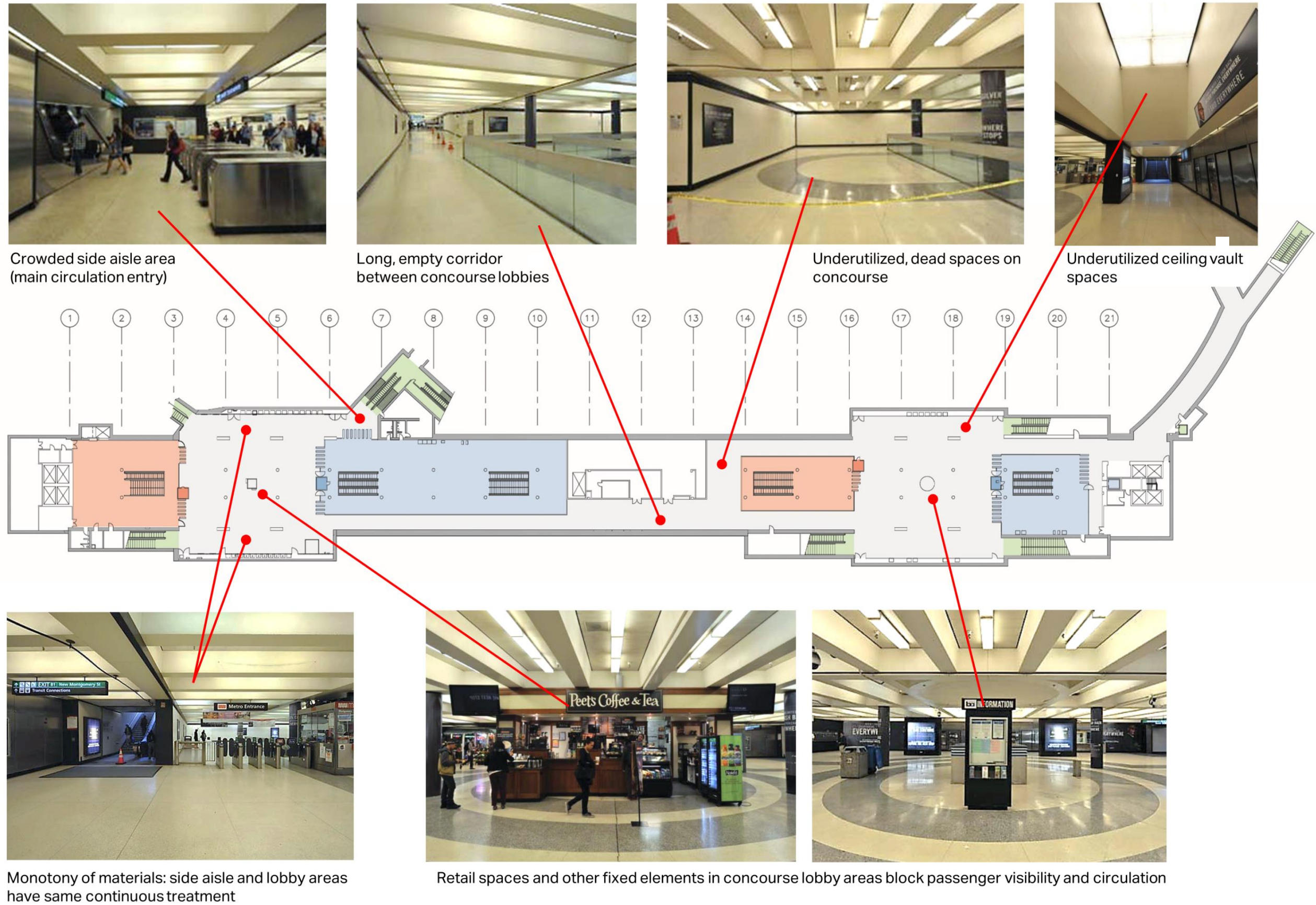


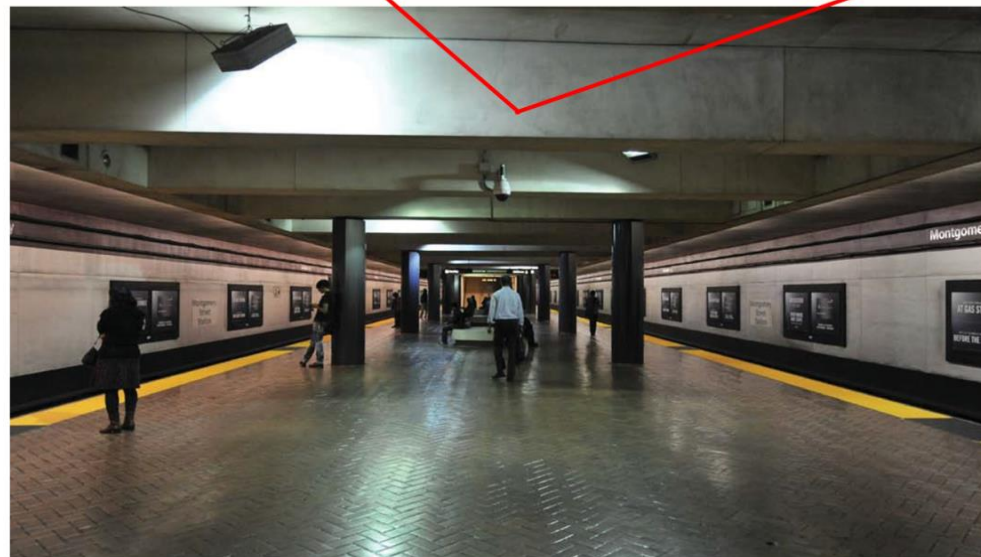
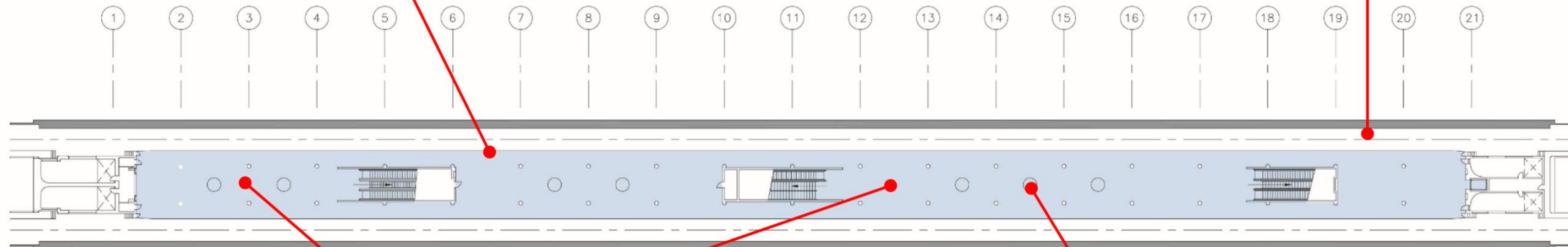
Figure 39: Existing Conditions Analysis – Montgomery Platform Level



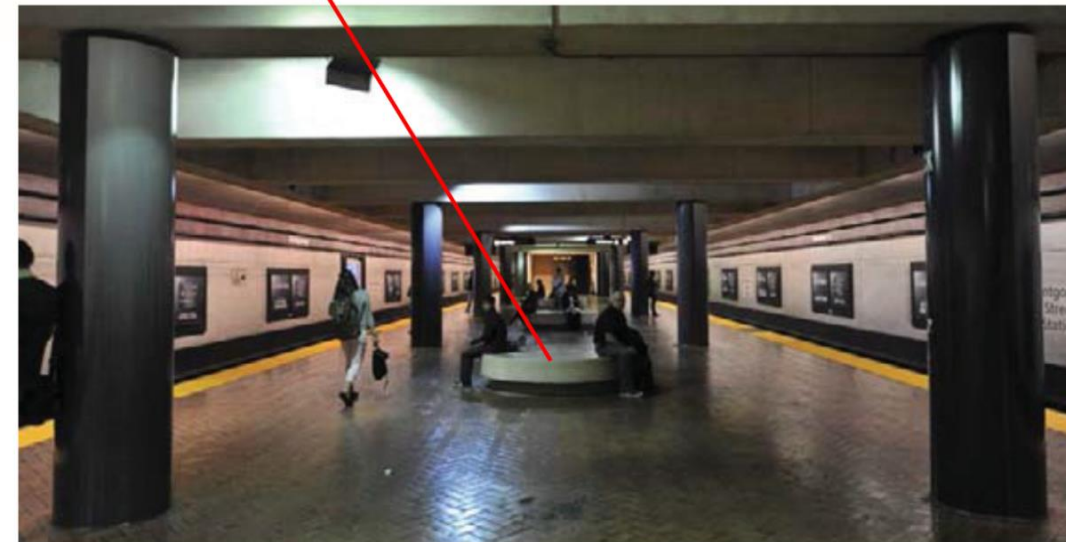
Limited provision of real-time information; partially obscured by platform columns



Lack of visual differentiation in platform materials makes it difficult for riders to identify the station; the color strip above the trackway provides only a limited visual clue



Dark-colored flooring, column covers and drab ceiling finish along with an inverted lighting scheme (sidewalls illuminated more than passenger areas) result in an uninviting and dark platform space



Large footprint of seating and structural columns limits platform queuing space

4.0 Public Outreach

The project team conducted outreach to familiarize the public and seek input regarding the project and related efforts in the area by other agencies. Over the duration of the project, two in-station open house events were held during commute hours in the free area of each station. As shown in **Figure 40**, the project team used presentation boards to introduce station improvement projects for public discussion and comment.

Outreach was accomplished through email blasts, postcard notifications, hand-delivered notices throughout the Market Street corridor, as well as platform-level electronic messages and BART webpage notices. Local stakeholders helped to share open house invitations with their constituents. Title VI outreach was conducted through local limited-English-speaking community-based organizations in and around the project corridor.

October 2014 Open House Events

Over the course of four events during the AM and PM commute hours at each station, over 15,000 take-along cards were distributed, which invited the public to participate in an online survey. A paper survey was also available, along with fact sheets and other information. Nearly 2,900 survey responses were received from riders at Embarcadero, and over 2,000 from Montgomery riders. Translated materials were made available, and all documents featured language translation assistance upon request.

Figure 40: October 2014 Open House Events



Embarcadero – 10/28

Source: AECOM, 2015



Montgomery – 10/30

Feedback was requested with respect to Station Environment, Station Access, and Capacity Improvements, and the results were similar between the two stations. The top priorities in each category are summarized below:

Station Environment

- More cleaning (70%)
- More safety patrols/enforcements (47%)
- Additional/improved lighting (36%)

Station Access

- Real-time arrival displays at street and concourse levels (81%)
- Canopies to protect entrances (54%)
- Clearer public announcements (50%)

Capacity Improvements

- Additional platforms to relieve crowding (73%)
- Faster escalators (65%)
- Reduced platform clutter (56%)

Further detail on the October 2014 open house events is provided in Technical Memorandum #4 (“Community Workshop #1 Outreach Summary”).

October 2015 Open House Events

Following the development of the Recommended Alternative Concept for each station, a second round of outreach was conducted to present the concepts for public review. The following elements incorporated and prioritized in the Recommended Alternative Concepts were highlighted:

- **Improve passenger flow during rush hours:** additional street entrances, new stairs, escalators and elevators
- **Improve elevator redundancy and reliability:** larger, BART-dedicated elevator for existing platform and two elevators per side platform
- **Reduce platform crowding:** reorganization of platform elements to reduce clutter and create more space, new side platforms
- **Better space planning:** expanded paid areas, free circulation between all entrances at concourse level, new retail/amenity space
- **Improve station environment:** cleanliness and brightening
- **Better information:** improved signage, more real-time information on concourse and at street level

Further detail on the October 2015 open house events is provided in Technical Memorandum #9 ("Community Workshop #2 Outreach Summary").

5.0 Recommended Capacity Alternatives

As discussed in Section 3.3.1, previous studies recommended that new platforms be installed outside the existing tracks to increase capacity. This study advances the concept, making sure that side platforms would not conflict with other projects, that they would accommodate expected pedestrian flows, and would be compatible with established BART operations at both the platform and concourse levels. In addition, the plan packages the side platform capacity expansion concept into actionable phases to facilitate implementation.

A substantial part of the study focused on the feasibility of operating side platforms, including the preferred layout of the concourse and vertical circulation to the new platforms. Beginning with the previous studies, alternatives were developed and reviewed by the TAC and BART staff. Through this process, certain options and concepts were dropped from further consideration, and a recommended alternative was selected for each station.

5.1 Overview of Process

A comprehensive, iterative process was used to test potential capacity alternatives for the two stations. As the fundamental capacity improvements at both stations involve increasing and upgrading vertical circulation and the construction of new side platforms, this analysis exercise focused on two key design and operation components:

- *Concourse layout:* The analysis considered potential options for modifying or redesigning the concourse layout to accommodate the new side platforms and associated vertical circulation. This exercise focused on alternatives for the layout of the concourse level at each station, including changes to the free and paid areas, the resulting changes to passenger circulation, and other considerations.
- *Platform operating schemes:* The analysis considered potential operating schemes for the (existing) center and (new) side platforms, including segregation by flow (boarding and alighting), segregation by line (certain platforms would only be served by specific lines), and unrestricted access (where passengers would be able to board and alight from either side).

Concourse Layouts

Potential concourse layouts were developed to accommodate the additional vertical circulation that would be needed to connect the concourse with new side platforms. Initial concepts that did not maintain free area circulation between all existing station entrances and all BART and Muni Metro fare gates were discarded based on stakeholder input. The remaining layouts were developed into two alternatives for each station:

- *Unified Paid Areas:* this alternative enlarges the existing paid areas to accommodate new vertical circulation to side platforms.
- *Split Paid Areas:* this alternative creates new paid areas enclosing new vertical circulation elements, “splitting” the paid area of the concourse into additional elements.

Platform Operating Schemes

Three general platform operations scenarios were identified as follows:

- Scenario 1: All platforms allow boarding and alighting for all lines
- Scenario 2: Side platform(s) allow(s) boarding and alighting, but only for particular lines
- Scenario 3: Side platform(s) is/are used only for alighting or only for boarding, for all lines

Through a performance analysis, the scenarios were rated with respect to how evenly they distributed passengers and resulted in the least crowded escalators and platforms. The results were vetted internally with BART staff and Scenario 2 with the Blue/Green lines (serving Dublin/Pleasanton and Fremont) boarding and alighting at the side platforms was selected as the basis for conducting passenger flow modeling. The models were used to test and refine each of the alternatives, based on metrics such as queuing at vertical circulation and fare gates and crowding at platform level, and confirmed the operational feasibility of the alternatives.

Further detail on the platform operating analysis is provided in Technical Memorandum #7 ("Platform Operations Analysis"). As side platform design proceeds, operations needs and priorities will be reevaluated to reflect current system conditions and emerging technologies.

Recommended Alternative Concept

The results of the pedestrian flow modeling, together with an evaluation of performance relative to BART staff input and priorities, informed the selection process for the recommended alternative concept at each station. Qualitative metrics used in this evaluation included ease of navigation and wayfinding; technological feasibility (train control system); constructability; compatibility with other projects such as the BART–Muni Connection or the Transbay Transit Center pedestrian tunnel; and availability of retail / amenity space.

5.2 Previous Side Platform Constructability Study

Constructability issues and potential conflicts were identified for the proposed capacity upgrades at both stations, building off of work conducted for the Constructability and Construction Staging Analysis (2009).

As indicated in Section 1.4, the Constructability and Construction Staging Analysis identified two potential solutions for construction of the new side platforms. The perimeter soil mix wall is a "cut-and-cover" approach that can result in disruption to street-level circulation and existing utilities. Noise, dust, and impacts to local business are also major concerns with cut-and-cover construction. An alternative method using mined tunneling was also suggested, offering potential benefits in reducing impacts to utilities or street-level circulation. However, adjacent buildings must be closely monitored for ground settlement. Costs for mined tunneling would also generally be higher than for a perimeter soil mix wall approach.

A decision on which solution to adopt would be made if and when the proposed side platforms begin detailed design and construction. However, both approaches are feasible and compatible with the side platforms.

Under both approaches, the side platforms would be constructed adjacent to the existing station boxes, accommodating BART's future fleet of three-door cars in consists of up to ten cars. Portions of the load-bearing station box walls would be demolished, creating openings aligned with train doors. Because portions of the wall would remain in place, train operators would have limited visibility of the platform edge along the side platforms. As a result, platform doors would be installed to ensure passenger safety, as illustrated in **Figure 41**. Openings would also be required in the roof and floor slabs at concourse level to accommodate new vertical circulation elements such as escalators, elevators, and stairwells.

Figure 41: Side Platform (Concept)*Conceptual rendering of new side platform (mined tunneling alternative)*

Source: PGH Wong Engineering, Inc., 2009

Most construction activities would take place outside the existing subway box and would not impact regular train operations. However, construction would require temporary closure of the adjacent track for an extended period of time (10 to 15 weeks per side platform) to accommodate the demolition of the subway box walls. A conceptual scheduling plan would implement single-tracking between 7:00 pm and the end of revenue service on weekdays and during the entire revenue service window on Saturdays and Sundays.

5.3 Initial Concepts

Development of capacity alternatives began with the conceptual plans included in the Constructability and Construction Staging Analysis (2009). To provide access to the new side platforms, the plans presumed that the existing BART paid areas would be expanded to the outside walls of the station so that passengers could reach side platform stairs, escalators and elevators along the outside wall.

This concept would require minimal modifications to the concourse, primarily extending the BART paid area barrier to the side walls and adding fare gates. In addition, once inside the BART paid area, passengers could reach any of the platforms, simplifying wayfinding. However, the expanded paid areas blocked existing paths for passengers and staff to walk from one end of the concourse to the other. In discussions with the project TAC, this was quickly identified as a fatal flaw.

At each station, there are two paid areas and station agent booths for each operator, BART and Muni. Though all four booths are usually staffed, there are times when only one agent is available for an operator. At those times, it is essential that passengers near the unstaffed booth who have questions or problems can easily reach the staffed booth. Conversely, it is also essential that the agent at the staffed booth can easily reach the unstaffed paid area when there are problems.

Development of Alternative Concepts

To maintain a path of travel through the free area of the station for the entire length of the concourse, two alternative concepts were explored for the concourse layout:

- The “unified paid area” concept would provide access to both existing and new side platforms by expanding the existing paid areas at both stations, but not to the outside walls, maintaining a circulation path around the paid areas.
- The “split paid area” concept retains the existing paid areas without modification and creates new paid areas along the outside walls of the concourse to serve the side platforms.

Constructability Concerns

Potential constructability concerns were identified for the “unified paid area” concept, related to passenger circulation at the concourse level. The “unified paid area” option for Embarcadero requires reducing the width of free-area corridors around the concourse perimeter in order to accommodate access to the new side platforms. These corridors fulfill critical circulation needs, including access to the Muni Metro paid area and ticket vending machines. Expanding the station box outward at concourse level at the most constricted pinch points could solve these issues, but would require a more detailed engineering and constructability assessment as described in Section 7.5.3.

At Montgomery Station, the “unified paid area” concept would expand the concourse walls outward to create a new north-side corridor through back-of-house areas housing mechanical systems, such as the fan room. As a result, further analysis and study is needed to quantify ventilation requirements under this option, and to determine alternate locations for this equipment.

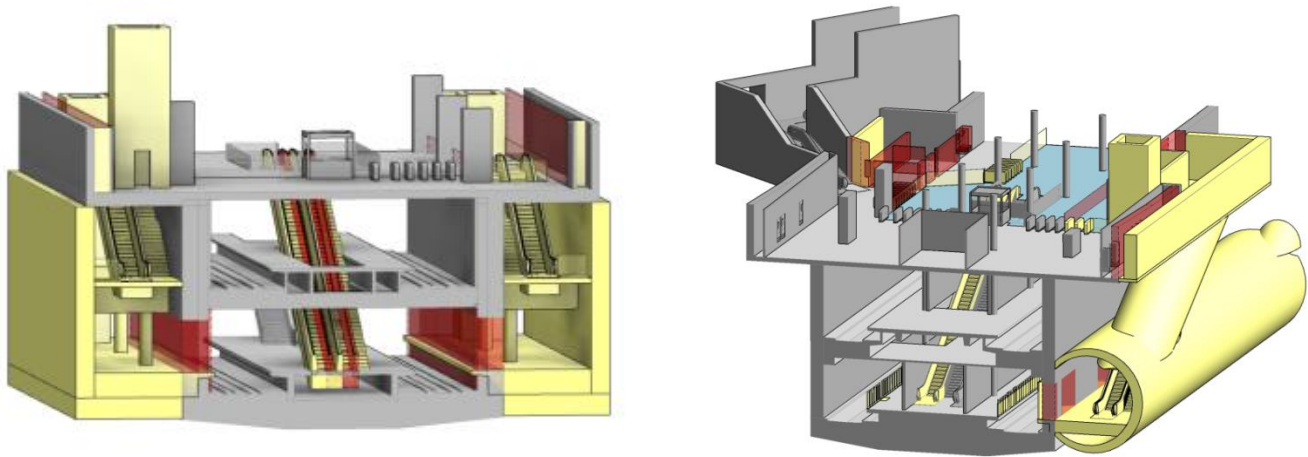
5.4 3-D Station Modeling

Three-dimensional (3-D) digital illustrations were created using Autodesk’s Revit software to support the process of developing a Recommended Alternative Concept for each station. In addition to allowing the station alternatives to be viewed in plan or section, the software generates longitudinal and transverse sections and axonometric views that can be shifted and rotated on-screen to explore various station elements.

As discussed in Section 5.2, there are two potential methods for constructing the side platforms. To illustrate both methods, Embarcadero was modeled assuming the soil mix wall cut and cover construction method while Montgomery was modeled assuming the mined tunneling construction method, as shown in **Figure 42**.

The 3-D illustrations were used for concept development and analysis. Selected views were incorporated into presentations to the project Technical Advisory Committee (TAC), to allow participants to visualize the station reconfiguration associated with implementing side platforms and to prompt discussion and comment. Input received from TAC members was used to develop the Recommended Alternative Concept for each station. Further detail on the 3-D station modeling is provided in Technical Memorandum #6 (“3-D Digital Illustrations”).





Figure 42: 3-D Digital Illustrations



Embarcadero Transverse Section View (Soil Mix Wall)

Montgomery Transverse Section View (Mined Tunnel)

LEGEND

 BART paid area	 Existing structures or elements to remain	 New structures or elements
	 Existing structures or elements to be removed	

Source: Robin Chiang & Co., 2015

5.5 Passenger Flow Simulation

Software-based pedestrian simulation tools were enlisted in the analysis of potential capacity alternatives. These tools are designed to approximate passenger flow through the station, including both platform and concourse levels and both paid and free areas. The software produces a visual simulation of passenger flow, as well as various graphical representations such as density maps that allow for quick identification of hot spots, bottlenecks, and other potential concerns.

The two station layout alternatives—the “unified paid area” concept and the “split paid area” concept—were tested together with the selected platform operating scheme (described in Section 5.5). Both weekday AM and weekday PM peak hours were modeled in this exercise, as the governing capacity constraints are different (vertical circulation during the AM and platform accumulation during the PM).

The simulation models confirmed that both the “unified paid area” and “split paid area” alternatives are feasible from a passenger flow perspective and achieve the primary goal of capacity improvement at the two stations. Passenger flow benefits were greater under the “unified paid area” layout, which generally showed slight improvements in station entrance and fare gate queuing in comparison of the “split paid area” layout.

5.6 Capacity Alternatives Analysis and Recommended Capacity Alternative

With input from BART staff, stakeholders, and TAC members, the "unified paid area" concept was selected as the recommended alternative concept for each station. While the "unified paid area" showed some marginal benefits in terms of passenger flow, there were several key concerns with the "split paid area" concept identified through the vetting process with BART staff and TAC members:

- Difficulty in navigating the station might make a legible wayfinding system difficult. Passengers would need to navigate to the correct paid area before processing their ticket at the fare gates.
- Significant redundancy in personnel (station agents) and equipment (agent booths, add-fare machines, fare gates, etc.) due to a greater number of paid areas.
- Lack of a precedent anywhere in the BART system.
- Less compatibility with the TTC pedestrian tunnel due to lack of a perimeter free-area corridor.

Based on these concerns, the "unified paid area" concept was selected for the recommended alternative concept at both stations.

The recommended alternative concept for both stations is summarized below, with further detail provided in Technical Memorandum #8 ("Recommended Alternative Concept and Construction & Phasing Strategy").

Embarcadero Station

The recommended alternative concept for Embarcadero is illustrated in **Figure 43** and **Figure 44**. As noted in Section 5.4, for comparative purposes, the plan is based on the soil mix wall cut and cover construction method.

Existing paid areas would be expanded to provide access to the new side platforms. Free-area corridors would be maintained around the perimeter of the concourse level, but the width of these corridors would be substantially reduced compared to current conditions in order to accommodate the vertical circulation serving the side platforms. This issue is discussed in more detail in Section 5.3.

On the existing (center) platform, the two escalator-only wells would be upgraded into shared escalator/stairway wells. The existing end-of-platform stairway at the east end of the platform would be relocated to the east, flush against the wall of the east vent shaft. A new platform elevator would be installed at the existing location of the stairway. This new elevator would serve as the primary platform elevator for BART and the secondary platform elevator for Muni Metro for special events or emergencies. The existing platform elevator in the center of the station would be converted for primary Muni Metro use and secondary BART use. Elevators would be as large as practical and, if possible, have faster operating speeds than the current elevators.

Platform doors would be installed on all four platform edges. At the concourse level, two additional entrances would be constructed from street level between Beale Street / Davis Street and Main Street / Drumm Street (one entrance each on the north and south sides of Market Street). The existing street elevator would be relocated to the east, while a second street elevator would be installed at the southwest corner of the Market Street / Beale Street / Davis Street / Pine Street intersection.

Montgomery Station

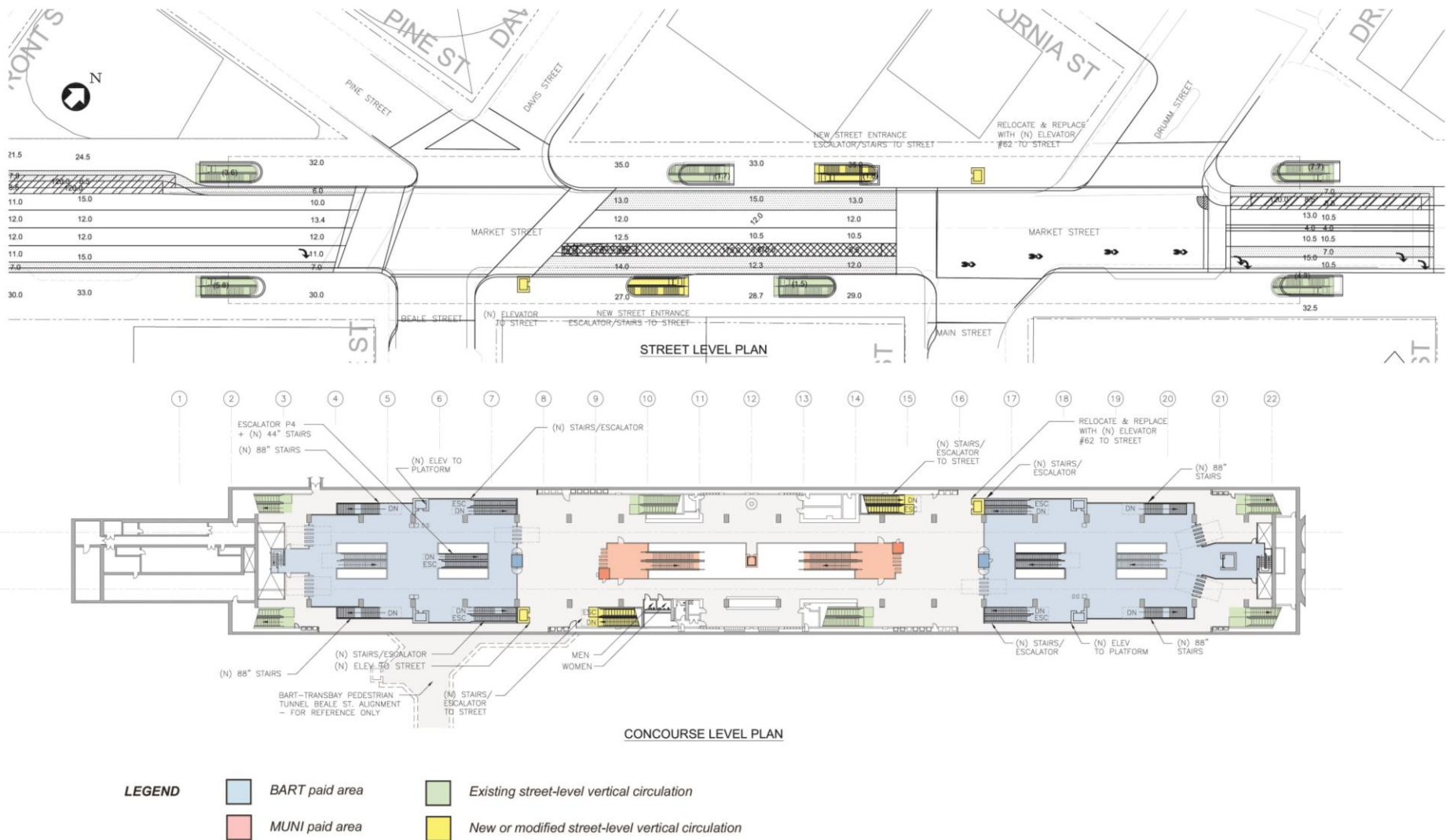
The recommended alternative concept for Montgomery is illustrated in **Figure 45** and **Figure 46**. The plan is based on the mined tunnelling construction method.

Existing paid areas would be expanded to provide access to the new side platform. The primary free-area corridor running east-west through the station is currently located along the south edge of the concourse, but would be relocated to the north side. Potential constructability issues and operational concerns with this relocation are discussed in more detail in Section 5.3.

On the existing (center) platform, a new shared escalator/stairway well and an end-of-platform stairway would be constructed in the eastern half of the platform. A new elevator serving as the primary Muni Metro platform elevator would be installed at the west end of the existing platform, while the existing platform elevator at the east end of the existing platform would be converted to serve as the primary BART platform elevator. Platform doors would also be installed on all three platform edges.

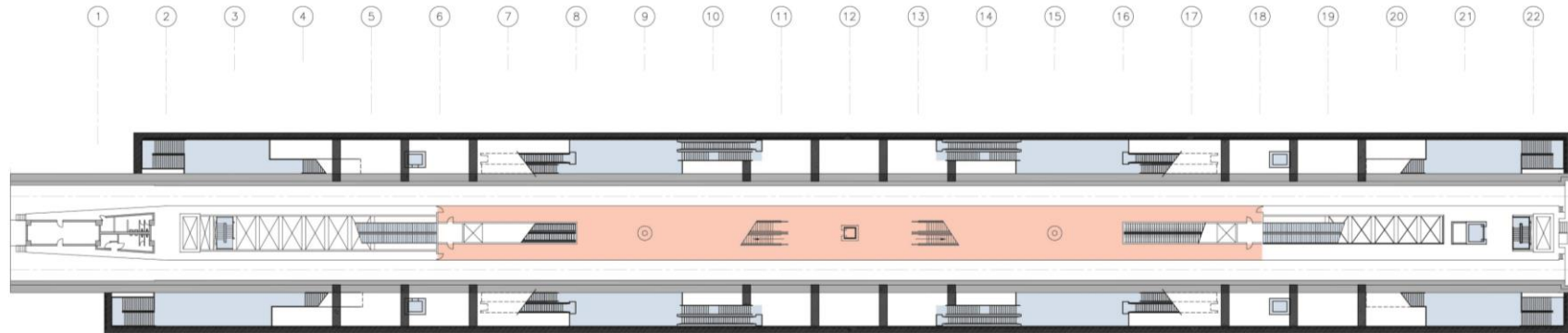
At the concourse level, a new entrance would be constructed from street level, tying into the existing corridor that connects into the Citigroup Center (One Sansome Street) complex and the station entrance on the west side of Sansome Street north of Sutter Street. The new station entrance would surface as a stairway along the north side of Sutter Street, between Sansome Street and Market Street. A new street elevator would be constructed along the south side of Market Street between New Montgomery Street and Second Street.

Figure 43: Embarcadero Capacity Plan – Street and Concourse Levels



Source: Robin Chiang & Co., 2015

Figure 44: Embarcadero Capacity Plan – Platform Levels



MUNI PLATFORM LEVEL PLAN

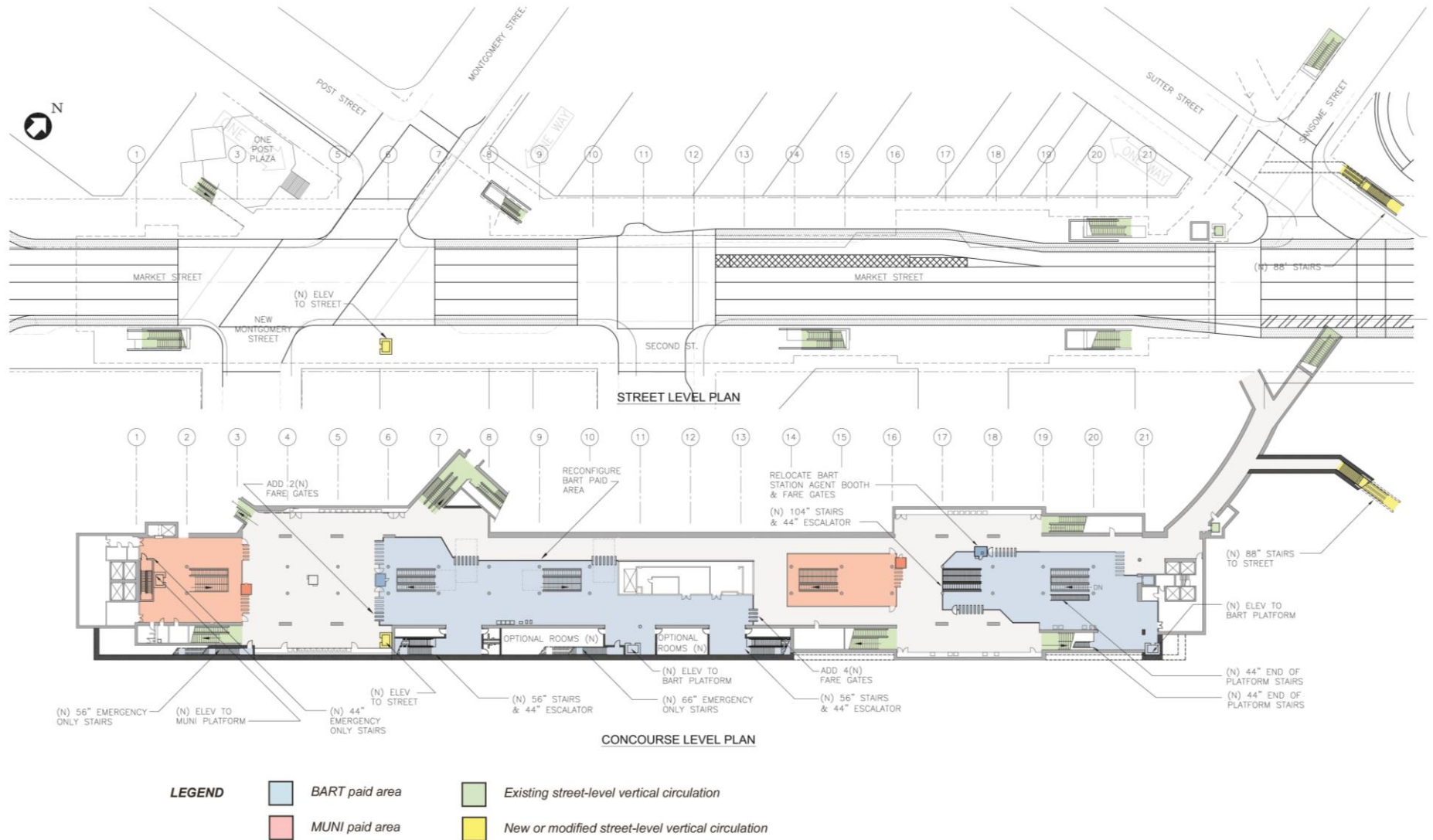


BART PLATFORM LEVEL PLAN

- LEGEND**
-  BART paid area
 -  MUNI paid area

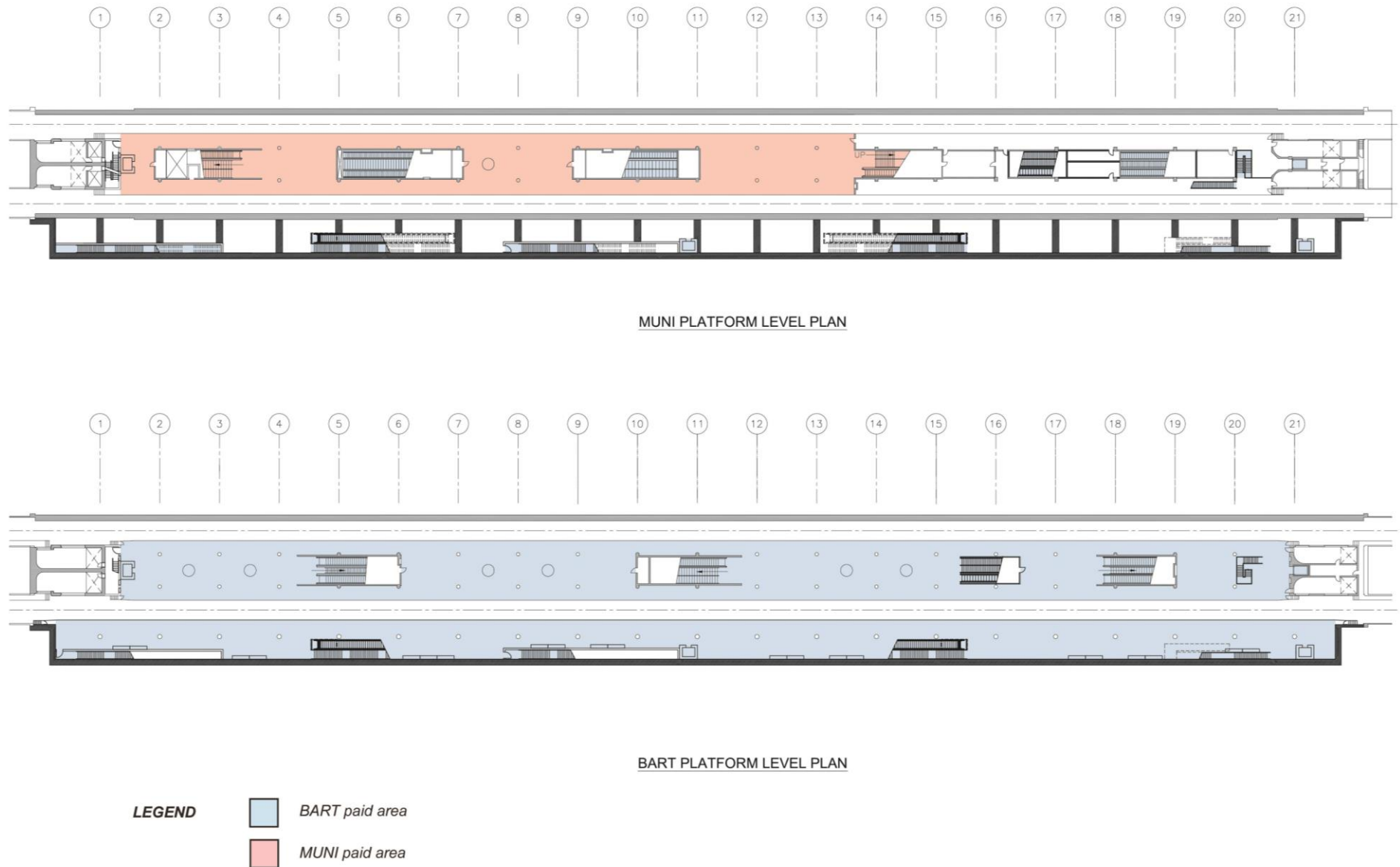
Source: Robin Chiang & Co., 2015

Figure 45: Montgomery Capacity Plan – Street and Concourse Levels



Source: Robin Chiang & Co., 2015

Figure 46: Montgomery Capacity Plan – Platform Levels



Source: Robin Chiang & Co., 2015

6.0 Station Modernization Concept Plan

Parallel to the analysis of capacity alternatives, modernization concepts were developed and integrated with the recommended capacity alternative. This effort began by applying BART's systemwide standards and programs to the stations. During station walk-throughs with BART operations and maintenance staff, plus other agencies' staff, deficiencies were identified and logged. This was followed by an architectural review of each station's aesthetics and function, which led to development of two alternative modernization concepts for each station.

The alternative concepts were presented at a series of meetings with BART staff, providing input to the architectural team to select components from each to include in a preferred modernization concept. Future implementation of the recommended capacity alternative would affect the timing of some components of the modernization concept. Both program elements were reviewed to identify elements that were complementary and those that could be potential conflicts. From these results, a recommended modernization concept plan was developed for each station.

6.1 Parameters

The following parameters were identified, including systemwide parameters (BART's standards, programs, and policies covering a variety of areas such as facilities design and operation, sustainability, and art) and priorities identified by the TAC, to flesh out the capacity implementation strategy and modernization concept plan to the desired level of detail.

6.1.1 Systemwide Parameters

BART has adopted a number of systemwide standards, programs, and policies that govern the planning, design, engineering, and construction of capacity- and modernization-related projects at the two stations.

BART Facilities Standards

The BART Facilities Standards (BFS) describe basic requirements for the design and construction of BART facilities, including standards for materials (e.g., concrete, masonry, metals, etc.); architectural features such as openings (e.g., doors, windows) and finishes; equipment (e.g., escalators, elevators); systems (e.g., fire suppression, plumbing, heating / ventilation / air conditioning (HVAC), electrical, communications, and electronic safety and security); earthwork; exterior improvements (e.g., pavement, landscaping, fencing); utilities (e.g., water, sewer, stormwater); and transportation infrastructure (e.g., tracks and ties, traction power and third rail systems, train control, and ticketing and fare collection). Appendices also provide guidelines such as Station Access and Universal Design. The BFS is updated annually.

Sustainability

BART's Environmental Policy calls for continuous improvement in operating practices aimed at preserving the environment. In particular, BART has established the following goals related to sustainability:

- Promote sustainable, transit-oriented development in the communities BART serves to maximize the use of BART as the primary mode of transportation.
- Enhance the use of resource-efficient and environmentally friendly access modes (e.g. bikes, walking, etc.), and other sustainable features at BART's new and existing stations.
- Integrate sustainability principles and practices including multimodal access into the planning, design, and construction of new BART stations and related facilities.

- Effectively incorporate proven sustainable materials, methods and technologies into BART's Facilities Standard to increase life-cycle value including reduction of energy and resource use, and to enhance the health and comfort of BART employees and customers.
- Apply sustainable techniques and procedures into BART's maintenance projects and operations in a cost-effective manner.
- Develop procurement strategies that incorporate sustainability criteria compatible with federal and state non-discrimination requirements.

Art in Transit Policy

BART's recently adopted Art in Transit Policy calls for implementation of an arts program to enrich the passenger experience, strengthen station identity, establish and enhance connections with communities, and support a distinctive sense of place at stations and beyond. BART has established the following set of eight goals as part of this policy:

- *Cohesion* Create a cohesive and consistent art program.
- *Opportunity* Proactively seek opportunities to implement art across the District, and leverage general capital investments by incorporating art and design elements into public-facing infrastructure.
- *Partnerships* Maximize art in the system by leveraging BART's investments through partnerships with other organizations and agencies, and through grant writing and fundraising.
- *Make Transit Work* Use arts programming to further BART's functional goals and enhance public perception of BART as a transit system that works well for its riders.
- *Showcase Art* Maintain and make BART's art collection accessible through effective asset management and interpretive strategies.
- *Integrated Design* Utilize art to elevate the design of stations and affirm the distinct identity of the surrounding community.
- *Transparency* Establish a transparent and effective process for developing and implementing collaborative projects and programming.
- *Engagement* Engage with communities throughout the BART system to enhance customer relations, support BART's positive impact in communities and create visible expressions of the unique characteristics of neighborhoods around stations and along tracks.

Advertising

BART guidelines for advertising content establish uniform, viewpoint-neutral standards for the advertising displays within BART facilities. The standards are designed to meet the following goals:

- Maintain a secure and orderly operating environment.
- Maintain a safe and welcoming environment for all BART passengers, including minors who travel on or come in contact with the BART system.

- Maximize advertising and fare revenue. In no event shall any advertising be installed without payment of the prevailing commercial rate.
- Avoid identifying or associating BART, its employees, board members, or its contractors with the advertisements or the viewpoints of advertisers.
- Restrict advertising content that 1) can be considered demeaning, disparaging, or inappropriate; 2) depicts tobacco, alcoholic beverages, firearms, or unlawful goods or services; 3) includes profanity, graffiti, violence, or obscenity; 3) is false, misleading, libelous; or 4) injurious to BART and its mission.

Station Retail Program

The goals of BART's Station Retail Program are to improve customer service and create a stable revenue source for BART, without disrupting BART's primary function as a transit service. The Station Retail Design and Development Standards are influenced by the following main objectives:

- Encourage quality design.
- Ensure consistent standards associated with retail development.
- Maintain or improve clarity of circulation.
- Complement the unique existing conditions of each station and the surrounding environment.

The standards also prescribe general guidelines for the types of retail (e.g., mix of national and locally owned businesses), design (i.e., materials and construction, signage and graphics), and systems needs (e.g., utilities, services, and tie-ins). By providing a diverse array of retail services, the program hopes to entice passengers to spend their waiting time at concourse level rather than on platform level, improving station capacity and passenger flow.

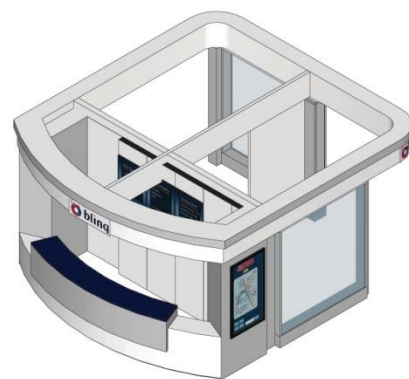
A pilot program at Embarcadero and Montgomery, illustrated in **Figure 47**, will evaluate potential kiosk designs for performance. The installation of additional retail space should be considered carefully, as the stations do not have sufficient utilities (water, sewer, electric, fire protection, ventilation) to support these spaces. In addition, these retail spaces would need to be built to a higher level of safety than normal retail spaces due to their location within a mass transit station.

Figure 47: Station Retail Program

Preliminary concept for station retail at Montgomery Station (left) and Blinq pilot kiosk (right)



Source: EPS-Doublet, 2015



Source: BART, 2015

Wayfinding

The Metropolitan Transportation Commission (MTC), in coordination with transit agencies including BART, has developed the Regional Transit Wayfinding Guidelines & Standards² to ensure consistency across the region as wayfinding signage is deployed and maintained.

The Standards include:

1. Four main sign types: directional signs, wayfinding kiosks, transit information displays, and real-time transit information displays.
2. Guidance to locate signs at key decision points between transit operator services.
3. Design elements to establish a common "look" and "feel" for the signage including:
 - Orange "i" icon on a green background;
 - Standard logos, icons, arrows and messages and an organizing hierarchy;
 - Standard font family (Frutiger);
 - Hierarchy for the location of information on each sign;
 - Consistent map orientation and colors;
 - Directional map compass and walking distance/time radius;
 - Transit stop designation through agency logo / mode icon / route number "bubbles"; and
 - Prominent 511 logo/message and regional transit program information.

The Guidelines are intended to standardize signage conventions among the region's diverse array of transit operators, which will simplify transfers between transit providers and other forms of transportation and facilitate passenger movement through transit hubs and into the surrounding area.

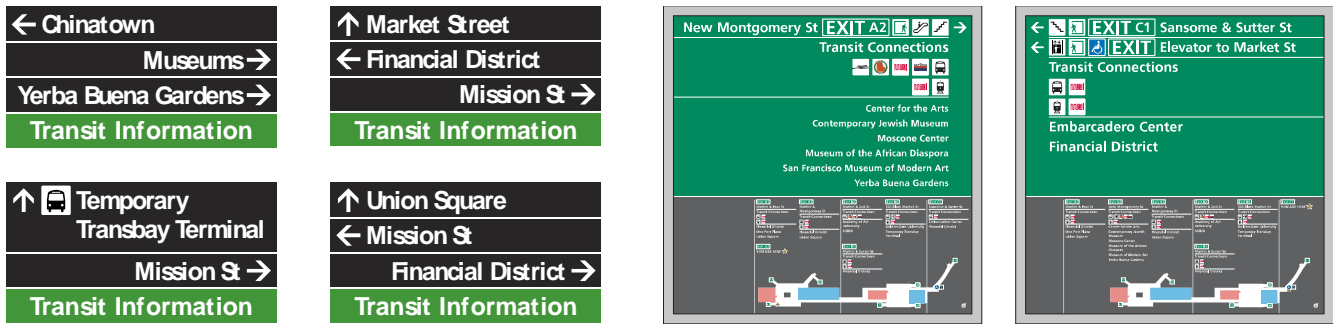
The District's wayfinding program is undertaking a phased implementation plan to incorporate the new BART and MTC signage Standards and Guidelines at its stations. Phase 2, which includes Embarcadero and Montgomery, will provide signage improvements at 16 stations. Existing signs will be replaced and new signs will be added. These new signs will include street level station identification signs and information kiosks, concourse and platform level exit and directional exit signs, and destination signs. New station identification signs will include directional graphics to stairs, escalators and elevators. Transit Information Displays (TIDs) and real-time displays (RTDs) will also be provided at concourse level. Installation has begun and completion is scheduled for late 2016.

BART has currently been replacing and improving the wayfinding systems at many of its stations to incorporate these new regional standards. Examples are shown in **Figure 48**.

In addition, BART is undertaking a RTD upgrade project in conjunction with MTC. Additional RTDs will be provided at the 4 Downtown San Francisco stations (which include Embarcadero and Montgomery) and 2 Downtown Oakland stations. The RTD enhancement project will also include a redesign of the display graphics to improve legibility and provide service alerts to customers.

² http://mtc.ca.gov/sites/default/files/MTC_Regional_Hub_Signage_Standards_2012.pdf

Figure 48: New Signage Standards



New signage installed at Montgomery integrates Regional Transit Hub signage standards (such as arrows, icons and hierarchy, foreground) with BART-specific signage (“BART Entrance”, background), left; Civic Center street level wayfinding kiosk, right



Source: BART, 2015



6.1.2 Technical Advisory Committee Priorities

Several station-specific objectives were also identified through discussions with and input from TAC members, including representatives from Muni Metro. In particular, TAC members identified the following three key objectives that influenced the project development process:

- Maintain unobstructed free-area circulation throughout the entire length of the station and to / from all entrances for passenger convenience and safety.
- Add elevator redundancy to ensure ADA-compliant access in the event of equipment failure or maintenance.
- Deter fare evasion and prevent crime by securing platform elevators within the paid area of the stations.

- Provide an accessible (ADA-compliant) fare gate at each fare gate array per BART Facilities Standards, and consider a second accessible fare gate for redundancy, where feasible.

Discussions at Technical Advisory Committee meetings and with disabled advisory groups resulted in the objective of providing redundant elevators to every platform in the two stations. For the center platforms, this will be done by designating one elevator for Muni and one for BART during normal operations. However, when one elevator is out of service, all passengers will be directed to the elevator that is still in service. For each side platform, two elevators will be provided in case one was out of service. BART will consider multi-door elevators on a case-by-case basis, where feasible.

6.2 Modernization Improvement Project Development

Following the maintenance and operations review and functional analysis, the project team then assessed the overall qualities and potential of the stations and developed various ideas to address the problems found. Initially, two alternate modernization concepts were developed for each station. After receiving feedback from BART, a recommended modernization concept plan for each station was advanced.

Embarcadero was recognized for its many desirable qualities and having the potential to be "world class". The station features cohesive and intuitive architecture, with good transitions between spaces in both materials and spatial quality. However, some programming and finish issues related to the station's age were identified, particularly in the concourse entries and side aisles. Common goals reflected in each modernization concept include:

- As the existing station is elegant in terms of flow, contrast between spaces and openness of design, any proposed improvements should maintain passenger comprehension of spaces and station quality.
- Improve neglected, underutilized concourse areas that compromise station cohesiveness.
- Provide better access to real-time train departure information, especially when there are delays.
- Increase platform capacity by consolidating, reducing, and eliminating items that take up valuable queuing space.

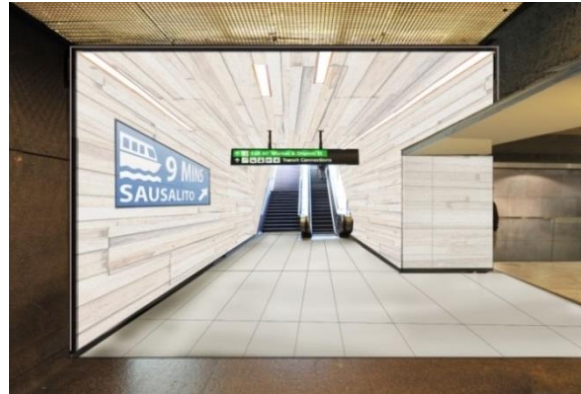
The two Embarcadero modernization concepts are illustrated in **Figure 49** through **Figure 51**.

- Concept A – "Grand Hall": this concept would introduce a new ceiling spine treatment with integration of new side bay ceiling and lighting. The ceiling would be expanded over walkway areas to create a cohesive concept running the entire length of the concourse. New wall finishes would be installed to mask existing dead spaces and allow them to be reserved for future amenities and additional retail. The side aisles would be refreshed with a new ceiling treatment and real-time information displays would be introduced.
- Concept B – "Central Lobbies": this concept would feature a new ceiling treatment, lighting, real-time displays, coordinated retail and public art. Side aisle areas would be renovated to accommodate retail/amenity and staff spaces. New "connector" bridges would tie retail/amenity spaces together, assuming future retail consolidation following capacity modifications. Entry vestibules would receive new lighting and real-time information displays.

Figure 49: Embarcadero Modernization Concepts – New Ceiling and Improved Entries



Concept A – New Ceiling
Source: Robin Chiang & Co., 2015



Concept B – Improved Entries

In both concepts, similar strategies were considered for the platforms. Freestanding items would be reduced or consolidated. Seating would be modified for greater space efficiency. The existing elevator would be refit with transparent cladding.

Figure 50: Embarcadero Modernization Concept A

Concept A – “Grand Hall”

Major Design Features

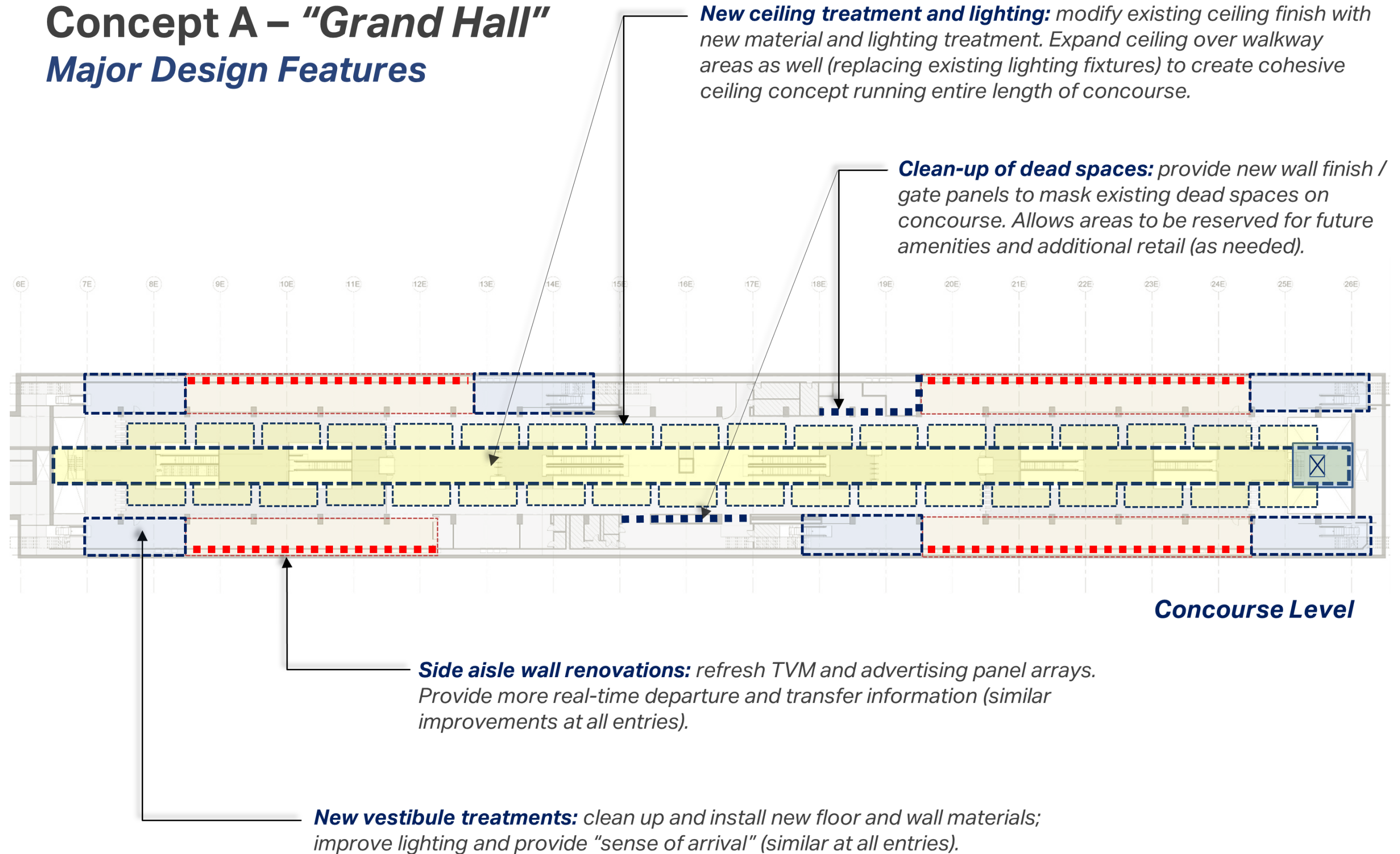
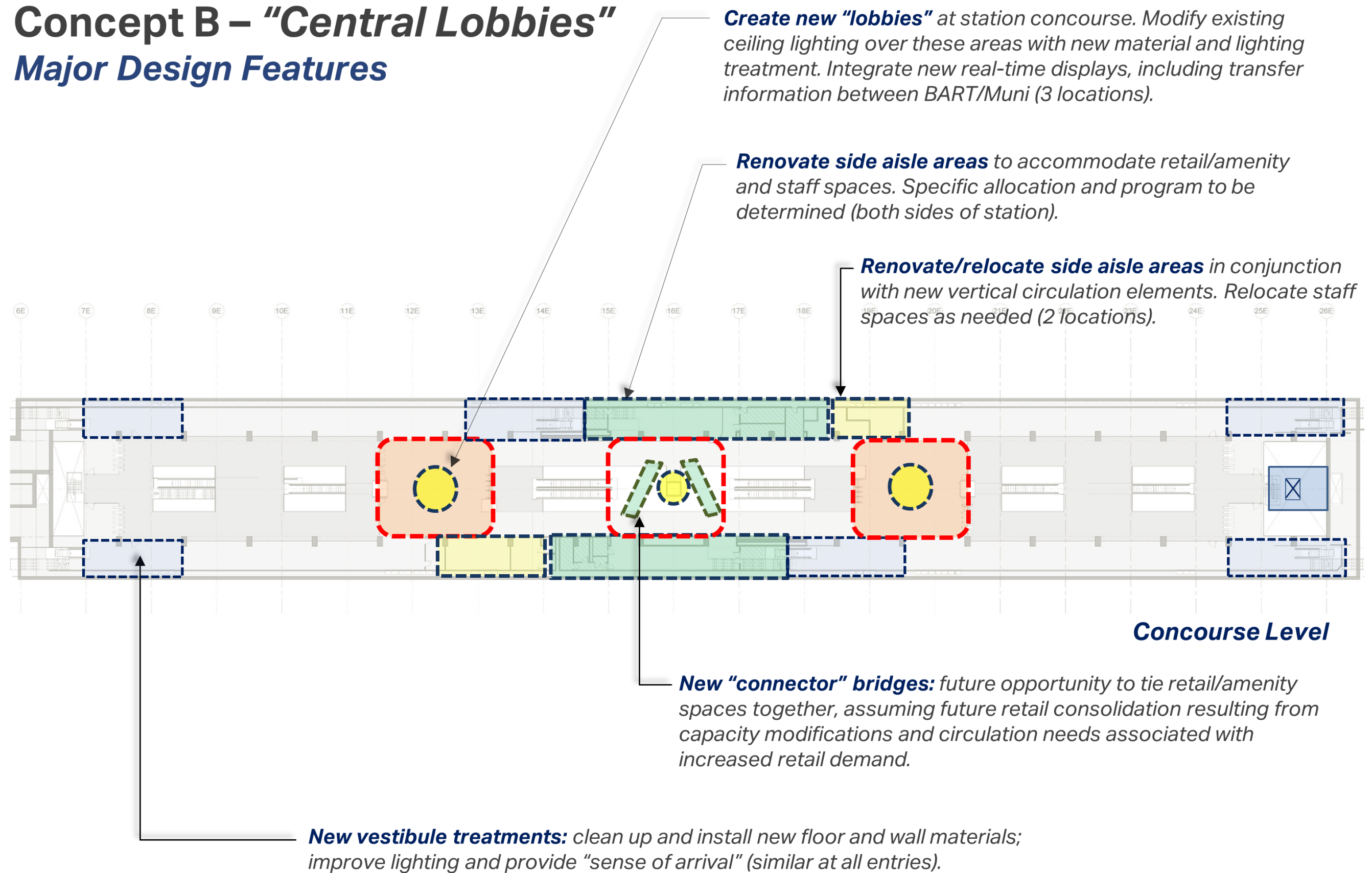


Figure 51: Embarcadero Modernization Concept B

Concept B – “Central Lobbies”

Major Design Features



Montgomery is challenged by monotonous finishes and undifferentiated lighting, as well as a lack of a well-defined concept for retail and advertising. The concourse's many "dead spaces" and under-utilized areas are a concern, but present a significant opportunity for repurposing and reprogramming. At the platform level, visual order is inverted with the sidewalls being bright and the actual passenger space being dark, dirty and unappealing.

Common goals reflected in each modernization concept include:

- Improve passenger comprehension of spaces, transparency and ease of use.
- Provide better access to real-time train departure information at the concourse level.
- Decrease visual and physical clutter.
- Introduce guidelines on integrating retail and advertising.
- Create a more passenger-friendly platform environment.

The two Montgomery concourse modernization concepts are illustrated in **Figure 52** through **Figure 54**.

- Concept A – "Open Centroid": Open centroid space for circulation, new ceiling treatment, real-time display and new "pop-up" retail. Relocate retail from centroid to under-utilized space, and introduce new side-aisle wall, ceiling, and floor treatments.
- Concept B – "The Hubs": Open centroid space with new transparent retail features, integrate new real-time information display, and focus attention on "hubs" centrally located between Muni and BART paid areas. Maintain simplicity of finishes, including terrazzo floor and coffered ceiling to act as backdrop for "hub" structures.

Figure 52: Montgomery Modernization Concepts – Lobbies and Ticketing Areas



Concept A – Opening Up Lobby Spaces

Source: Robin Chiang & Co., 2015



Concept B – Renovation of Ticketing Areas

A single modernization concept was developed at the platform level. A new dropped ceiling panel and recessed lighting would be installed, the sidewalls would receive new treatment, and flooring would be replaced. Seating would be modified to achieve greater space efficiency. The modernization concept also considered the integration of the capacity improvements of an additional concourse to platform elevator and platform screen doors.

Figure 53: Montgomery Modernization Concept A

Concept A – “Open Centroid”

Major Design Features

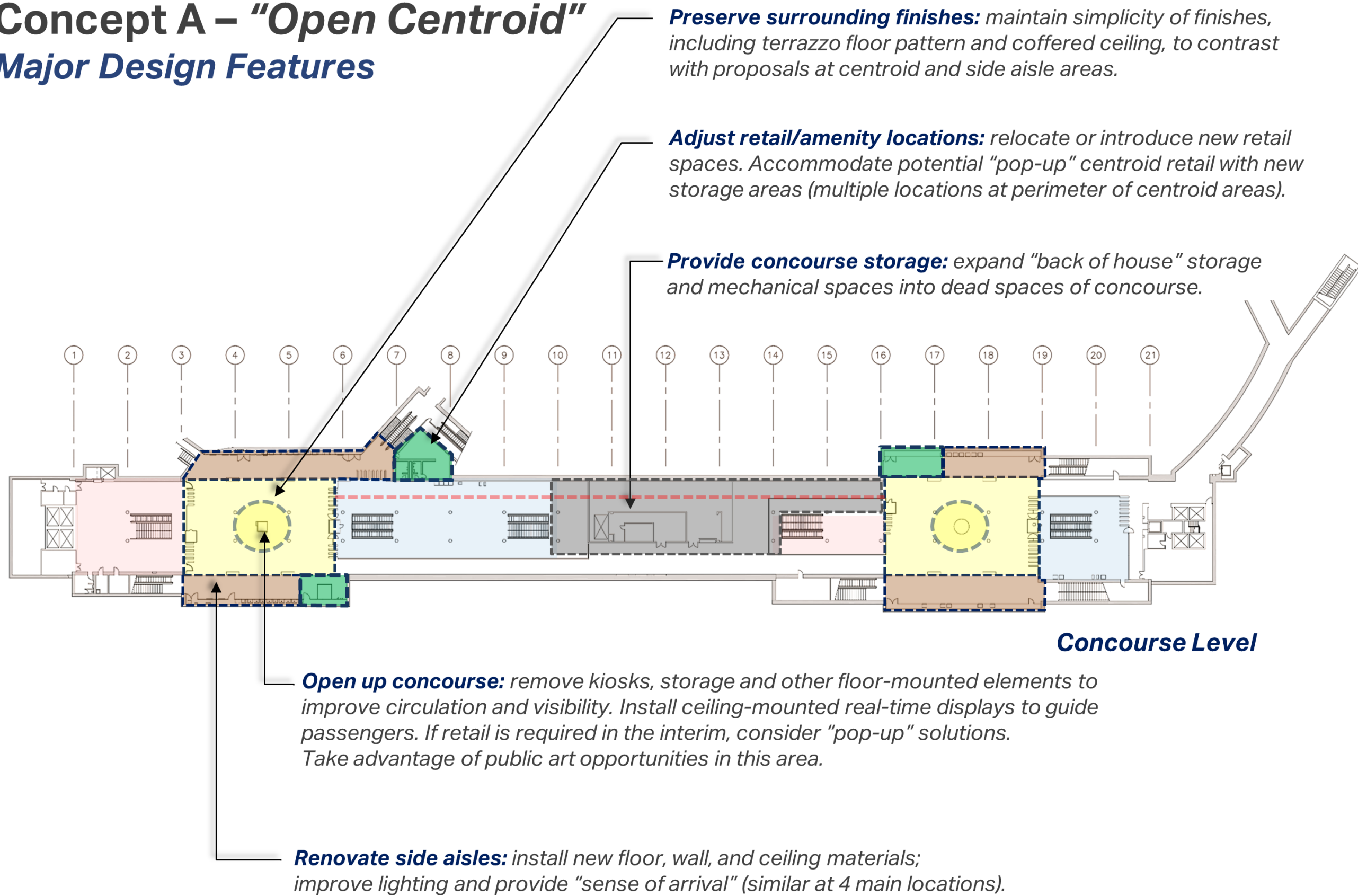
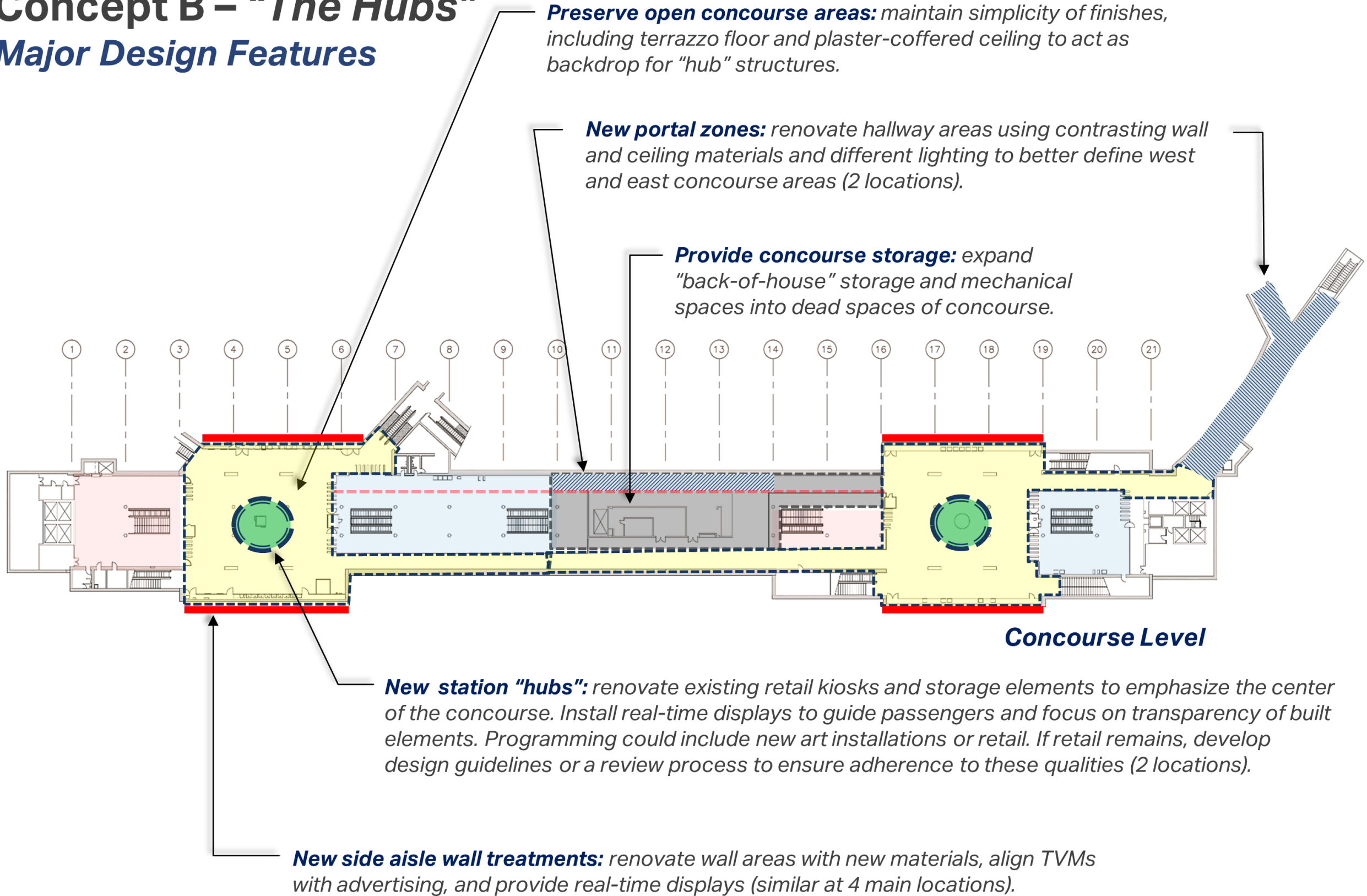


Figure 54: Montgomery Modernization Concept B

Concept B – “The Hubs”

Major Design Features



The development of two modernization concepts for each station and subsequent vetting with respect to compatibility with capacity improvements led to the selection of a preferred modernization concept that includes elements of both concepts and advances common modernization goals.

The preferred modernization concept allows flexibility with respect to phasing and recognizes that individual projects will require their own design processes. Coordination of the various projects will be an ongoing effort as they are planned and designed, with implications that cannot be completely anticipated at this time.

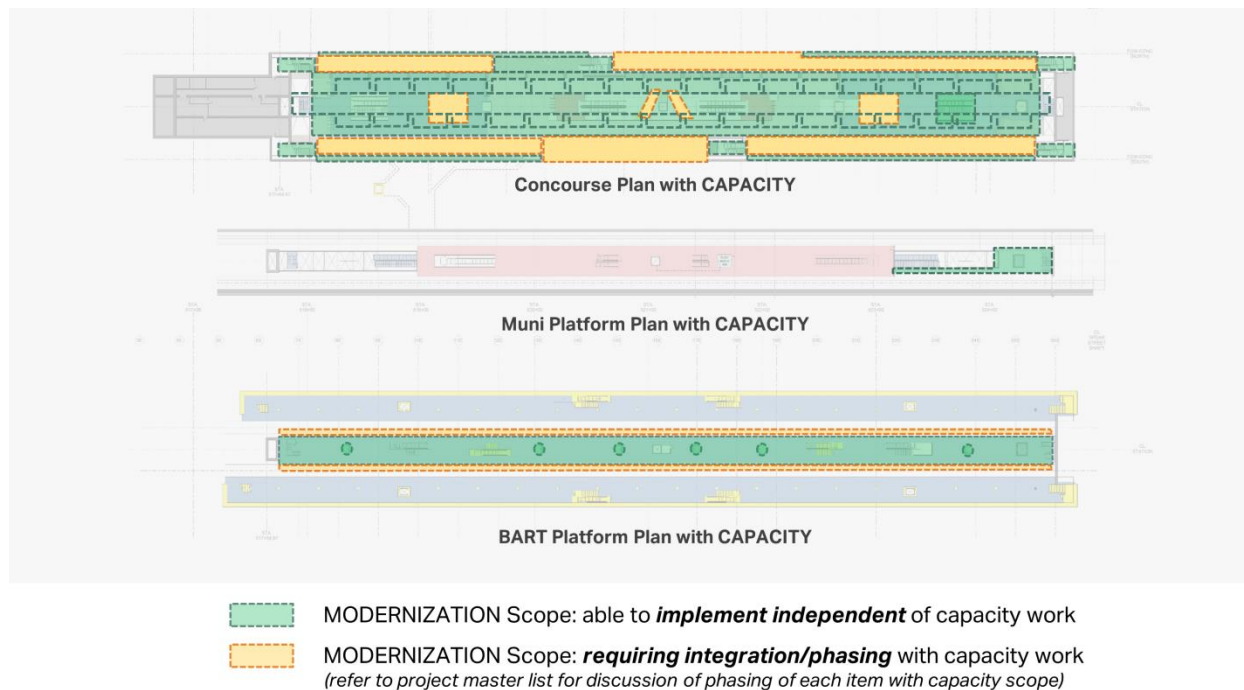
6.3 Synthesis of Capacity and Modernization Improvements

The Recommended Modernization Concept Plan for each station includes both capacity-related and modernization-related elements. The capacity improvement alternatives and modernization concepts described in Sections 5.1 and 6.2 were reviewed to identify complementary and opposing elements.

In some cases, modernization and capacity improvements could be modified into an integrated project preserving the objectives of both. In cases where this would not be feasible, contradictory relationships could be resolved by phasing. For instance, in the long-term future (10-20 years out), a modernization improvement may be incompatible with a capacity improvement; but the modernization improvement may have value in the near-term (within 10 years) before being modified or replaced by the long-term capacity project.

Figure 55 and **Figure 56** that follow illustrate the process of identifying modernization projects that could be implemented independently of capacity projects, and modernization projects that would require integration or phasing.

Figure 55: Synthesis of Capacity and Modernization Improvements – Embarcadero

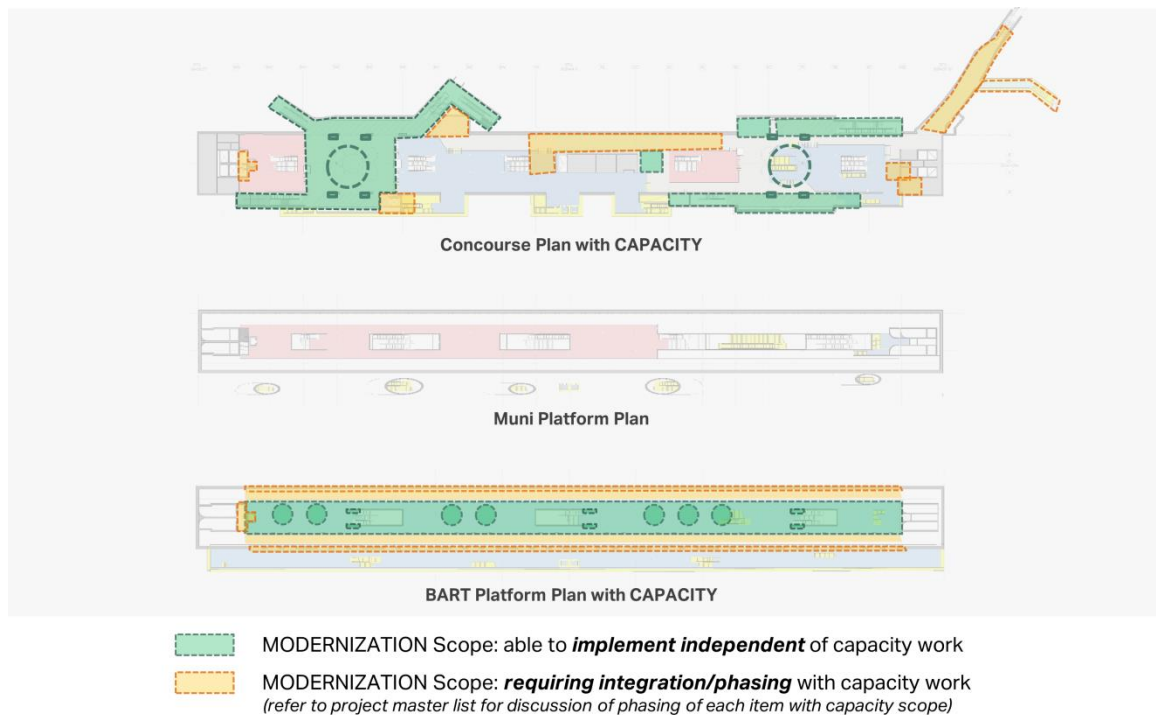


Source: Robin Chiang & Co., 2015

At Embarcadero, concepts for modernizing the station’s central spine with ceiling and lighting treatments could proceed independently of capacity projects. However, capacity needs for additional street entrances and expanded paid areas at concourse level conflict with modernization concepts for side aisle treatments and potential new retail and amenity spaces.

At the platform level, installation of platform doors to address capacity needs would need to be phased or integrated with modernization concepts for lighting and flooring finishes. The platform edge would likely need to be removed to accommodate the platform screen doors, requiring conformation with the platform flooring. Thus, new flooring would best be installed in conjunction with the platform screen doors to avoid replacing portions of the floor more than once.

Figure 56: Synthesis of Capacity and Modernization Improvements – Montgomery



Source: Robin Chiang & Co., 2015

At Montgomery, concepts for modernizing the station lobbies could be implemented largely independent of capacity projects. However, capacity needs for an expanded paid area at concourse level, with a new north side through corridor, conflict with modernization concepts for new retail or amenity spaces. Improvements to the area where the through passageway is currently located would need to wait until the through corridor is relocated from the south to the north side of the station.

At the platform level, installation of platform doors to address capacity needs would need to be phased or integrated with modernization concepts for lighting and flooring finishes. New sidewall treatments would need to be integrated or phased with the capacity project to implement of a new side platform.

The following sections present an overview of the modernization concept plan for each station, highlights of a master list of modernization improvements, and concept plan drawings. There are two sets of plan drawings for each station. The first set is drawing on a base plan showing the station’s current configuration. Most of the projects identified here in Section 6 are shown on these plans. The second set is drawn on a base plan showing the station’s future configuration when the new side platforms have been added. In general, the projects described in Section 5 are shown on these plans.

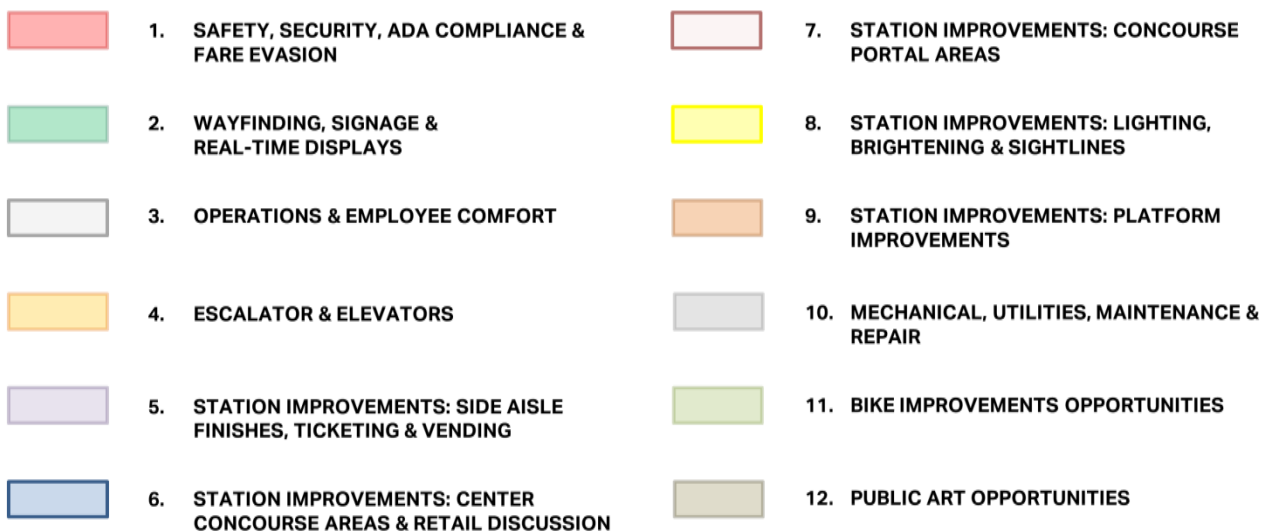
6.4 Embarcadero Modernization Concept Plan

The Embarcadero Modernization Concept Plan addresses the following elements:

- Vertical circulation capacity
- Improved platform capacity – reduce seating footprint while retaining or increasing seating capacity, consolidate free-standing items and upgrade elevator
- Implementing a new visual and functional concept for the station – create a “world class” station experience, implement new street level canopies at entries
- State of good repair – return facilities and systems to a state of good repair, replacing elements and components at the end of their useful life
- New ceiling – improved appearance and lighting
- Improved entries – new flooring, lighting and finishes
- Enhanced passenger information – better transit information signage and integrated real-time information
- Renovated ticketing areas – new wall design, replacement of lighting and ceiling finishes, cleaning and polishing of walls and floors

A Master Project List has been developed including all projects in the Embarcadero Modernization Concept Plan. Each project is cross-referenced by number on the conceptual plans and in the project list. The Master Project List is organized into twelve areas of concern as follows. The areas of concern are color-coded as shown in **Figure 57** on the conceptual plans and in Master Project List. Below, the highlights under each area are presented; the complete Master Project List is provided in the Appendix.

Figure 57: Color-Coding Scheme for Projects



Source: Robin Chianq & Co., 2015

1. Safety, Security, ADA Compliance and Fare Evasion

Near-term projects (within 10 years) include ADA improvements to detection devices, signage, amenities and handrails:

- Limiting fare evasion
- Improvements to electrical and lighting
- Repair/replacement of damaged glass partitions
- Redesign/relocation of fire command center location
- Implement design changes to address security concerns, allowing BART to re-open public restrooms

Middle-term projects (5-15 years out) include:

- Improved safety and security through use of new security cameras
- New public restroom (new location)

2. Wayfinding, Signage and Real-Time Displays

Projects include:

- Better wayfinding and less signage clutter
- Better organized and located station advertising
- Improved availability/design of real-time display information

3. Operations and Employee Comfort

Projects in the near term (within 10 years) would include an improved public address (PA) system and audible messages, and in the middle term (5-15 years out) station agent booths would be renovated or replaced.

4. Escalator and Elevators

In addition to elevator and escalator maintenance, replacement of the existing concourse to platform elevator and installation of a new elevator machine room are key near-term projects (within 10 years). Long-term projects (10-20 years out) include:

- Installation of new stairs between the concourse and platform levels
- New elevators and escalators between the concourse and platform/street levels

5. Station Improvements: Side Aisle Finishes, Ticketing and Vending

Additional vending, ATM and change machines at concourse ticketing areas are near-term project to be implemented in the next 10 years, while in the middle term (5-15 years out), the "side aisle" areas of concourse would be renovated, removing outdated/abandoned items.

6. Station Improvements: Center Concourse Areas and Retail Discussion

Near-term projects (within 10 years) include:

- Removal/relocation of barrier/storage items to improve circulation at concourse level
- Station-specific retail guidelines to better define physical requirements for retail establishments
- Improvements to retail/amenity spaces at concourse level
- Ceiling and wall repairs
- Station-specific advertising guidelines and evaluation of advertising locations relative to BART's wayfinding and public art programs

7. Station Improvements: Concourse Portal Areas

In the near-term (within 10 years), concourse entry spaces would be improved.

8. Station Improvements: Lighting, Brightening and Sightlines

Near-term projects (within 10 years) include:

- Maintaining lighting
- Improving sightlines for passengers on the concourse level by relocating items that block views
- Removing redundant security cameras and exposed wires
- Removing outdated fixtures

Middle-term projects (5-15 years out) include:

- Installing new lighting
- Renovating ceilings (avoiding the removal of existing finishes, which would likely trigger asbestos abatement of the existing steel structure)

9. Station Improvements: Platform Improvements

Near-term projects (within 10 years) include:

- Platform improvements to lighting and visibility
- Platform circulation and queuing improvements (seating replacement)

In the long-term (10-20 years out), platform screen doors would be installed and platform edge tiles would be updated to current standards.

10. Mechanical, Utilities, Maintenance and Repair

Trash storage facilities would be improved in the near term (within 10 years), followed by widening the entries to mechanical rooms to improve access. In the middle-term (5-15 years out), new fan room/ventilation equipment would be installed to address station ventilation issues and station infrastructure would be upgraded to accommodate planned retail/amenity build-outs.

11. Bike Improvement Opportunities

In the near-term (within 10 years), bike access would be improved through projects such as stair channels.

12. Public Art Opportunities

New public art opportunities/installations would be introduced.

Plan Drawings

Plan drawings of the Embarcadero Modernization Concept Plan are presented on the following pages, organized by the three station levels (concourse, Muni platform, and BART platform) and by sector. For presentation purposes, the concourse level is divided into three sectors ("A" on the west end, "B" in the middle, and "C" on the east end), while the platform levels are split into "A" and "B" sectors (the west and east ends, respectively).

Modernization projects and capacity projects are shown on separate drawings for greater clarity. There are several dozen modernization projects, each generally limited to smaller areas of the station. On the other hand, the capacity projects, though fewer in number, have many constituent parts spread over larger areas of the station. Both modernization and capacity projects at the Muni platform level are shown on a single set of plans.

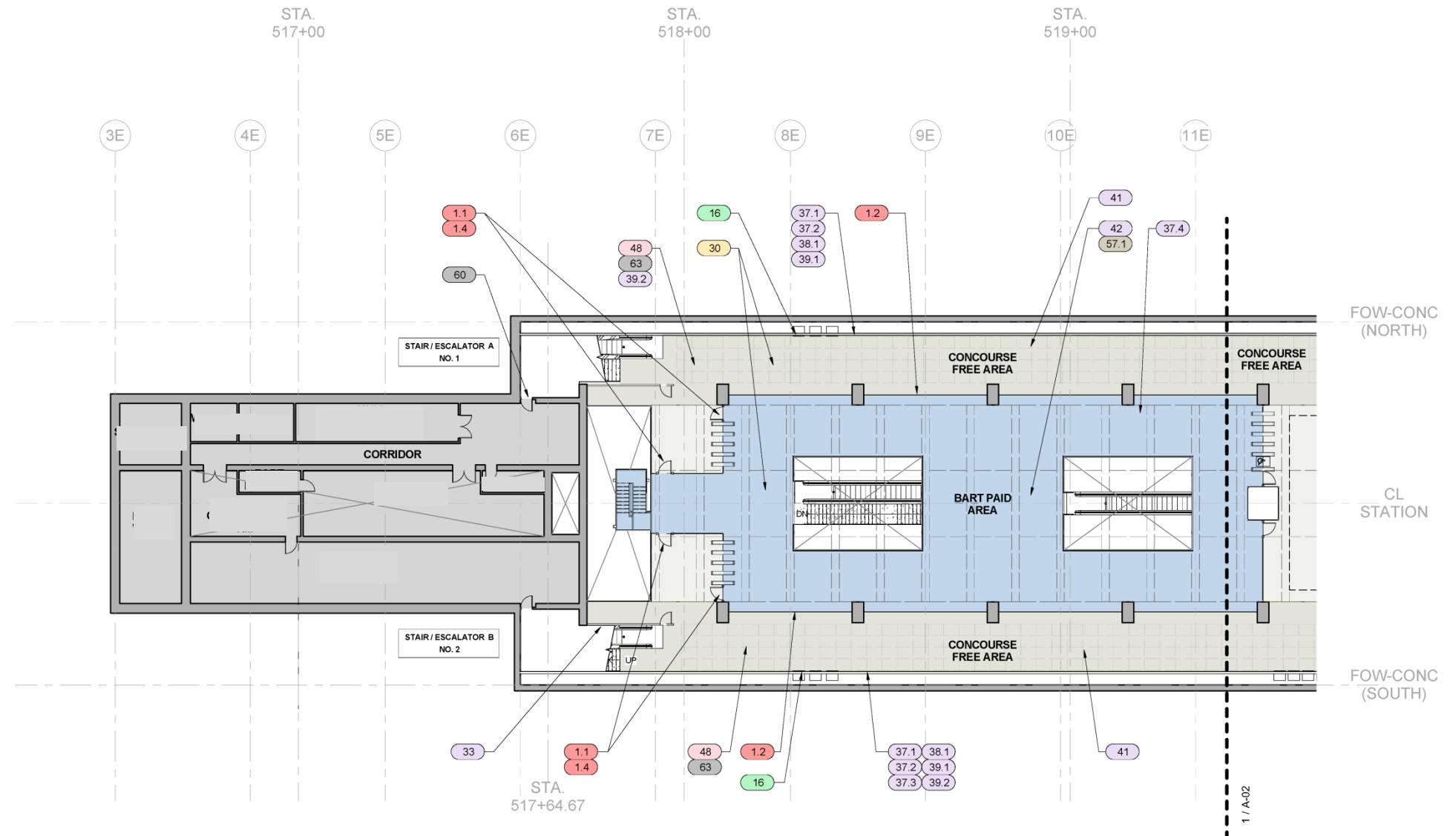
Table 6 provides a key to the modernization and capacity improvement plan drawings, indicating the figure number of each.

Table 6: Embarcadero Plan Drawings

Station Level and Sector		Modernization Projects	Capacity Projects
Concourse	Sector A	Figure 58	Figure 65
	Sector B	Figure 59	Figure 66
	Sector C	Figure 60	Figure 67
Muni Platform	Sector A	Figure 61	
	Sector B	Figure 62	
BART Platform	Sector A	Figure 63	Figure 68
	Sector B	Figure 64	Figure 69

Figure 58: Embarcadero Modernization Projects – Concourse Sector A

KEYNOTE LEGEND	
1.1	SECURE GATES TO AVOID FARE EVASION
1.2	DEMO (E) PAID/FREE BARRICADE AND REPLACE WITH 5' GLASS PAID/FREE BARRICADE, RECONFIGURING BARRIER CONFIGURATION WHERE INDICATED. TYP THROUGHOUT CONCOURSE.
1.4	ELIMINATE OBSCURE OR REDUNDANT ADA ACCESS GATES
16	ADDITIONAL REAL-TIME DISPLAY CONCEPTS
30	UPGRADE CONCOURSE LIGHTING
33	INSTALL STORAGE CABINETS (FOR TEMP STORAGE OF UNUSED GARBAGE CONTAINERS, CLEANING EQUIPMENT, CAUTION SIGNAGE, CONES, ETC)
37.1	ADD'L VENDING MACHINES: ADD A TICKET EXCHANGE AND/OR TICKET VENDING MACHINE
37.2	ADD'L VENDING MACHINES: ADD CHANGE MACHINE
37.3	ADD'L VENDING MACHINES: ADD ATM MACHINE (FLUSH-MT WITHIN TVM WALL)
37.4	REMOVE (E) FREE-STANDING ATM/VENDING UNITS
38.1	RENOVATE TVM/ALCOVE AREAS (NEAR-TERM): COVER/REMOVE ABANDONED PHONE PANELS WITH STAINLESS STEEL PLATES
39.1	RENOVATE TVM/ALCOVE AREAS (LONGER TERM): NEW WALL FINISH & TVM ARRAY TREATMENT
39.2	RENOVATE TVM/ALCOVE AREAS (LONGER TERM): NEW CEILING & LIGHTING DESIGN
41	CEILING RENOVATION - DROP CEILING AREAS (SIDE-AISLES)
42	CEILING RENOVATION - CONCOURSE MAIN AREAS
48	RENOVATE CONCOURSE "GATEWAY" AREAS (EXITS TO STREET LEVEL). (N) WALL/CHAIN TREATMENT. (N) FLOOR MATS. (N) STREET CANOPY INSTALLATION
57.1	ART OPPORTUNITY: (N) ART LOCATION ON (N) CEILING TREATMENT
60	MECH RM ACCESS: DEMO (E) WALL (AS REQ'D), INSTALL (N) DBL-DR
63	RENOVATE WALK-OFF MAT TO AVOID TRIPPING HAZARD



1 EMBARCADERO STATION CONCOURSE - SECTOR A
 A-01 Scale: 1/16" = 1'-0"

PLAN LEGEND - COLOR SCHEMES

- CONCOURSE "FREE" AREA
- PROPOSED MODERNIZATION SCOPE
- BART "PAID" AREA
- PROPOSED CAPACITY SCOPE
- MUNI "PAID" AREA
- MECHANICAL/ UTILITY AREAS

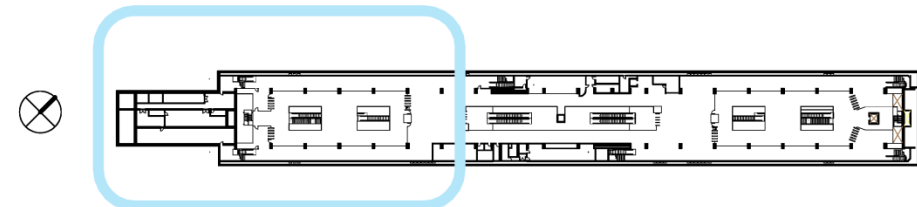
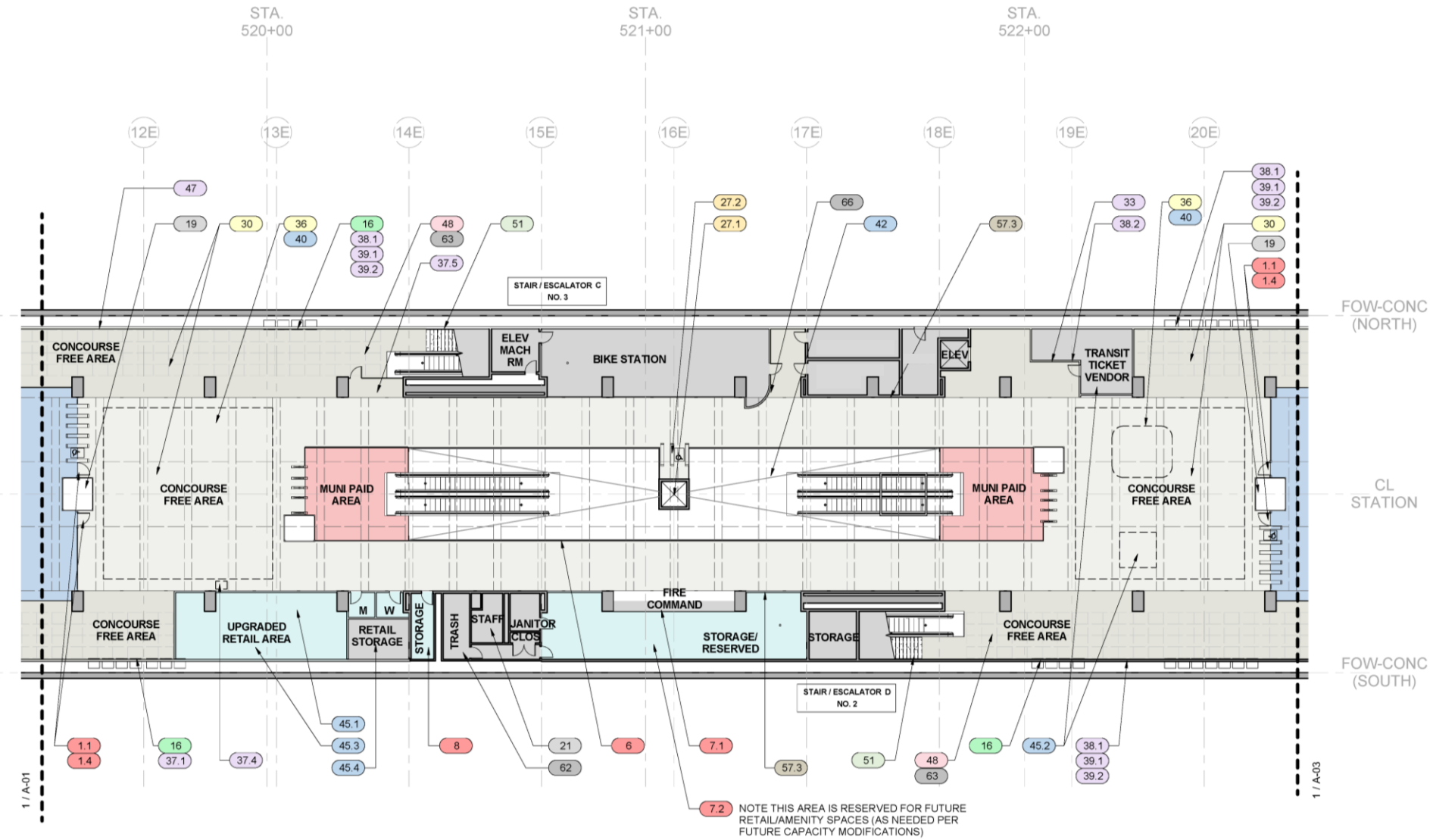


Figure 59: Embarcadero Modernization Projects – Concourse Sector B

KEYNOTE LEGEND	
1.1	SECURE GATES TO AVOID FARE EVASION
1.4	ELIMINATE OBSCURE OR REDUNDANT ADA ACCESS GATES
6	REPAIR BROKEN GLASS PARTITION(S)
7	
7.1	REDESIGN FIRE COMMAND CENTER SPACE. EMP ROOM TO REPLACE FCC
7.2	REDESIGN OPEN AREA BEHIND FIRE CONTROL CENTER FOR POSSIBLE RETAIL, BREAK ROOM OR STORAGE
8	RE-OPEN PUBLIC RESTROOM. REMODEL TO PROVIDE (2) SINGLE-OCCUPANT RESTROOMS, UPDATE TO ADA REQUIREMENTS
16	ADDITIONAL REAL-TIME DISPLAY CONCEPTS
19	UPGRADE/REPLACE BART STATION AGENT BOOTH
21	RENOVATE STATION BREAK ROOM
27.1	REPLACE EXISTING CONCOURSE-PLATFORM ELEVATOR. CHANGE HOISTWAY TO CLEAR GLAZING TO IMPROVE SAFETY/SECURITY
27.2	INSTALL NEW FARE GATES (TO REQUIRE ELEVATOR ACCESS FROM INSIDE PAID AREA)
30	UPGRADE CONCOURSE LIGHTING
33	INSTALL STORAGE CABINETS (FOR TEMP STORAGE OF UNUSED GARBAGE CONTAINERS, CLEANING EQUIPMENT, CAUTION SIGNAGE, CONES, ETC)
36	IMPROVE CONCOURSE SIGHTLINES (REMOVE/UPDATE TRIANGULAR INFORMATION KIOSKS, GARBAGE CONTAINERS & OTHER FREESTANDING ITEMS)
37.1	ADD'L VENDING MACHINES: ADD A TICKET EXCHANGE AND/OR TICKET VENDING MACHINE
37.4	REMOVE (E) FREE-STANDING ATM/VENDING UNITS
37.5	CONSOLIDATE UPS/PACKAGE SERVICE BOXES TO BUILT-IN WALL LOCATIONS
38.1	RENOVATE TVM/ALCOVE AREAS (NEAR-TERM): COVER/REMOVE ABANDONED PHONE PANELS WITH STAINLESS STEEL PLATES
38.2	RENOVATE TVM/ALCOVE AREAS (NEAR-TERM): UTILIZE CLOSED-OFF (BLANK) WALL AREAS AS TEMP STORAGE
39.1	RENOVATE TVM/ALCOVE AREAS (LONGER TERM): NEW WALL FINISH & TVM ARRAY TREATMENT
39.2	RENOVATE TVM/ALCOVE AREAS (LONGER TERM): NEW CEILING & LIGHTING DESIGN
40	REMOVE NEWSPAPER KIOSKS
42	CEILING RENOVATION - CONCOURSE MAIN AREAS
45.1	RETAIL/AMENITIES: UPGRADE CUSTOMER SERVICE BOOTH/RETAIL SHOPS
45.2	RETAIL/AMENITIES: CONSOLIDATE CLIPPER CARD BOOTH & TRANSIT STORE BOOTH (W/ 1 NEW ENTITY)
45.3	RETAIL/AMENITIES: CLEAN UP HAPHAZARD FLOWER SHOP DISPLAYS
45.4	RETAIL/AMENITIES: BETTER UTILIZE COFFEE VENDOR "DEAD SPACE"
47	INSTALL WALL PLAQUES
48	RENOVATE CONCOURSE "GATEWAY" AREAS (EXITS TO STREET LEVEL). (N) WALL/CHAIN TREATMENT. (N) FLOOR MATS. (N) STREET CANOPY INSTALLATION
51	BIKE ACCESS: INSTALL STAIR CHANNELS TO FACILITATE BICYCLE CIRCULATION
57.3	ART OPPORTUNITY: (N) ART LOCATION AT (N) WALL PANELS
62	IMPROVE STORAGE FACILITY FOR DUMPSTERS, UTILITY CLOSET, JANITORIAL EQUIPMENT
63	RENOVATE WALK-OFF MAT TO AVOID TRIPPING HAZARD
66	CLEAN METAL GRATING (BIKE STORAGE FACILITY)



1 EMBARCADERO STATION CONCOURSE - SECTOR B
A-02 Scale: 1/16" = 1'-0"

PLAN LEGEND - COLOR SCHEMES

- CONCOURSE "FREE" AREA
- BART "PAID" AREA
- MUNI "PAID" AREA
- MECHANICAL/ UTILITY AREAS
- PROPOSED MODERNIZATION SCOPE
- PROPOSED CAPACITY SCOPE

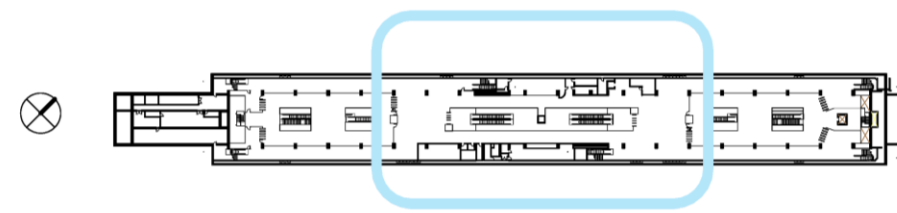
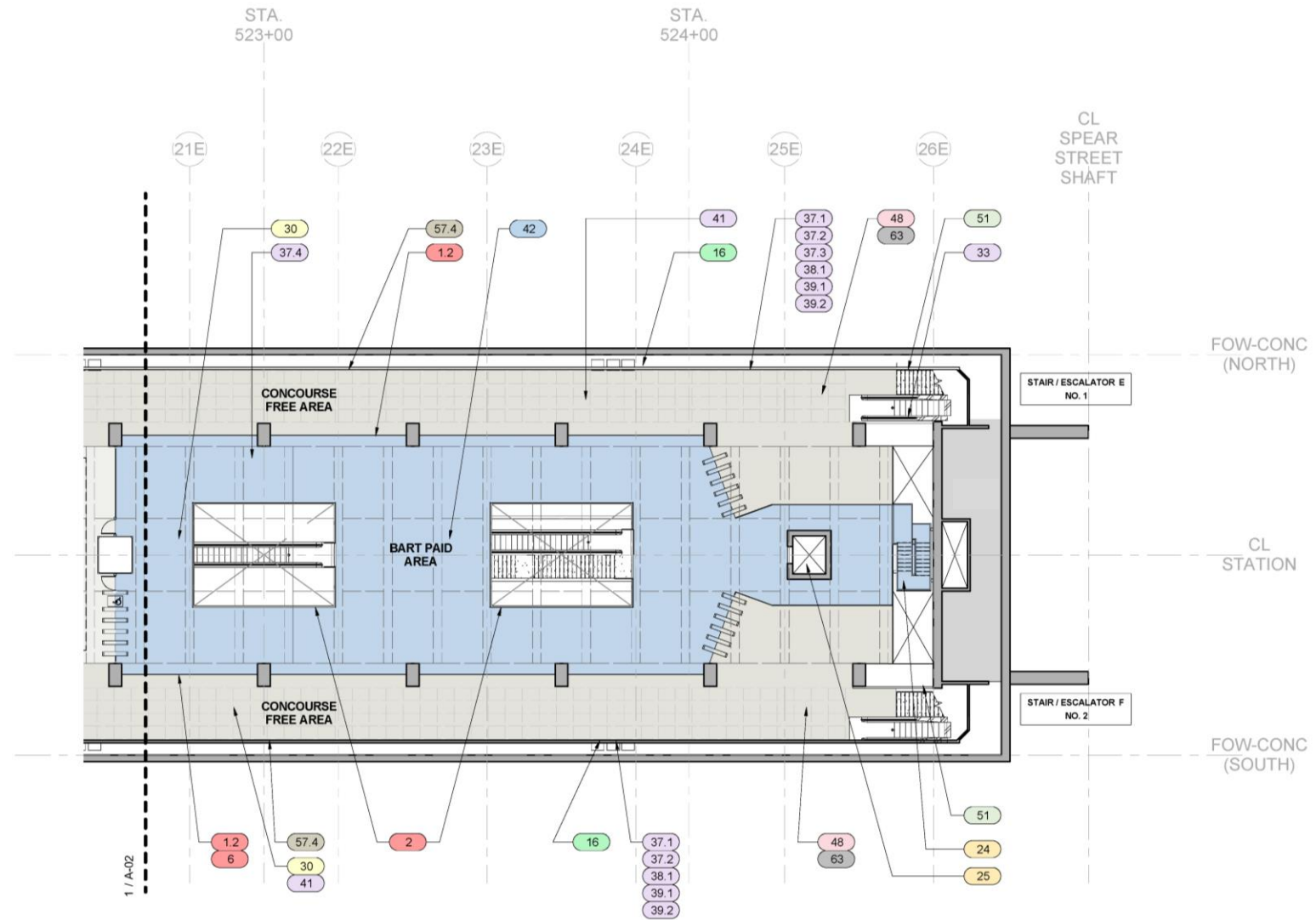


Figure 60: Embarcadero Modernization Projects – Concourse Sector C

KEYNOTE LEGEND	
1.2	DEMO (E) PAID/FREE BARRICADE AND REPLACE WITH 5' GLASS PAID/FREE BARRICADE, RECONFIGURING BARRIER CONFIGURATION WHERE INDICATED. TYP THROUGHOUT CONCOURSE.
2	ENSURE (E) GUARDRAIL MEETS UBC STANDARDS
6	REPAIR BROKEN GLASS PARTITION(S)
16	ADDITIONAL REAL-TIME DISPLAY CONCEPTS
19	UPGRADE/REPLACE BART STATION AGENT BOOTH
24	RELOCATE EXISTING STAIR & INFILL OF CONCOURSE FLOOR
25	INSTALL NEW ELEVATOR (BETWEEN BART PAID AREA AND BART PLATFORM)
30	UPGRADE CONCOURSE LIGHTING
33	INSTALL STORAGE CABINETS (FOR TEMP STORAGE OF UNUSED GARBAGE CONTAINERS, CLEANING EQUIPMENT, CAUTION SIGNAGE, CONES, ETC)
37.1	ADD'L VENDING MACHINES: ADD A TICKET EXCHANGE AND/OR TICKET VENDING MACHINE
37.2	ADD'L VENDING MACHINES: ADD CHANGE MACHINE
37.3	ADD'L VENDING MACHINES: ADD ATM MACHINE (FLUSH-MT WITHIN TVM WALL)
37.4	REMOVE (E) FREE-STANDING ATM/VENDING UNITS
38.1	RENOVATE TVM/ALCOVE AREAS (NEAR-TERM): COVER/REMOVE ABANDONED PHONE PANELS WITH STAINLESS STEEL PLATES
39.1	RENOVATE TVM/ALCOVE AREAS (LONGER TERM): NEW WALL FINISH & TVM ARRAY TREATMENT
39.2	RENOVATE TVM/ALCOVE AREAS (LONGER TERM): NEW CEILING & LIGHTING DESIGN
41	CEILING RENOVATION - DROP CEILING AREAS (SIDE-AISLES)
42	CEILING RENOVATION - CONCOURSE MAIN AREAS
48	RENOVATE CONCOURSE "GATEWAY" AREAS (EXITS TO STREET LEVEL). (N) WALL/CHAIN TREATMENT. (N) FLOOR MATS. (N) STREET CANOPY INSTALLATION
51	BIKE ACCESS: INSTALL STAIR CHANNELS TO FACILITATE BICYCLE CIRCULATION
57.4	ART OPPORTUNITY: (N) ART LOCATION AT (E) SIDE WALLS
63	RENOVATE WALK-OFF MAT TO AVOID TRIPPING HAZARD



1
A-03
EMBARCADERO STATION CONCOURSE - SECTOR C
Scale: 1/16" = 1'-0"

PLAN LEGEND - COLOR SCHEMES

- CONCOURSE "FREE" AREA
- BART "PAID" AREA
- MUNI "PAID" AREA
- MECHANICAL/ UTILITY AREAS
- PROPOSED MODERNIZATION SCOPE
- PROPOSED CAPACITY SCOPE

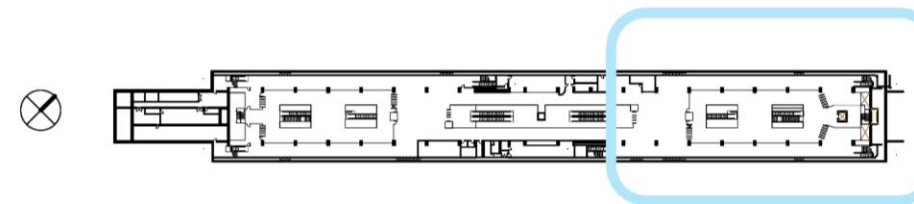
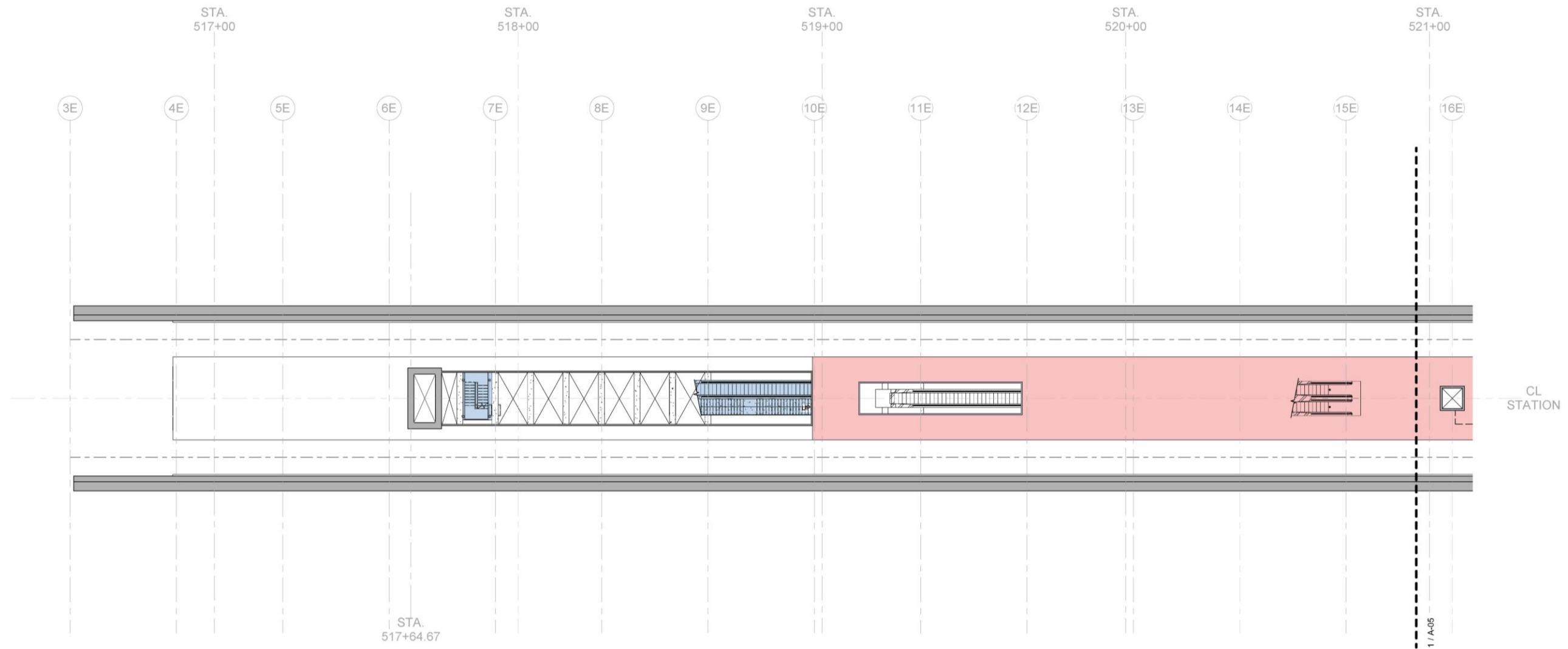


Figure 61: Embarcadero Modernization and Capacity Projects – Muni Platform Sector A



1 EMBARCADERO STATION MUNI PLATFORM - SECTOR A
A-04 Scale: 1/16" = 1'-0"



PLAN LEGEND - COLOR SCHEMES

- CONCOURSE "FREE" AREA
- PROPOSED MODERNIZATION SCOPE
- BART "PAID" AREA
- PROPOSED CAPACITY SCOPE
- MUNI "PAID" AREA
- MECHANICAL/ UTILITY AREAS

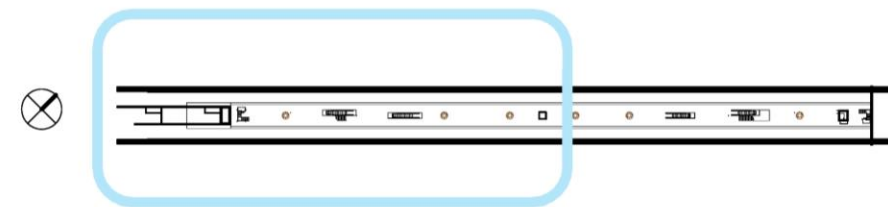


Figure 62: Embarcadero Modernization and Capacity Projects – Muni Platform Sector B

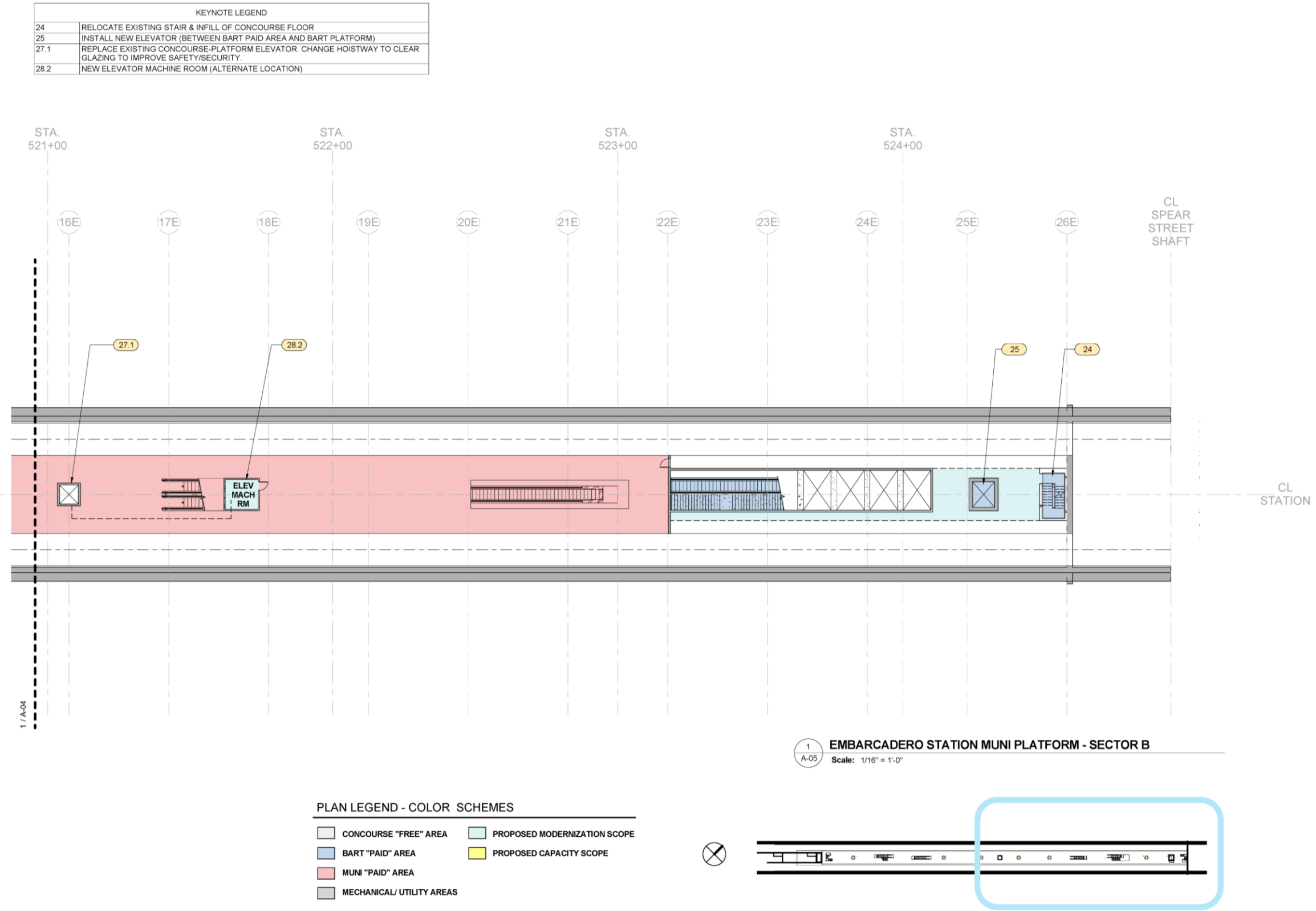
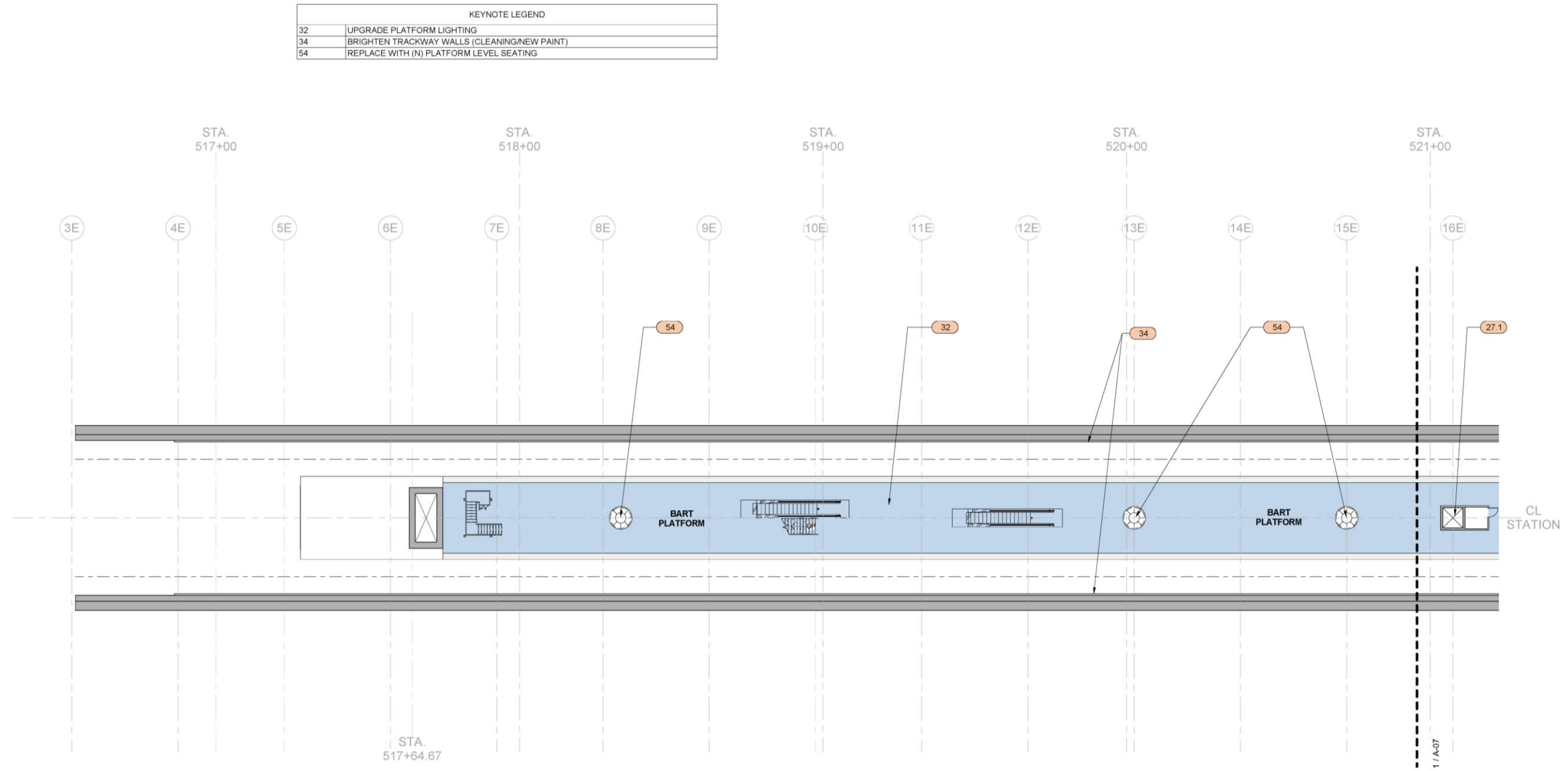


Figure 63: Embarcadero Modernization Projects – BART Platform Sector A



1
A-06 **EMBARCADERO STATION BART PLATFORM - SECTOR A**
Scale: 1/16" = 1'-0"

PLAN LEGEND - COLOR SCHEMES

CONOURSE "FREE" AREA	PROPOSED MODERNIZATION SCOPE
BART "PAID" AREA	PROPOSED CAPACITY SCOPE
MUNI "PAID" AREA	
MECHANICAL/ UTILITY AREAS	

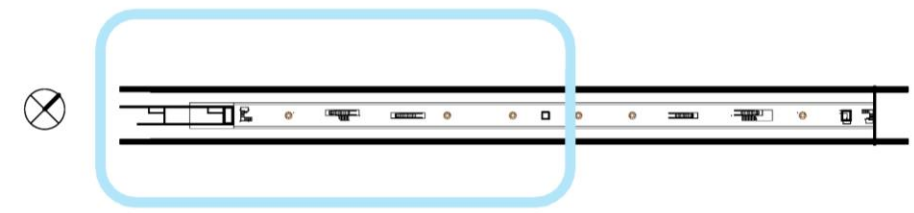
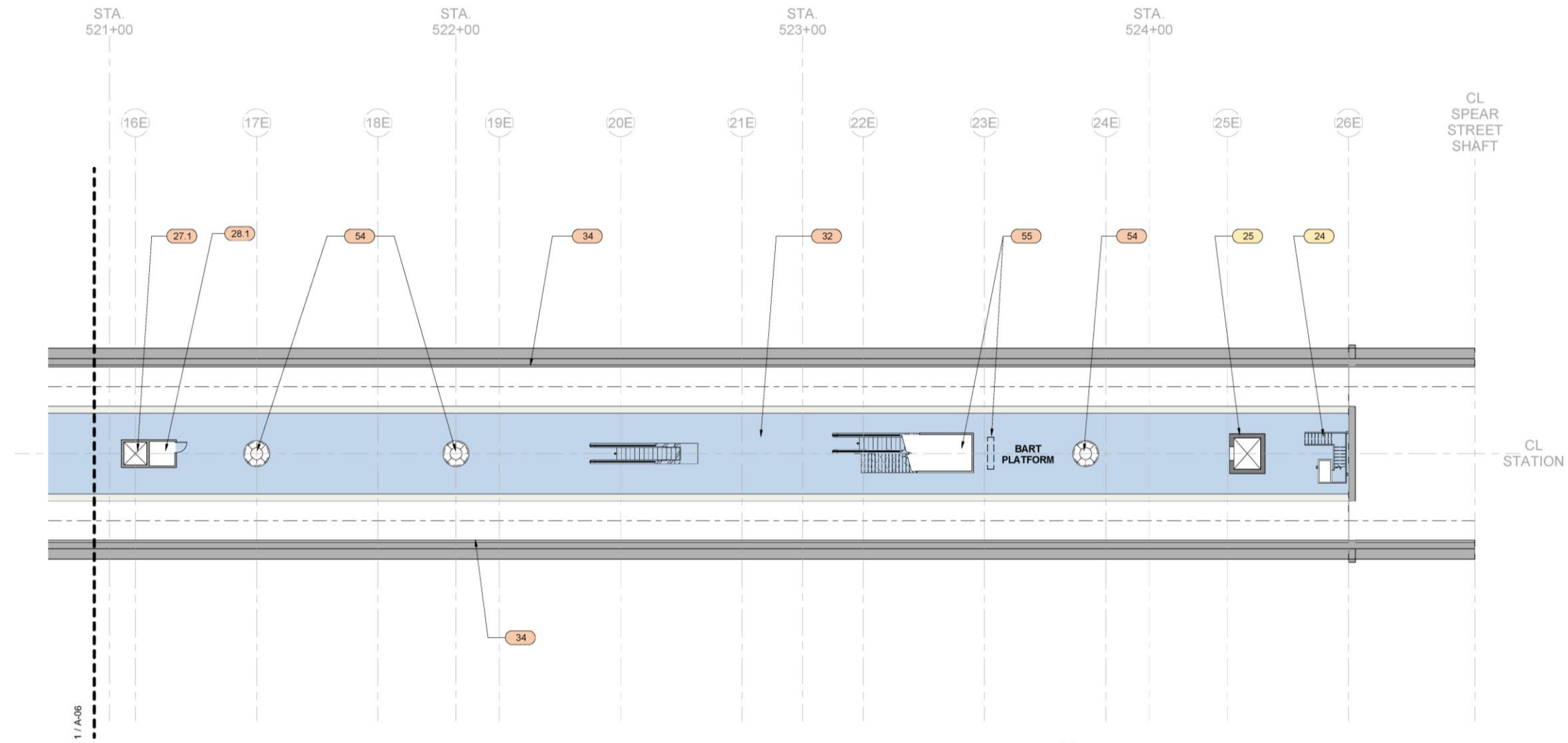


Figure 64: Embarcadero Modernization Projects – BART Platform Sector B

KEYNOTE LEGEND	
24	RELOCATE EXISTING STAIR & INFILL OF CONCOURSE FLOOR
25	INSTALL NEW ELEVATOR (BETWEEN BART PAID AREA AND BART PLATFORM)
27.1	REPLACE EXISTING CONCOURSE-PLATFORM ELEVATOR. CHANGE HOISTWAY TO CLEAR GLAZING TO IMPROVE SAFETY/SECURITY.

KEYNOTE LEGEND	
28.1	NEW ELEVATOR MACHINE ROOM
32	UPGRADE PLATFORM LIGHTING
34	BRIGHTEN TRACKWAY WALLS (CLEANING/NEW PAINT)
54	REPLACE WITH (N) PLATFORM LEVEL SEATING
55	NEW UNDER-STAIR STORAGE CABINETS



1
A-07
EMBARCADERO STATION BART PLATFORM - SECTOR B
Scale: 1/16" = 1'-0"



PLAN LEGEND - COLOR SCHEMES

- CONCOURSE "FREE" AREA
- BART "PAID" AREA
- MUNI "PAID" AREA
- MECHANICAL/ UTILITY AREAS
- PROPOSED MODERNIZATION SCOPE
- PROPOSED CAPACITY SCOPE

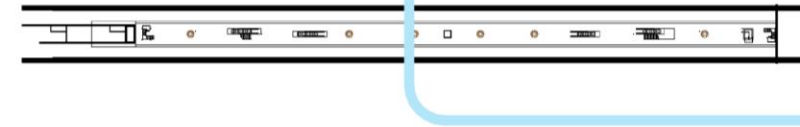
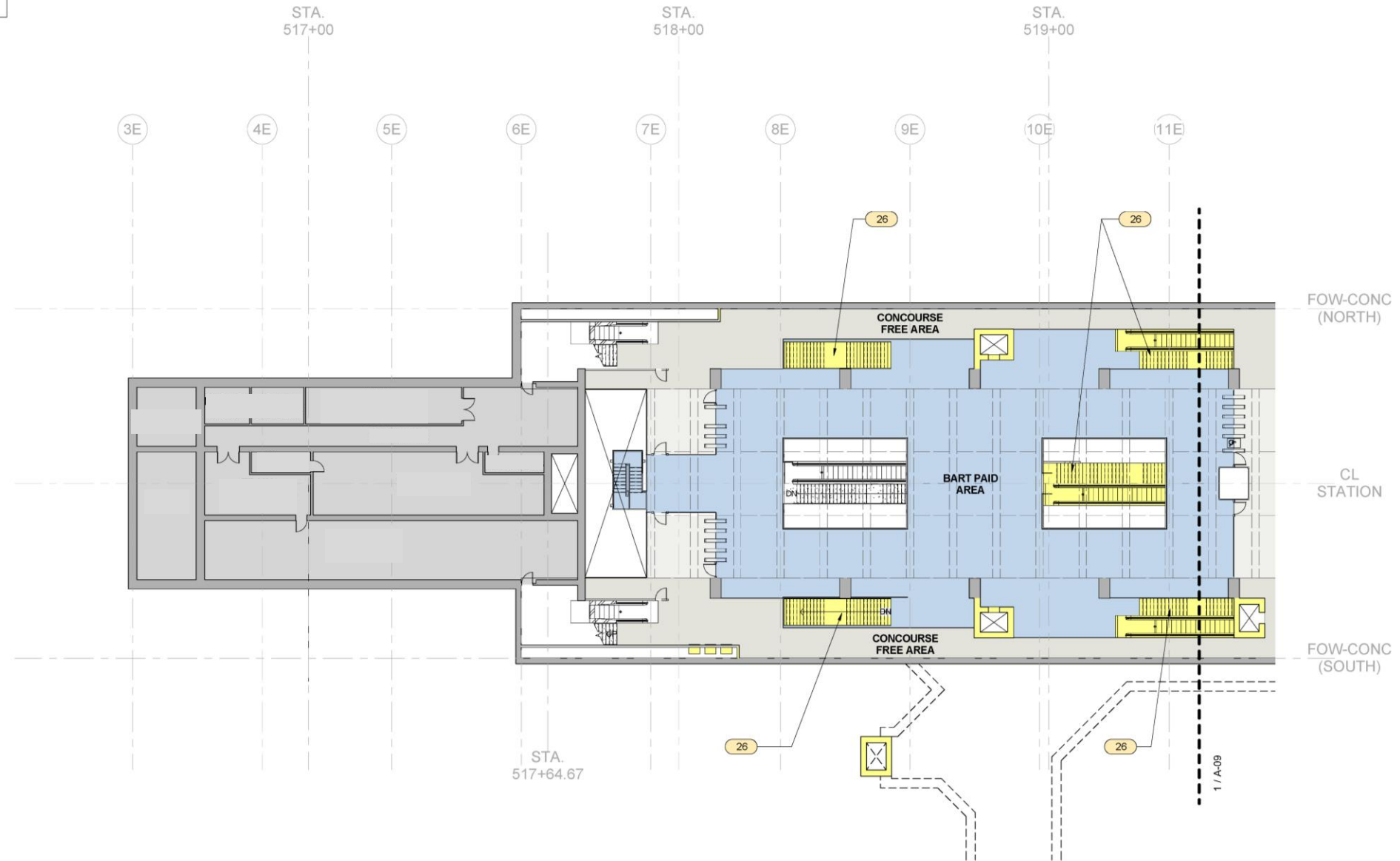


Figure 65: Embarcadero Capacity Projects – Concourse Sector A

KEYNOTE LEGEND	
26	INSTALL NEW STAIR (FROM BART PAID AREA DOWN TO BART PLATFORM)



1
A-08
EMBARCADERO STATION (CAPACITY SCOPE) CONCOURSE - SECTOR A
Scale: 1/16" = 1'-0"

PLAN LEGEND - COLOR SCHEMES

- | | |
|--------------------------|------------------------------|
| CONCOURSE "FREE" AREA | PROPOSED MODERNIZATION SCOPE |
| BART "PAID" AREA | PROPOSED CAPACITY SCOPE |
| MUNI "PAID" AREA | |
| MECHANICAL/UTILITY AREAS | |

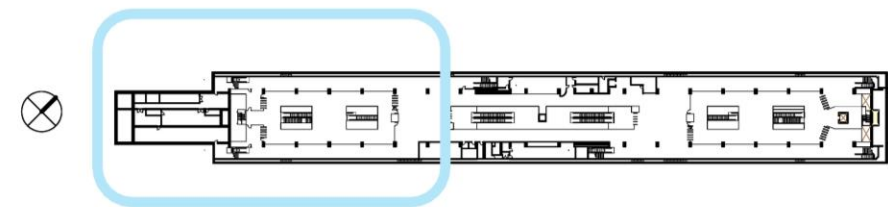
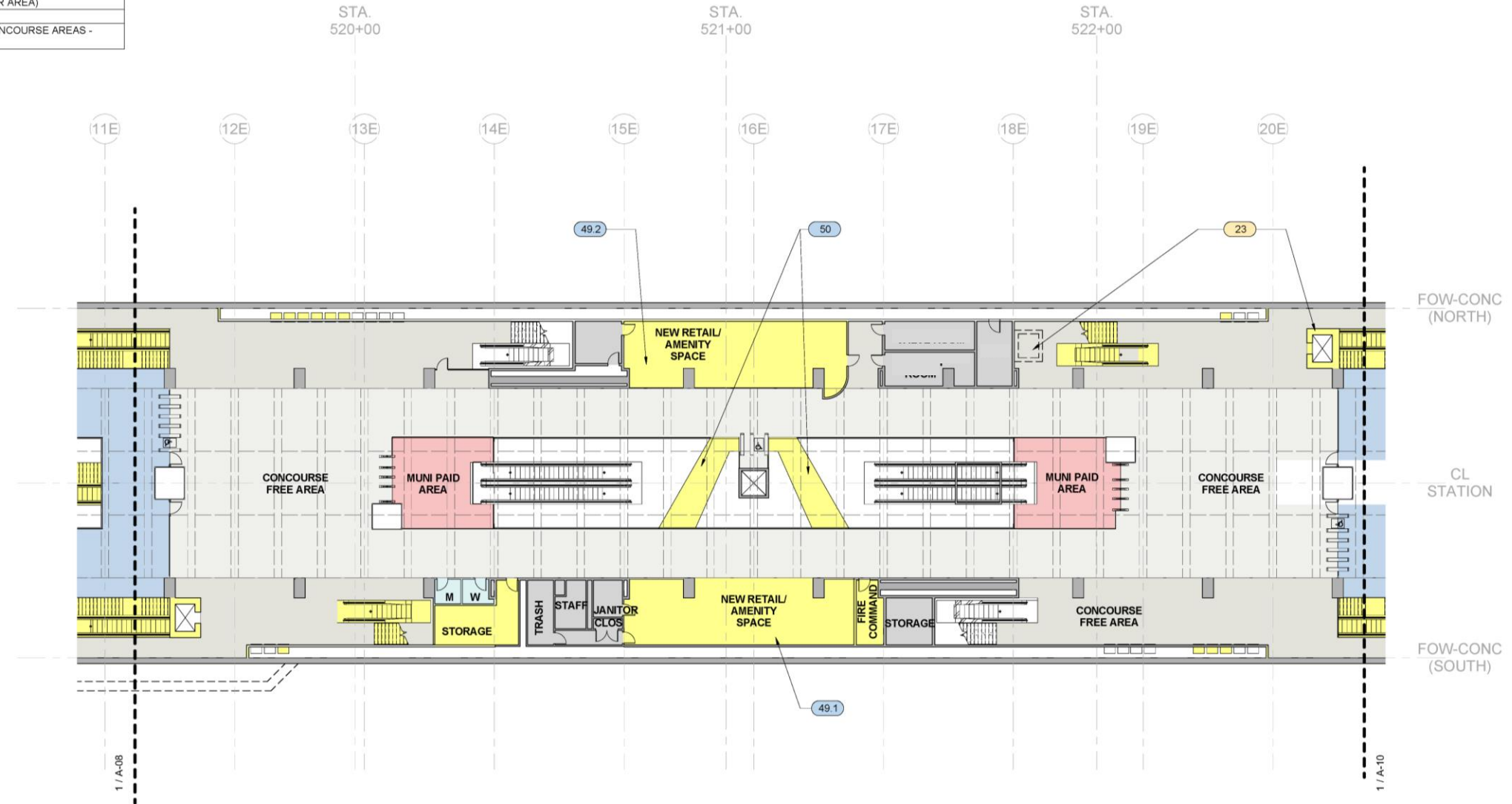


Figure 66: Embarcadero Capacity Projects – Concourse Sector B

KEYNOTE LEGEND	
23	INSTALL NEW ELEVATOR FROM STREET LEVEL TO CONCOURSE LEVEL. REMOVE EXISTING ELEVATOR SERVING SAME AREAS (BETWEEN COL 14-15)
26	INSTALL NEW STAIR (FROM BART PAID AREA DOWN TO BART PLATFORM)
49.1	NEW RETAIL/AMENITY SPACE (EXIST FIRE CONTROL CENTER AREA)
49.2	NEW RETAIL/AMENITY SPACE (EXIST BIKE STATION AREA)
50	NEW CONCOURSE "BRIDGES" (CONNECT NORTH/SOUTH CONCOURSE AREAS - ABOVE MUNI LEVEL)



1 EMBARCADERO STATION (CAPACITY SCOPE) CONCOURSE - SECTOR B
 A-09 Scale: 1/16" = 1'-0"

PLAN LEGEND - COLOR SCHEMES

- CONCOURSE "FREE" AREA
- BART "PAID" AREA
- MUNI "PAID" AREA
- MECHANICAL/ UTILITY AREAS
- PROPOSED MODERNIZATION SCOPE
- PROPOSED CAPACITY SCOPE

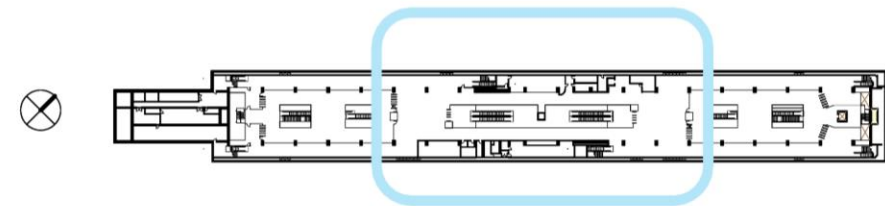
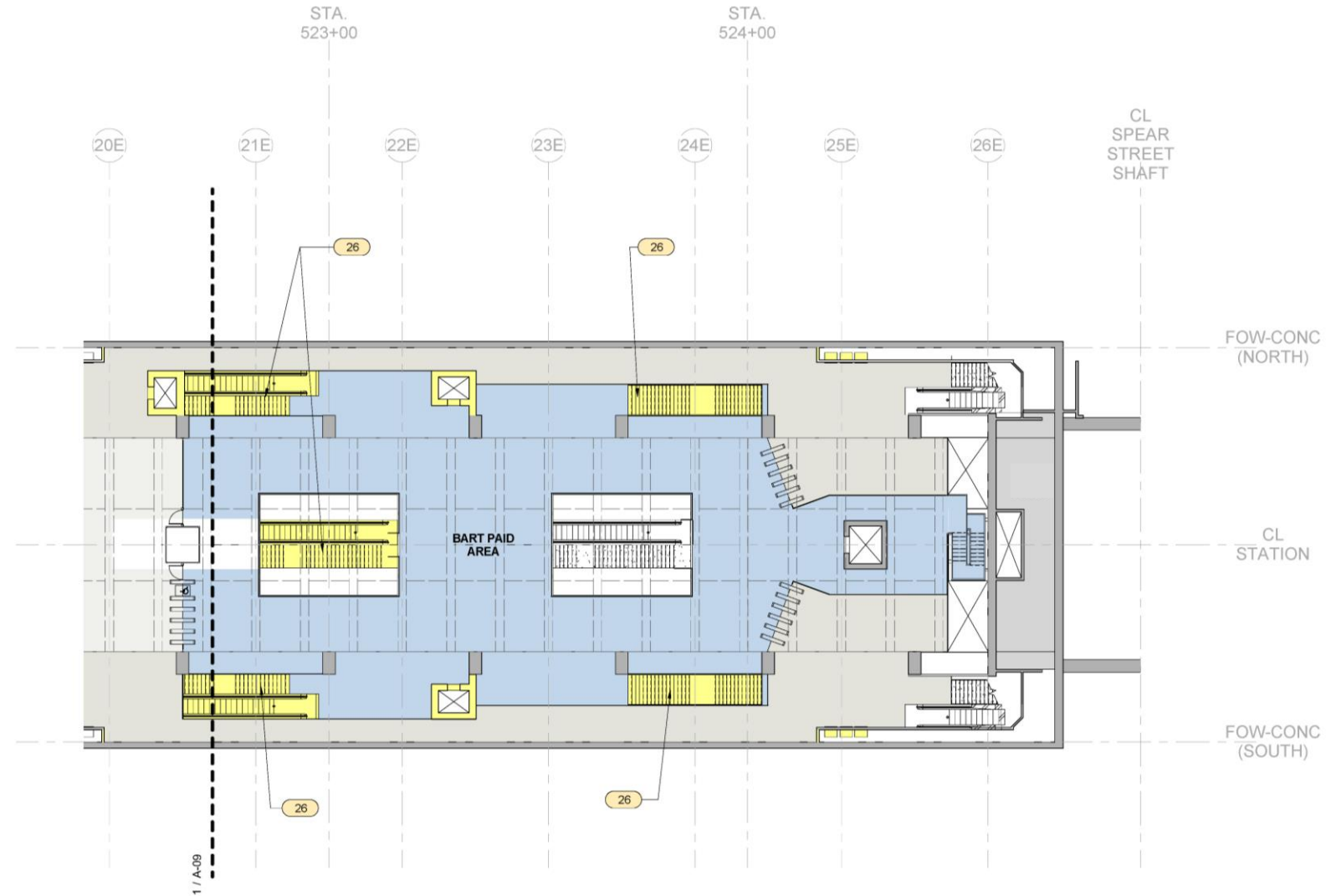


Figure 67: Embarcadero Capacity Projects – Concourse Sector C

KEYNOTE LEGEND	
24	RELOCATE EXISTING STAIR & INFILL OF CONCOURSE FLOOR
25	INSTALL NEW ELEVATOR (BETWEEN BART PAID AREA AND BART PLATFORM)
26	INSTALL NEW STAIR (FROM BART PAID AREA DOWN TO BART PLATFORM)



1 EMBARCADERO STATION (CAPACITY SCOPE) CONCOURSE - SECTOR C
A-10 Scale: 1/16" = 1'-0"

PLAN LEGEND - COLOR SCHEMES

- CONCOURSE "FREE" AREA
- BART "PAID" AREA
- MUNI "PAID" AREA
- MECHANICAL/ UTILITY AREAS
- PROPOSED MODERNIZATION SCOPE
- PROPOSED CAPACITY SCOPE

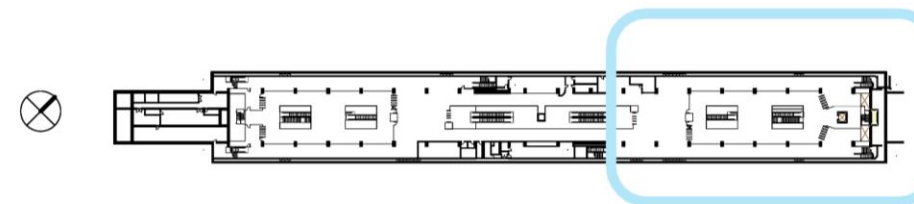
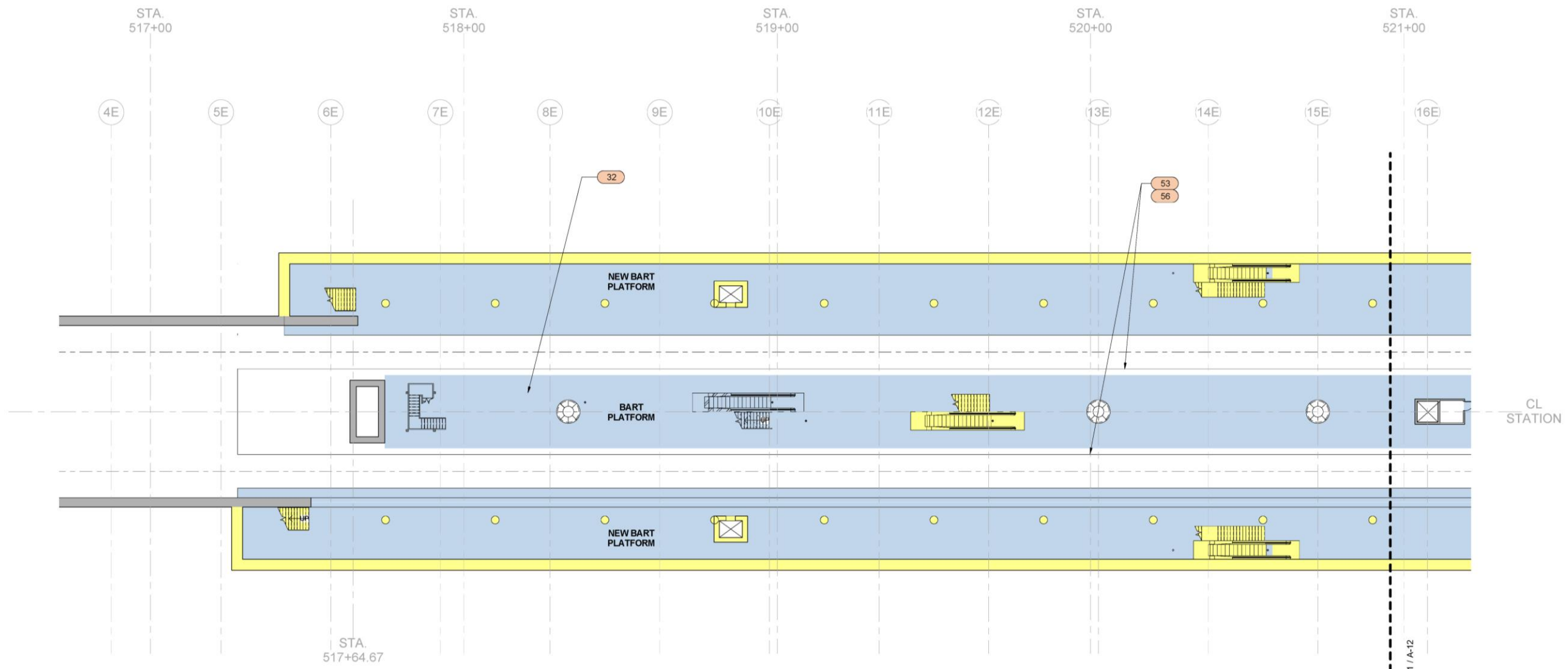


Figure 68: Embarcadero Capacity Projects – BART Platform Sector A

KEYNOTE LEGEND	
32	UPGRADE PLATFORM LIGHTING
53	INSTALL PLATFORM SCREEN DOORS
56	REPLACE PLATFORM EDGE TILE



1
A-11
EMBARCADERO STATION (CAPACITY SCOPE) BART PLATFORM - SECTOR A
Scale: 1/16" = 1'-0"

PLAN LEGEND - COLOR SCHEMES

- CONCOURSE "FREE" AREA
- PROPOSED MODERNIZATION SCOPE
- BART "PAID" AREA
- PROPOSED CAPACITY SCOPE
- MUNI "PAID" AREA
- MECHANICAL/ UTILITY AREAS

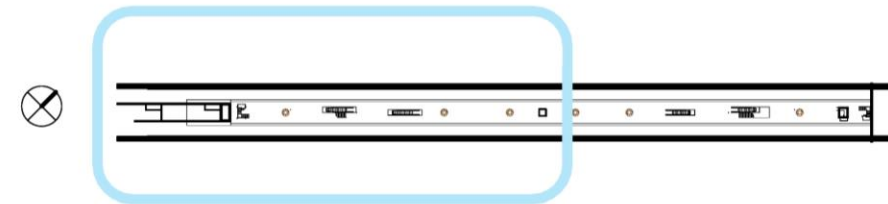
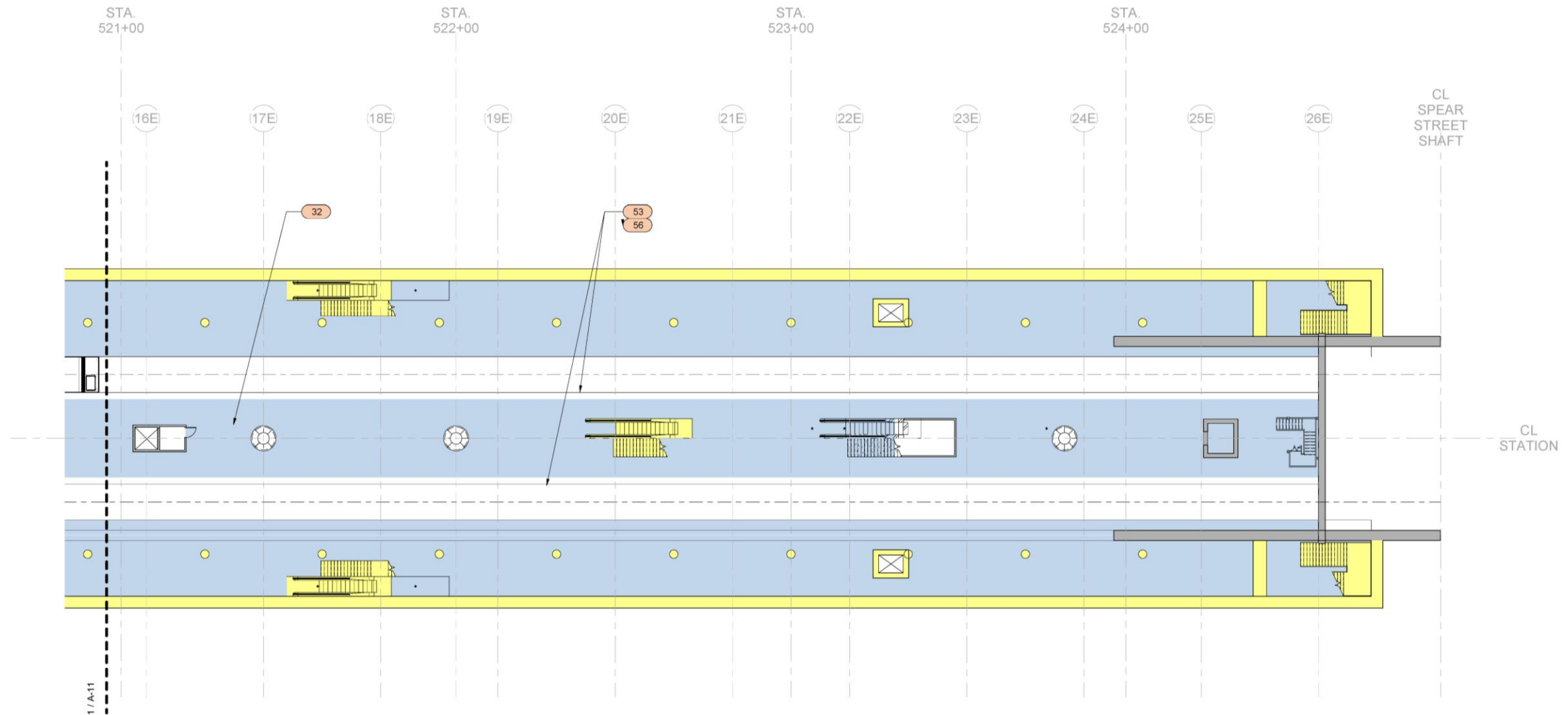


Figure 69: Embarcadero Capacity Projects – BART Platform Sector B

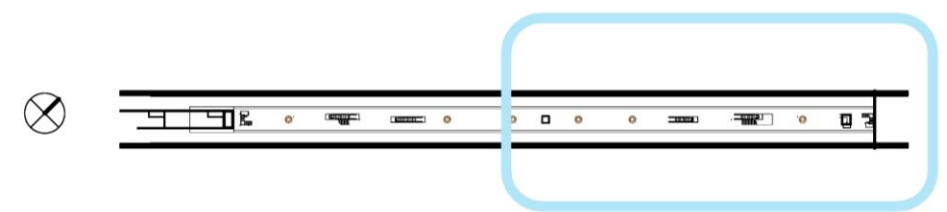
KEYNOTE LEGEND	
32	UPGRADE PLATFORM LIGHTING
53	INSTALL PLATFORM SCREEN DOORS
56	REPLACE PLATFORM EDGE TILE



1
A-12
EMBARCADERO STATION (CAPACITY SCOPE) BART PLATFORM - SECTOR B
Scale: 1/16" = 1'-0"

PLAN LEGEND - COLOR SCHEMES

	CONCOURSE "FREE" AREA		PROPOSED MODERNIZATION SCOPE
	BART "PAID" AREA		PROPOSED CAPACITY SCOPE
	MUNI "PAID" AREA		
	MECHANICAL/ UTILITY AREAS		



6.5 Montgomery Modernization Concept Plan

The Montgomery Modernization Concept Plan addresses the following elements:

- Vertical circulation capacity
- Improved platform capacity – reduce seating footprint while maintaining or increasing seating capacity, consolidate free-standing items and upgrade elevator
- Implementing a new visual and functional concept for the station – create a station experience befitting a major financial district, implement new street level canopies at entries
- State of good repair – return facilities and systems to a state of good repair, replacing elements and components at the end of their useful life
- Opened-up lobby spaces – improved visibility and circulation; new ceiling design; and better incorporation of public art
- Renovated ticketing areas – differentiated vending areas, new flooring and finishes, new ceiling and lighting, new wall design, replacement of lighting and ceiling finishes, cleaning and polishing of walls and floors
- New ceiling – improved appearance and lighting
- Improved entries – new flooring, lighting and finishes
- Enhanced passenger information – better transit information signage and integrated real-time information

As with Embarcadero, a Master Project List has been developed for Montgomery organized into areas of concern. Highlights under each area are presented below; the complete Master Project List is provided in the Appendix.

1. Safety, Security, ADA Compliance and Fare Evasion

Near-term projects (within 10 years) include ADA improvements to detection devices, signage, amenities and handrails:

- Limiting fare evasion
- Improving electrical systems and lighting
- Addressing under-utilized/remnant spaces at concourse level
- Implementing design changes to address security concerns, allowing BART to re-open public restrooms

Middle-term projects (5-15 years out) include:

- Improved safety and security through use of new security cameras
- New public restroom (new location)

2. Wayfinding, Signage and Real-Time Displays

Projects include:

- Better wayfinding and less signage clutter
- Better organized and located station advertising
- Improved availability/design of real-time display information

3. Operations and Employee Comfort

Projects in the near term (within 10 years) would include an improved public address (PA) system and audible messages, followed in the middle term (5-15 years out) by renovation of the station break room and renovation or replacement of the station agent booths.

4. Escalator and Elevators

Near-term projects (within 10 years) would include elevator and escalator maintenance. Long-term projects (10-20 years out) include new elevators and escalators between the concourse and platform/street levels.

5. Station Improvements: Side Aisle Finishes, Ticketing and Vending

Additional vending, ATM and change machines at concourse ticketing areas are near-term project (within 10 years), while in the middle term (5-15 years out), the "side aisle" areas of concourse would be renovated, removing outdated/abandoned items, and introducing a new wall/floor/ceiling design concept.

6. Station Improvements: Center Concourse Areas and Retail Discussion

Near-term projects (within 10 years) include:

- Removal/relocation of barrier/storage items to improve circulation at concourse level
- Station-specific retail guidelines to better define physical requirements for retail establishments
- Improvements to retail/amenity spaces at concourse level
- Station-specific advertising guidelines and evaluation of advertising locations relative to BART's wayfinding and public art programs

7. Station Improvements: Concourse Portal Areas

In the near-term (within 10 years), concourse entry spaces would be improved.

8. Station Improvements: Lighting, Brightening and Sightlines

Projects include:

- Improving sightlines for passengers on the concourse level by relocating items that block views
- Repair of walls and ceilings

9. Station Improvements: Platform Improvements

Near-term projects (within 10 years) include:

- Platform improvements to lighting and visibility
- Platform circulation and queuing improvements (seating replacement)

In the long term (10-20 years out), platform screen doors would be installed and platform edge tiles would be updated to current standards.

10. Mechanical, Utilities, Maintenance and Repair

Trash storage facilities would be improved in the near term (within 10 years), followed by widening the entries to mechanical rooms to improve access. In the middle-term (5-15 years out) new fan room/ventilation equipment would be installed to address station ventilation issues and station infrastructure would be upgraded to accommodate planned retail/amenity build-outs.

11. Bike Improvement Opportunities

In the near-term (within 10 years), bike access would be improved through projects such as stair channels.

12. Public Art Opportunities

New public art opportunities/installations would be introduced.

Plan Drawings

Plan drawings of the Montgomery Modernization Concept Plan are presented on the following pages, organized by the three station levels (concourse, Muni platform, and BART platform) and by sector. For presentation purposes, each level is divided into two sectors ("A" for the west end and "B" for the east end).

Modernization projects and capacity projects are shown on separate drawings for greater clarity. There are several dozen modernization projects, each generally limited to smaller areas of the station. On the other hand, the capacity projects, though fewer in number, have many constituent parts spread over larger areas of the station. Both modernization and capacity projects at the Muni platform level are shown on a single set of plans.

Table 7 provides a key to the modernization and capacity improvement plan drawings, indicating figure number of each.

Table 7: Montgomery Plan Drawings

Station Level and Sector		Modernization Projects	Capacity Projects
Concourse	Sector A	Figure 70	Figure 74
	Sector B	Figure 71	Figure 75
Muni Platform	Sector A	Figure 76	
	Sector B	Figure 77	
BART Platform	Sector A	Figure 72	Figure 78
	Sector B	Figure 73	Figure 79

Figure 70: Montgomery Modernization Projects – Concourse Sector A

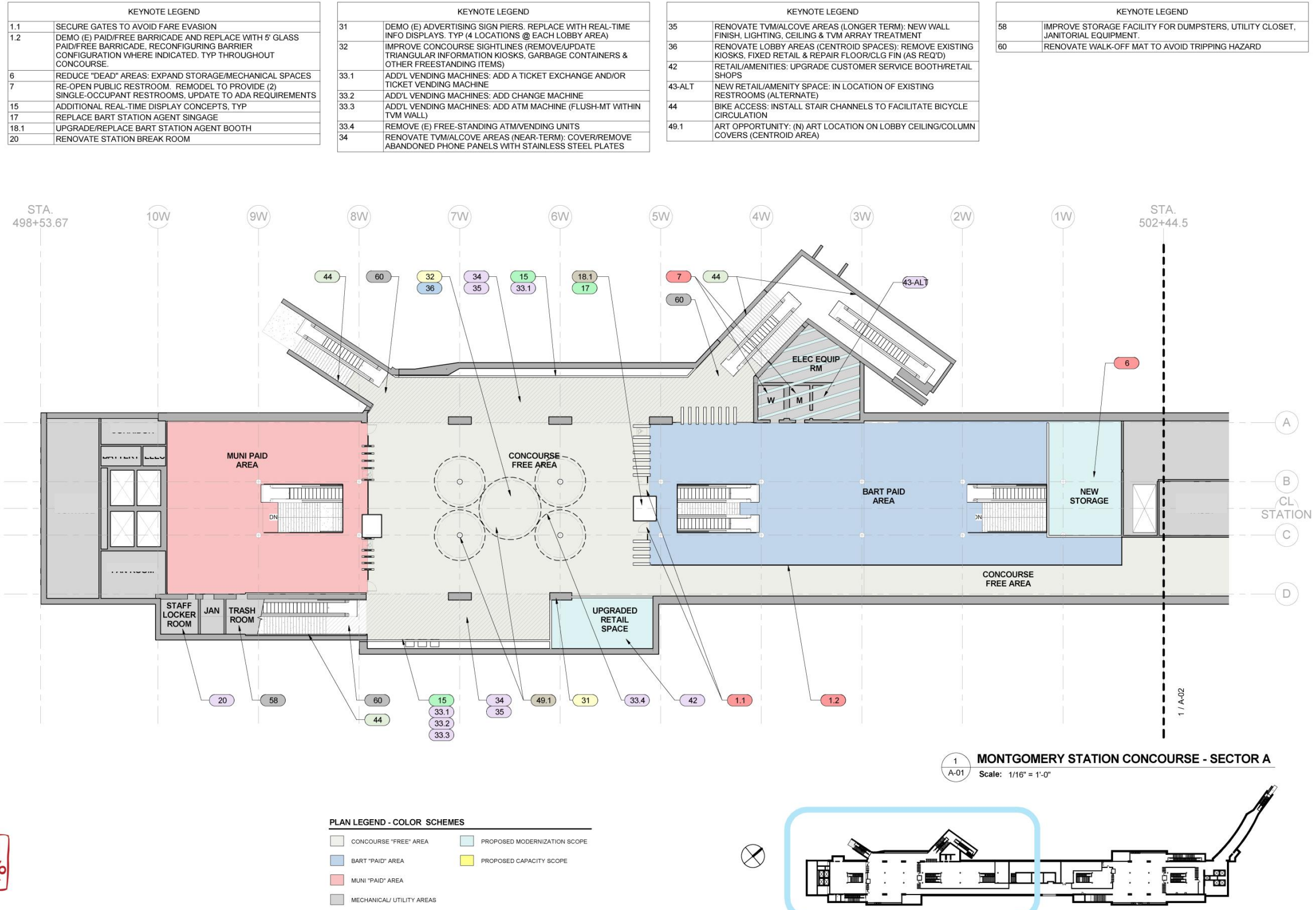
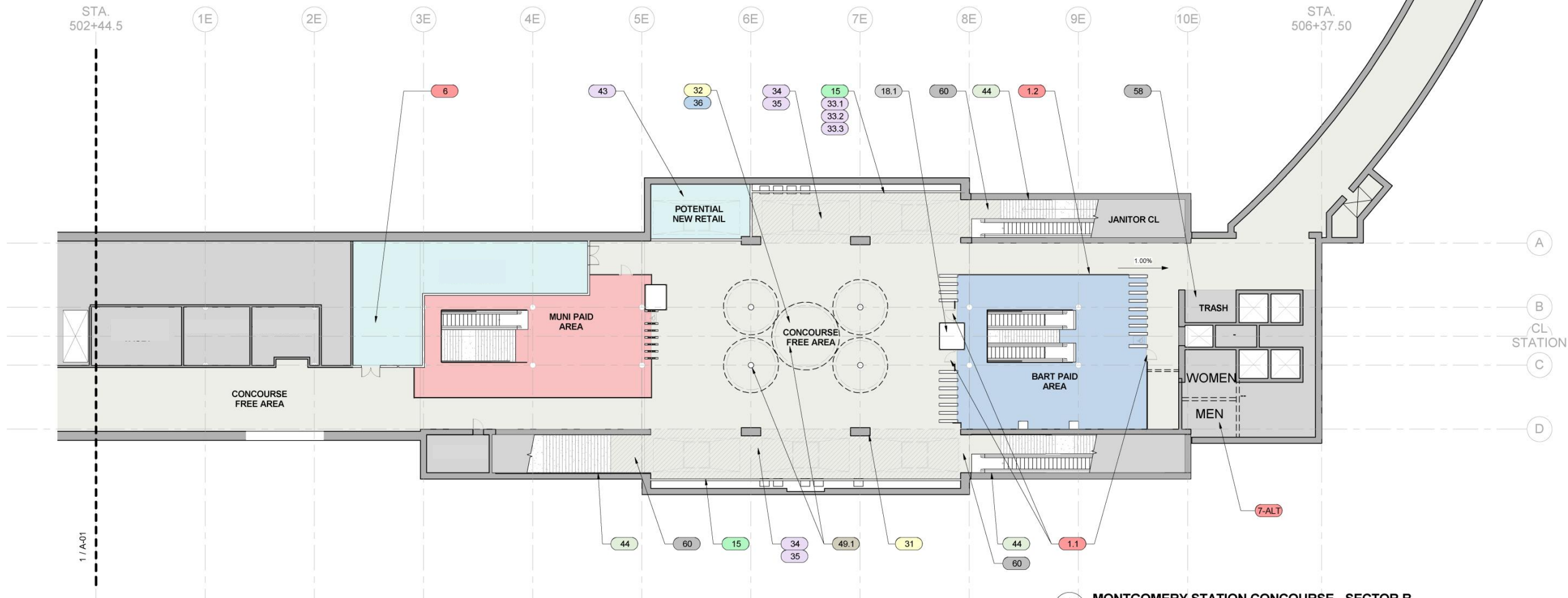


Figure 71: Montgomery Modernization Projects – Concourse Sector B

KEYNOTE LEGEND	
1.1	SECURE GATES TO AVOID FARE EVASION
1.2	DEMO (E) PAID/FREE BARRICADE AND REPLACE WITH 5' GLASS PAID/FREE BARRICADE, RECONFIGURING BARRIER CONFIGURATION WHERE INDICATED. TYP THROUGHOUT CONCOURSE.
6	REDUCE "DEAD" AREAS: EXPAND STORAGE/MECHANICAL SPACES
7-ALT	NEW PUBLIC RESTROOM. REMODEL FARE COUNTING AREA TO PROVIDE (2) SINGLE-OCCUPANT RESTROOMS, UPDATE TO ADA REQUIREMENTS
15	ADDITIONAL REAL-TIME DISPLAY CONCEPTS, TYP
18.1	UPGRADE/REPLACE BART STATION AGENT BOOTH

KEYNOTE LEGEND	
31	DEMO (E) ADVERTISING SIGN PIERS. REPLACE WITH REAL-TIME INFO DISPLAYS. TYP (4 LOCATIONS @ EACH LOBBY AREA)
32	IMPROVE CONCOURSE SIGHTLINES (REMOVE/UPDATE TRIANGULAR INFORMATION KIOSKS, GARBAGE CONTAINERS & OTHER FREESTANDING ITEMS)
33.1	ADD'L VENDING MACHINES: ADD A TICKET EXCHANGE AND/OR TICKET VENDING MACHINE
33.2	ADD'L VENDING MACHINES: ADD CHANGE MACHINE
33.3	ADD'L VENDING MACHINES: ADD ATM MACHINE (FLUSH-MT WITHIN TVM WALL)
34	RENOVATE TVM/ALCOVE AREAS (NEAR-TERM): COVER/REMOVE ABANDONED PHONE PANELS WITH STAINLESS STEEL PLATES

KEYNOTE LEGEND	
35	RENOVATE TVM/ALCOVE AREAS (LONGER TERM): NEW WALL FINISH, LIGHTING, CEILING & TVM ARRAY TREATMENT
36	RENOVATE LOBBY AREAS (CENTROID SPACES): REMOVE EXISTING KIOSKS, FIXED RETAIL & REPAIR FLOOR/CLG FIN (AS REQ'D)
43	NEW RETAIL/AMENITY SPACE: CONCOURSE ALCOVE AREA
44	BIKE ACCESS: INSTALL STAIR CHANNELS TO FACILITATE BICYCLE CIRCULATION
49.1	ART OPPORTUNITY: (N) ART LOCATION ON LOBBY CEILING/COLUMN COVERS (CENTROID AREA)
58	IMPROVE STORAGE FACILITY FOR DUMPSTERS, UTILITY CLOSET, JANITORIAL EQUIPMENT.
60	RENOVATE WALK-OFF MAT TO AVOID TRIPPING HAZARD



1 A-02 MONTGOMERY STATION CONCOURSE - SECTOR B
Scale: 1/16" = 1'-0"

PLAN LEGEND - COLOR SCHEMES	
	CONCOURSE "FREE" AREA
	MUNI "PAID" AREA
	BART "PAID" AREA
	MECHANICAL/UTILITY AREAS
	PROPOSED MODERNIZATION SCOPE
	PROPOSED CAPACITY SCOPE

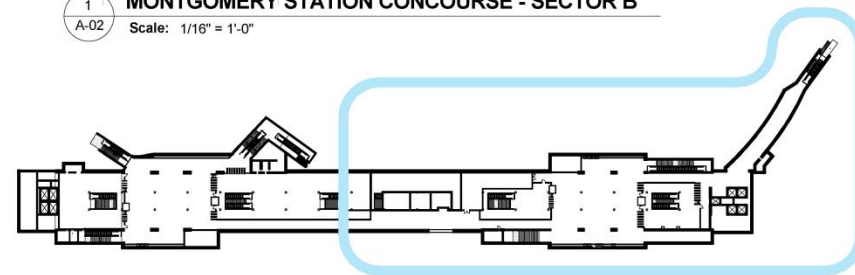
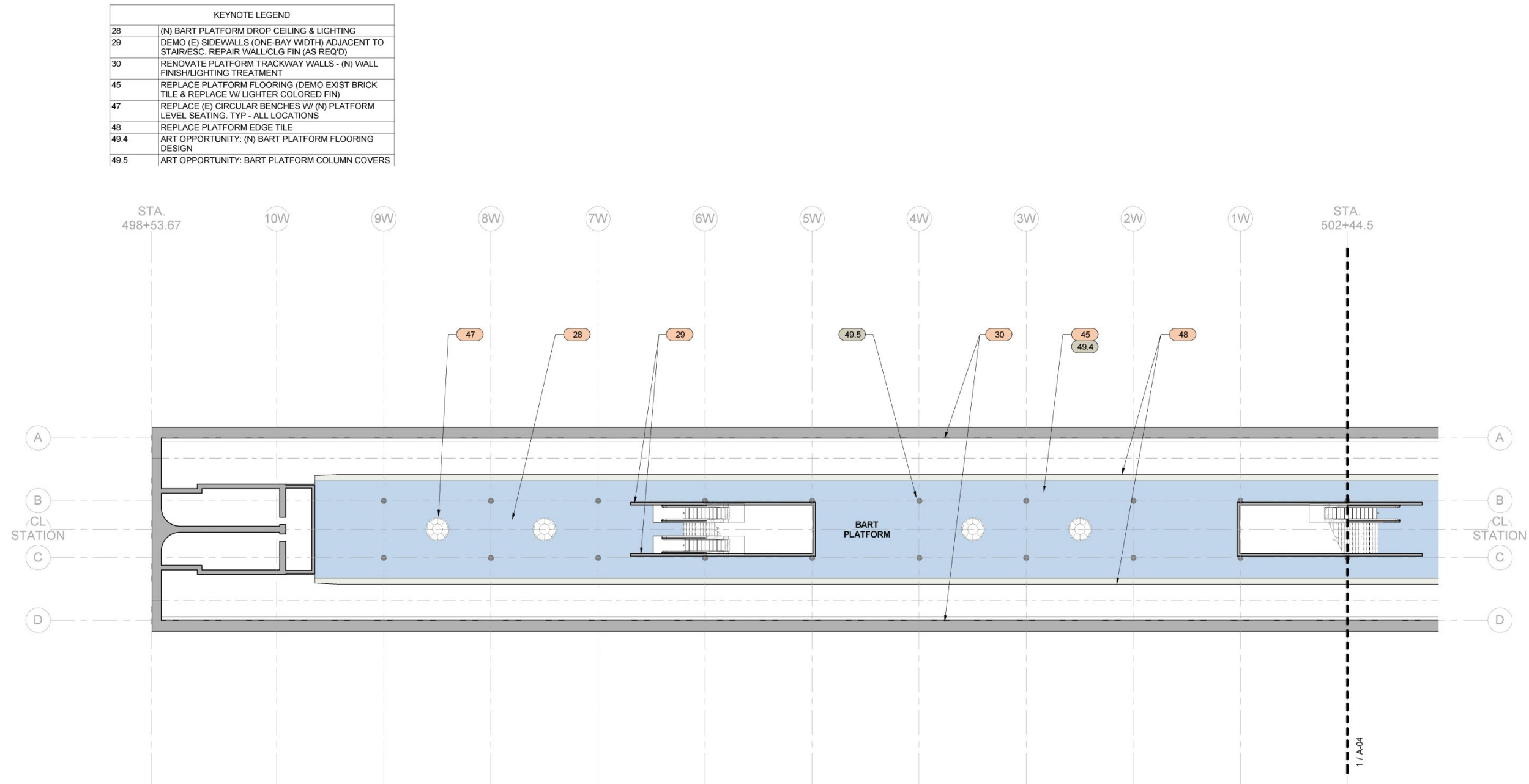


Figure 72: Montgomery Modernization Projects – BART Platform Sector A



1 MONTGOMERY STATION BART PLATFORM - SECTOR A
A-03 Scale: 1/16" = 1'-0"



PLAN LEGEND - COLOR SCHEMES	
	CONCOURSE "FREE" AREA
	BART "PAID" AREA
	MUNI "PAID" AREA
	MECHANICAL/ UTILITY AREAS
	PROPOSED MODERNIZATION SCOPE
	PROPOSED CAPACITY SCOPE

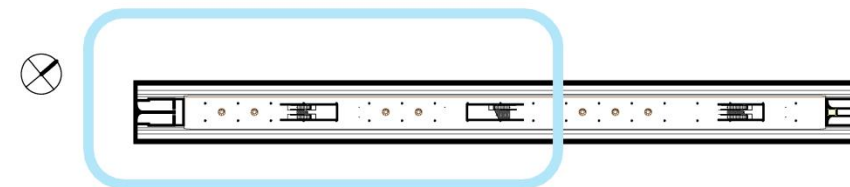
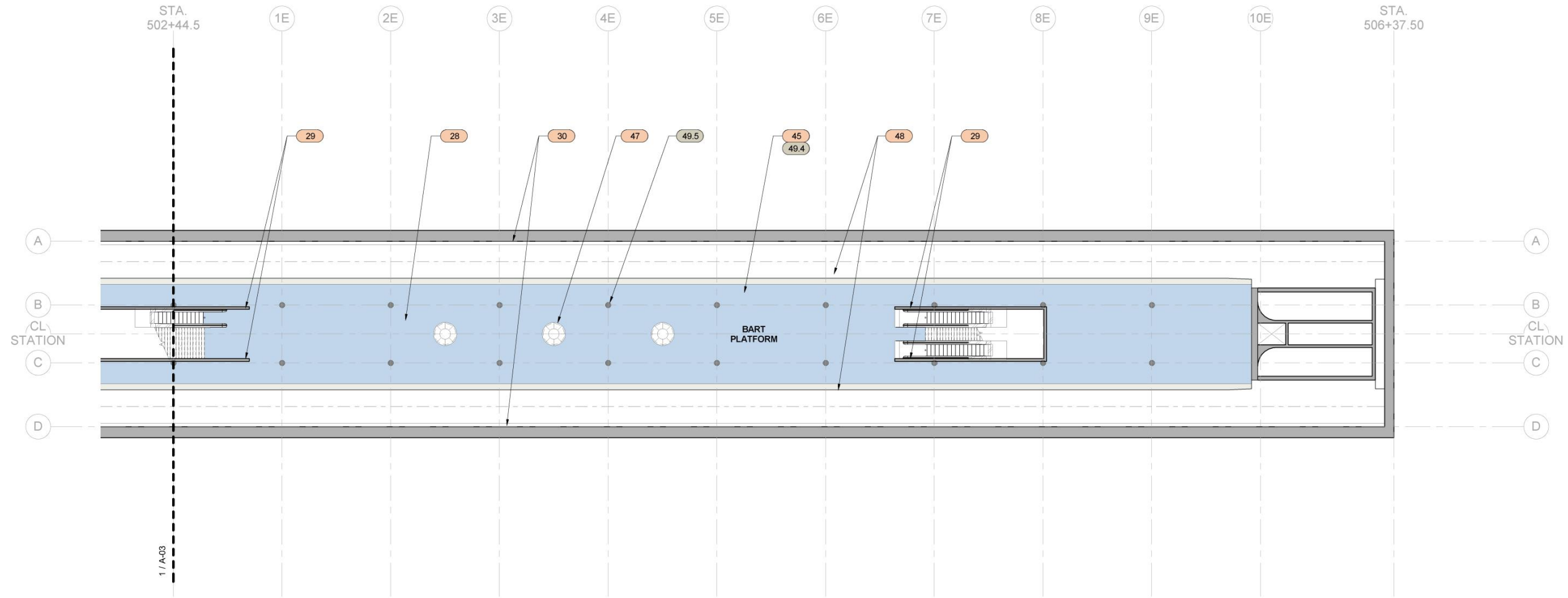


Figure 73: Montgomery Modernization Projects – BART Platform Sector B

KEYNOTE LEGEND	
28	(N) BART PLATFORM DROP CEILING & LIGHTING
29	DEMO (E) SIDEWALLS (ONE-BAY WIDTH) ADJACENT TO STAIR/ESC. REPAIR WALL/CLG FIN (AS REQ'D)
30	RENOVATE PLATFORM TRACKWAY WALLS - (N) WALL FINISH/LIGHTING TREATMENT
45	REPLACE PLATFORM FLOORING (DEMO EXIST BRICK TILE & REPLACE W/ LIGHTER COLORED FIN)
47	REPLACE (E) CIRCULAR BENCHES W/ (N) PLATFORM LEVEL SEATING. TYP - ALL LOCATIONS
48	REPLACE PLATFORM EDGE TILE

KEYNOTE LEGEND	
49.4	ART OPPORTUNITY: (N) BART PLATFORM FLOORING DESIGN
49.5	ART OPPORTUNITY: BART PLATFORM COLUMN COVERS



1 MONTGOMERY STATION BART PLATFORM - SECTOR B
A-04 Scale: 1/16" = 1'-0"



PLAN LEGEND - COLOR SCHEMES			
	CONCOURSE "FREE" AREA		PROPOSED MODERNIZATION SCOPE
	BART "PAID" AREA		PROPOSED CAPACITY SCOPE
	MUNI "PAID" AREA		
	MECHANICAL/ UTILITY AREAS		



Figure 74: Montgomery Capacity Projects – Concourse Sector A

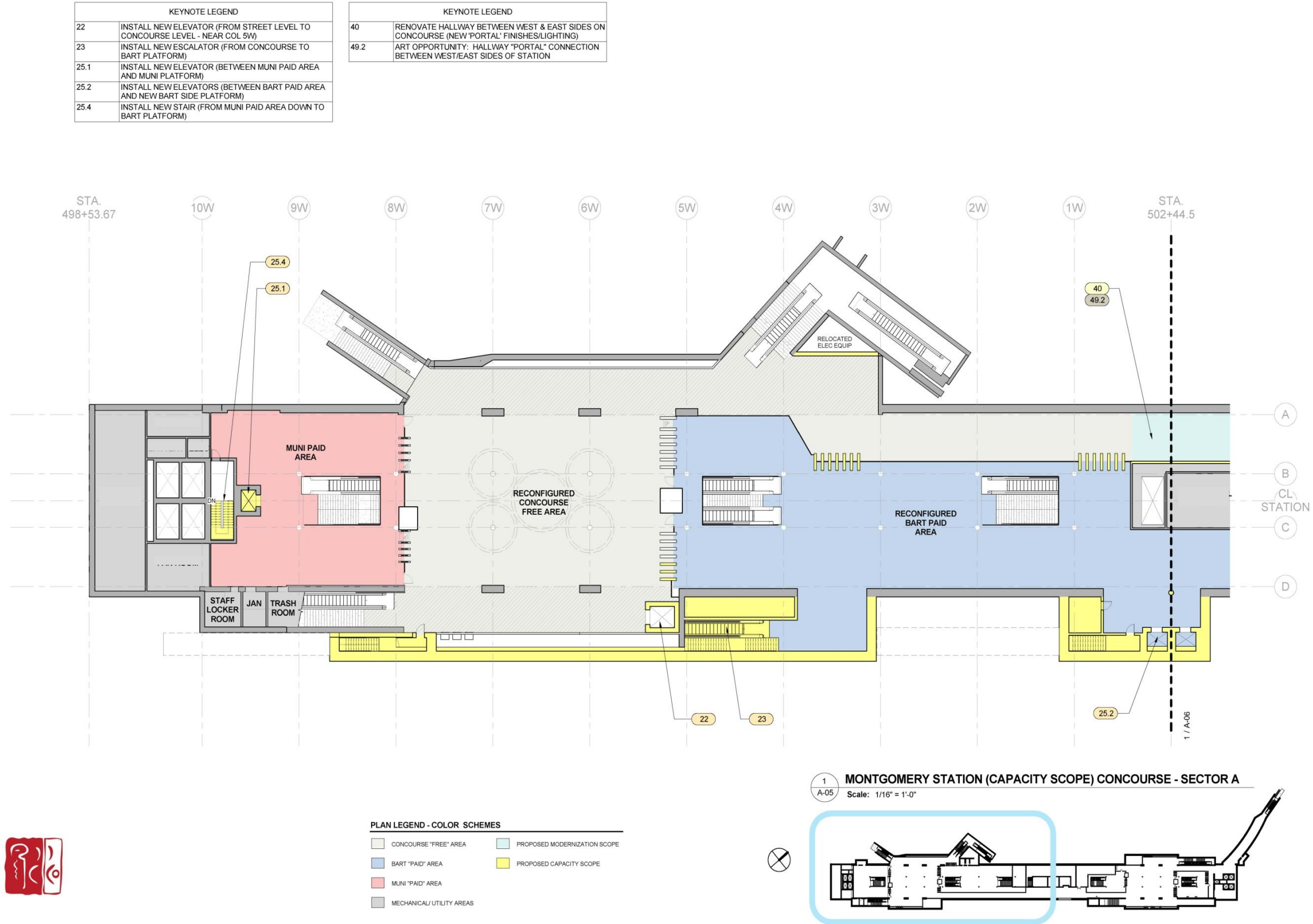


Figure 75: Montgomery Capacity Projects – Concourse Sector B

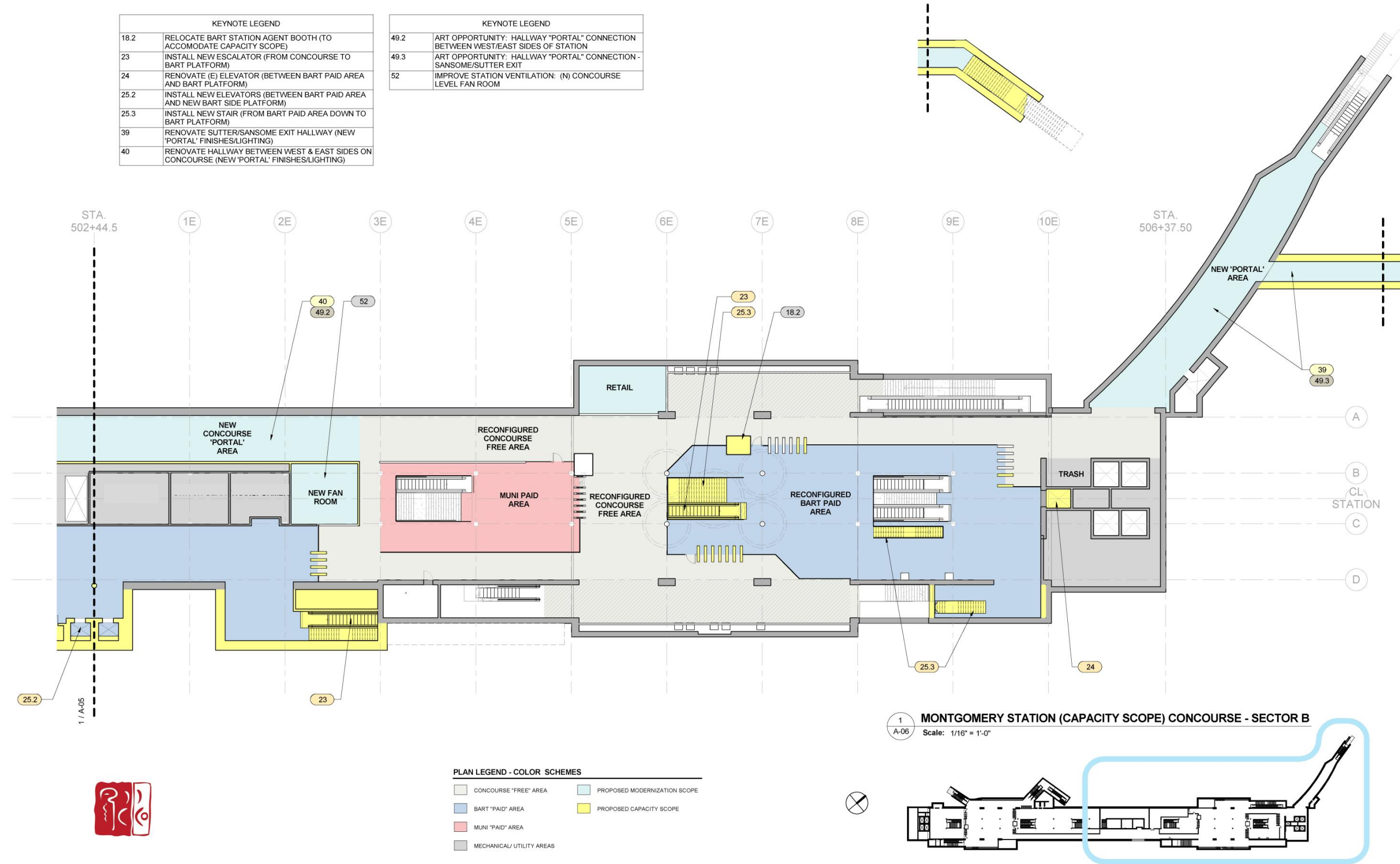
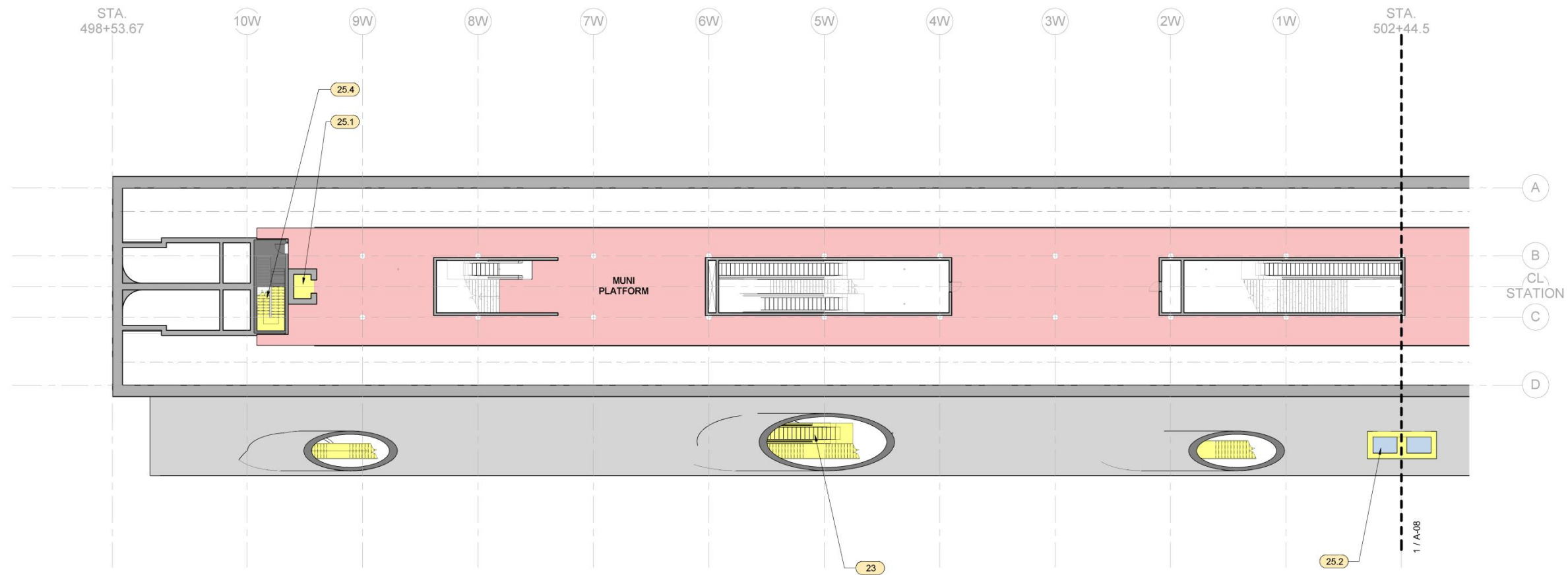


Figure 76: Montgomery Modernization and Capacity Projects – Muni Platform Sector A

KEYNOTE LEGEND	
23	INSTALL NEW ESCALATOR (FROM CONCOURSE TO BART PLATFORM)
25.1	INSTALL NEW ELEVATOR (BETWEEN MUNI PAID AREA AND MUNI PLATFORM)
25.2	INSTALL NEW ELEVATORS (BETWEEN BART PAID AREA AND NEW BART SIDE PLATFORM)
25.4	INSTALL NEW STAIR (FROM MUNI PAID AREA DOWN TO BART PLATFORM)



1
A-07 **MONTGOMERY STATION (CAPACITY SCOPE) MUNI PLATFORM - SECTOR A**
Scale: 1/16" = 1'-0"



PLAN LEGEND - COLOR SCHEMES	
	CONCOURSE "FREE" AREA
	BART "PAID" AREA
	MUNI "PAID" AREA
	MECHANICAL/ UTILITY AREAS
	PROPOSED MODERNIZATION SCOPE
	PROPOSED CAPACITY SCOPE

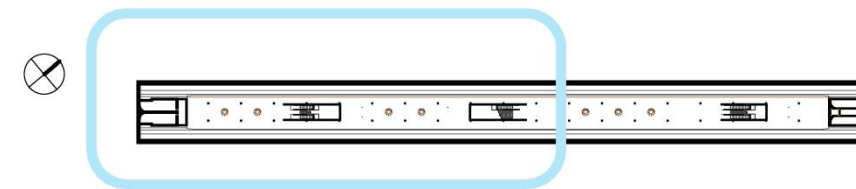
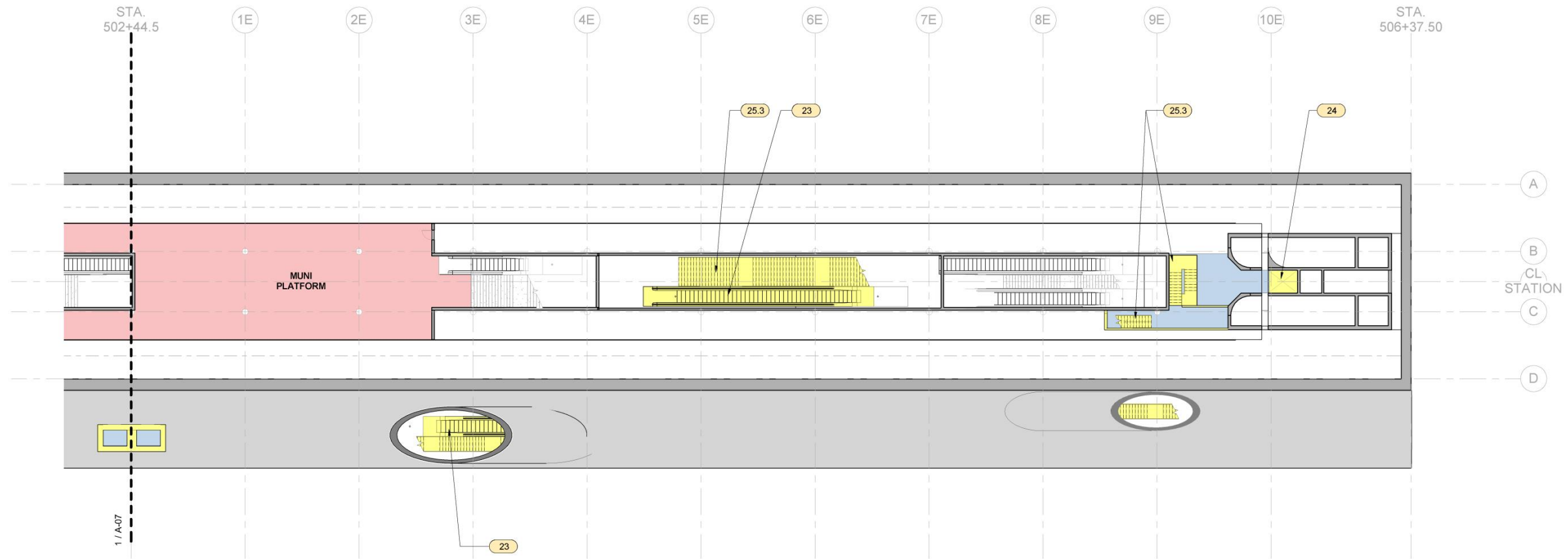


Figure 77: Montgomery Modernization and Capacity Projects – Muni Platform Sector B

KEYNOTE LEGEND	
23	INSTALL NEW ESCALATOR (FROM CONCOURSE TO BART PLATFORM)
24	RENOVATE (E) ELEVATOR (BETWEEN BART PAID AREA AND BART PLATFORM)
25.3	INSTALL NEW STAIR (FROM BART PAID AREA DOWN TO BART PLATFORM)



1 MONTGOMERY STATION (CAPACITY SCOPE) MUNI PLATFORM - SECTOR B
 A-08 Scale: 1/16" = 1'-0"



PLAN LEGEND - COLOR SCHEMES	
	CONCOURSE "FREE" AREA
	BART "PAID" AREA
	MUNI "PAID" AREA
	MECHANICAL/UTILITY AREAS
	PROPOSED MODERNIZATION SCOPE
	PROPOSED CAPACITY SCOPE

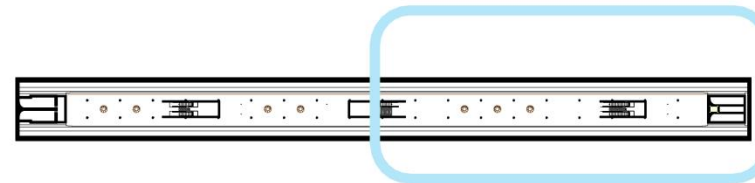
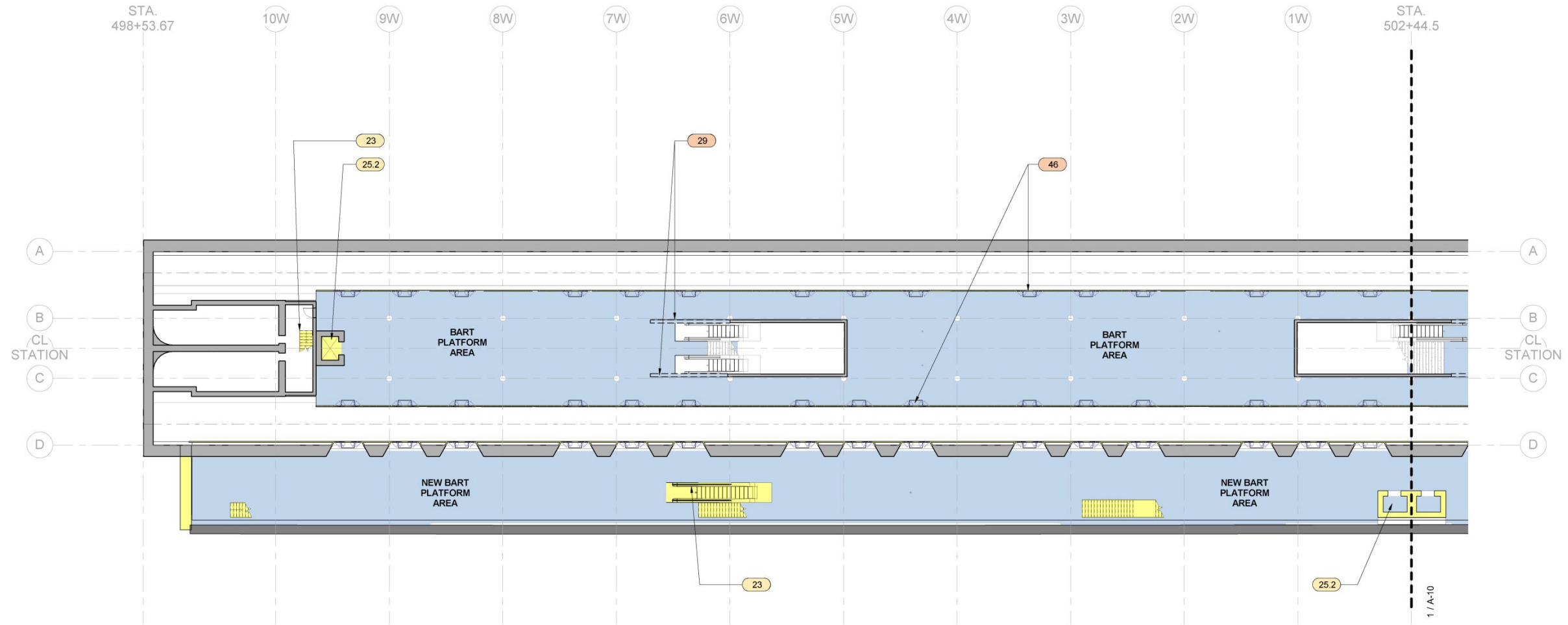


Figure 78: Montgomery Capacity Projects – BART Platform Sector A

KEYNOTE LEGEND	
23	INSTALL NEW ESCALATOR (FROM CONCOURSE TO BART PLATFORM)
25.2	INSTALL NEW ELEVATORS (BETWEEN BART PAID AREA AND NEW BART SIDE PLATFORM)
29	DEMO (E) SIDEWALLS (ONE-BAY WIDTH) ADJACENT TO STAIR/ESC. REPAIR WALL/CLG FIN (AS REQ'D)
46	INSTALL PLATFORM SCREEN DOORS



1
A-09 MONTGOMERY STATION (CAPACITY SCOPE) BART PLATFORM - SECTOR A
Scale: 1/16" = 1'-0"



PLAN LEGEND - COLOR SCHEMES	
	CONCOURSE "FREE" AREA
	BART "PAID" AREA
	MUNI "PAID" AREA
	MECHANICAL/ UTILITY AREAS
	PROPOSED MODERNIZATION SCOPE
	PROPOSED CAPACITY SCOPE

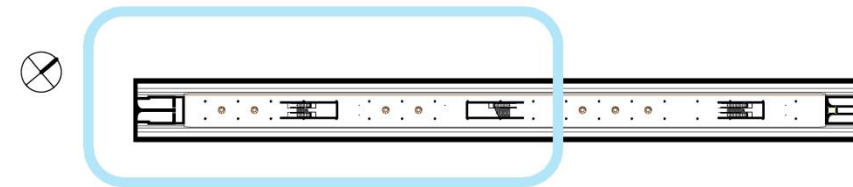
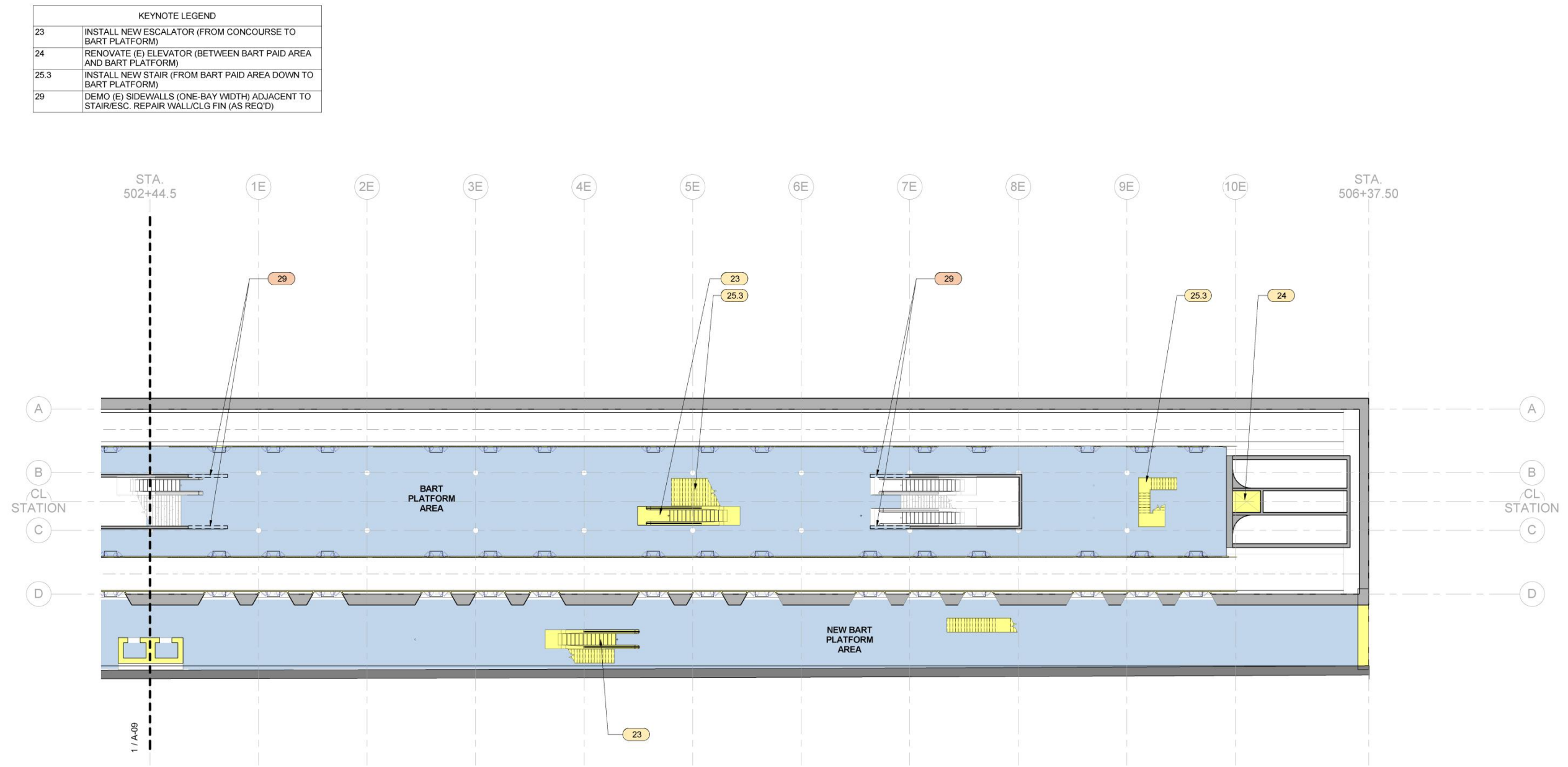


Figure 79: Montgomery Capacity Projects – BART Platform Sector B



1 A-10 MONTGOMERY STATION (CAPACITY SCOPE) BART PLATFORM - SECTOR B
Scale: 1/16" = 1'-0"



PLAN LEGEND - COLOR SCHEMES

CONCOURSE "FREE" AREA	PROPOSED MODERNIZATION SCOPE
BART "PAID" AREA	PROPOSED CAPACITY SCOPE
MUNI "PAID" AREA	
MECHANICAL/ UTILITY AREAS	



7.0 Prioritization, Implementation, and Next Steps

Through the process of selecting a recommended capacity alternative and a recommended modernization concept plan for Embarcadero and for Montgomery, several dozen discrete projects for each station were identified. The following sections detail an integrated prioritization strategy that facilitated a “packaging” of projects into a phased implementation plan. The implementation plan for each station reflects the priorities of BART, stakeholders, and the public; recognizes project predecessor / dependent relationships; and organizes projects into phases that, based on what is currently known, present the most logical and efficient approach to implement the recommended capacity alternative and modernization concept.

While the implementation plans represent an exhaustive approach to addressing each station’s capacity and modernization needs, it is recognized that additional study and ongoing coordination will be needed as the plans are advanced. These are documented as “Next Steps” to be pursued in conjunction with the implementation plans.

7.1 Prioritization and Phasing

Starting with the Master Project Lists of capacity and modernization projects described in the previous chapter, an integrated prioritization strategy was developed. The strategy takes the following criteria into consideration, in the order presented below, to prioritize the projects:

- Early Wins status
- Capacity / Modernization integration
- Project team priority
- Decision Lens priority
- Public priority
- Efficiency
- Estimated cost

Each of the above criteria in the sorting hierarchy are explained in greater detail, as follows. Project ratings for each category are included in the Master Project Lists in the Appendix.

Early Wins Status

A key component of BART’s Station Modernization Program is identifying station upgrades that are relatively low-cost investments bringing immediate benefits with minimal effort. These “early wins” investments are high-priority projects intended to be implemented in the short-term timeframe, in contrast to medium- and long-term projects that typically require more time and funding for planning, design, engineering, and coordination. Early Wins projects have highest priority.

Capacity / Modernization Integration

Capacity projects were organized into three general timeframes: near-term (0–10 years), middle-term (5–15 years), and long-term (10–20 years), as shown in **Figure 80**.

Predecessor / dependent linkages between the proposed improvements were evaluated to identify “critical path” projects. Specific project components that require the completion of preceding project components indicate that these projects exhibit a predecessor / dependent relationship. Subphases for which these relationships do not exist generally lie outside the “critical path” and are more flexible in terms of scheduling.

Figure 80: Recommended Phasing Strategy



Source: AECOM, 2015

Several predecessor / dependent relationships were identified between capacity project components, as summarized below:

Predecessor Project	Successor Project(s)
<ul style="list-style-type: none"> Removal of the janitorial storage closet at Embarcadero 	→ Construct new machine room for current elevator
<ul style="list-style-type: none"> Move stairway to end of platform 	<ul style="list-style-type: none"> → Construct new elevator → Install fare collection equipment at new and existing elevators → Move SFFD storage locker
<ul style="list-style-type: none"> Construct new decking at concourse level 	→ Modify BART paid area for new vertical circulation
<ul style="list-style-type: none"> Construct new elevator for Muni 	→ Install fare collection

For these cases, the subsequent subphases require the completion (or near-completion) of the preceding subphases before implementation can begin.

Modernization projects were prioritized within the capacity framework as follows, also considering predecessor / dependent relationships:

1. Independent – can occur before/without capacity improvements
2. Align with initial stair and elevator reconfiguration
3. Align with subsequent stair and escalator improvements
4. Integrate with major capacity improvements at concourse level (paid area reconfiguration)
5. Integrate with major capacity improvements at platform level (platform screen door implementation)
6. Hold until implementation of final capacity improvements (construction of new side platforms)

Each project was given a ranking between 1 and 6 reflecting its status relative to the “dependency scale” above, ranging from 1 for independent projects to 6 for projects that should be held until construction of new side platforms.

Project team priority

Projects were noted as having special importance to both BART and the consultant team (rated 2), to the consultant team only (rated 1), or having no special importance (rated 0), and prioritized in this order. This criterion was added to mitigate the application of the Decision Lens results (discussed in “Decision Lens priority” below) and ensure that important projects are prioritized accordingly.

Decision Lens priority

The prioritization process utilized a decision support software tool designed to guide BART through an organized and transparent decision making process. BART staff were engaged in an interactive Decision Lens prioritization activity, during which the relative importance of the Station Modernization program goals and objectives were valued with respect to each other in head-to-head comparisons, to identify which goals and objectives are most important for Embarcadero and Montgomery stations.

Prior to the Decision Lens activity, each project was given an effectiveness rating by the project team with respect to how well it would address each of the objectives. A preliminary prioritization list of the improvement projects was prepared by combining the results of the activities described above – the weighting of goals and objectives, and the application of effectiveness ratings – to assign a score between 1 and 0. Thus, projects with high ratings for the objectives deemed most important have highest priority (score closer to 1); projects with lower ratings for those objectives or high ratings for objectives of middle importance have less priority; and projects with the lowest ratings, especially for objectives deemed least important, have least priority.

Public priority

Projects were noted as having been highly ranked in the October 2014 outreach survey (rated 2), noted in the survey (rated 1), or not noted in the survey (rated 0), and prioritized in this order. This criterion was added to ensure that, all previous criteria being equal, projects most important to the public are prioritized accordingly.

Efficiency

Projects were classified as having:

- "critical" efficiency, i.e., needing to accompany other projects (rated 2);
- "beneficial" efficiency, i.e. tying in with other projects could realize cost benefits or optimize construction sequencing (rated 1);
- or as being "independent", and acceptable to complete as an independent project (rated 0);

and prioritized in this order.

Estimated construction cost

The final criterion prioritizes projects in order of increasing construction cost. Thus, all other criteria being equal, lower-cost projects would be implemented before higher -cost projects, maximizing cost/benefit considerations. Projects were assigned one of six estimated construction cost categories as listed below.

\$	Under \$10K
\$\$	\$10K - \$100K
\$\$\$	\$100K - \$500K
\$\$\$\$	\$500K - \$1M
\$\$\$\$\$	\$1M - \$3M
\$\$\$\$\$\$	\$3M - \$6M

Items that were carried over from BART's internal Master Project List generally included a cost estimate, which was used to assign a cost category here. Where cost estimate data is available from other BART projects for work scope similar to items on the Master Project Lists for these stations, that data was used to assign a cost category. Finally, for those items on the list for which no comparable cost data was available, the consultant team developed a rough order of magnitude cost for use in assigning a category.

The cost of new side platforms greatly exceed the construction cost categories above; thus no category is assigned. The Constructability and Construction Staging Analysis (2009) provided hard and soft cost estimates, which escalated to 2015 dollars amount to nearly \$175 million (eastbound side platform at Montgomery) and \$280 million (side platforms at Embarcadero).

With the comprehensive list of capacity and modernization projects sorted according to the criteria presented above, the final step of developing an implementation plan involved breaking the prioritized projects into logical packages.

7.2 Development of Implementation Packages

The Master Project List for each station was reviewed to identify design and construction "packages" of complementary projects. Generally speaking, projects were grouped if they involved either:

- Early wins
- Similar components (such as railings, handrails, etc.)
- Primary design by a single professional discipline (e.g., architecture vs. engineering)
- A common location within the station (e.g., ceilings and everything in and above them would be part of the same aggregate project).

In some cases, packages were based on priority, timing, and cost, such as the new side platforms. In other cases, projects were grouped because they would be constructed more efficiently together, such as replacing the platform floor and edge tiles at the same time platform screen doors were installed.

Most of the packages at each station could be arranged in a logical sequence for implementation, and these were given numbers in the order of their intended construction. Within each package, the projects are listed in priority order as described in Section 7.1.

Four packages appeared to be independent of any other package, meaning that they could either be constructed at any time (such as remodeled restrooms), or be part of a systemwide or regionwide program (such as wayfinding). In the latter case, timing and prioritization decisions will be driven by the multi-location program, not the situation at the station.

Finally, there were seven projects that applied to the entire station, but would be most efficiently implemented in pieces when a section of the station was undergoing renovation. For example, if the platform level ceilings were to be replaced, it would be efficient to install new security cameras, upgrade electrical systems and install emergency lighting at the same time.

However, this approach requires that the master design for each stationwide system already be developed before the construction project starts. Some renovation projects may take several years to construct, because only small areas of the station can be closed at any one time. For a system such as security cameras, the design and specifications for the entire station would guide the incremental installation of its components. In addition, the design would need to be backwards compatible, since new cameras would be operating alongside old cameras for quite some time.

7.3 Embarcadero Implementation Plan

The capacity and modernization plan for Embarcadero has ten sequential packages, as illustrated in **Figure 81**, which provides a general summary of cost, timing and sequencing. Relative cost is shown on the vertical axis with the lowest cost at the bottom. Elapsed time from the present is shown on the horizontal axis, starting from the left. Sequencing is indicated by the lines and arrows connecting the packages. Packages that include expansion of vertical circulation capacity are shown in red.

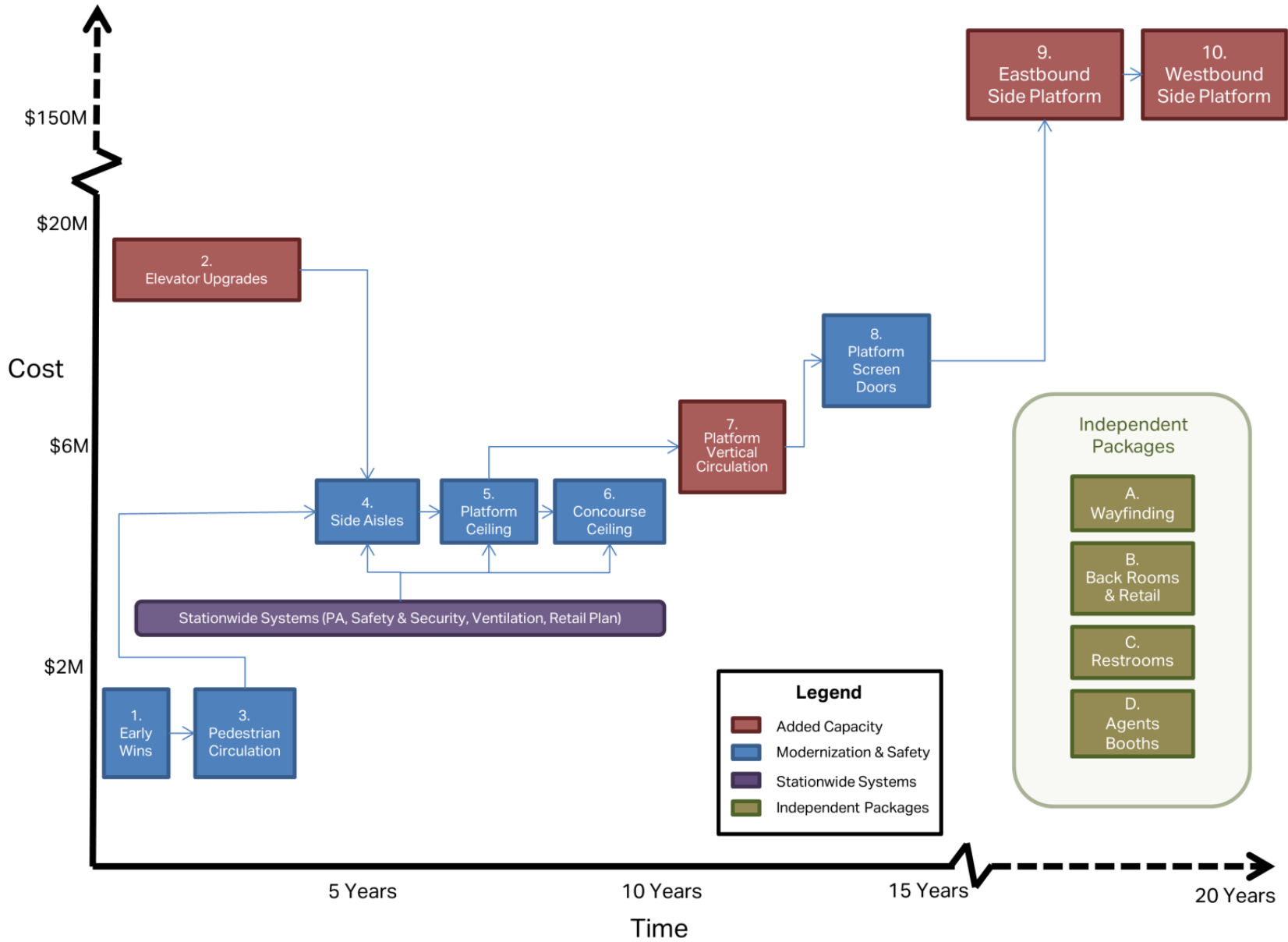
Early wins and elevator upgrades would start immediately, followed by pedestrian circulation upgrades, which would be completed while the elevator upgrade was still underway. Master design for the stationwide systems would begin shortly so that it would be complete prior to final design of the side aisle upgrades. Installation of the stationwide systems would continue throughout the implementation of Packages 4, 5 and 6.

One of the principles underlying the implementation plan is minimizing the number of areas under construction within the station at any one time. Therefore, the side aisle upgrades would be complete prior to beginning construction on the platform ceiling renovation. An exception occurs at the beginning of the plan when the elevator upgrades are simultaneous with the early wins and circulation upgrades. In this case, the construction impact of early wins and circulation upgrades are small and limited to only a few areas.

The relative cost of the early wins and the circulation upgrades is low, while the cost of the elevator upgrades are high. Renovation of the side aisles, platform ceiling and concourse ceiling are relatively moderate cost projects. Construction of new stairs and escalators between the concourse and the platform would have a cost in the same range as the elevator upgrades. Side platforms would be several orders of magnitude more expensive, which is indicated by the broken lines on the axes.

The independent packages are shown in their own box, and their placement is not indicative of their relative cost or timing. The projects comprising each package, their relation to other projects, and relative cost are shown in **Table 9** through **Table 15**. Each project is identified by number and area of concern, as described in Section 6.4. The project numbers and color-coding of area of concern in the table are consistent with those in the notes and call outs shown on the plan sheets in Chapter 6, allowing the project description to be cross-referenced with its location.

Figure 81: Embarcadero Implementation Plan



Source: AECOM, 2016

Table 8: Embarcadero Implementation Package 1 – Early Wins

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
1. Early Wins:						
Safety & Security	Proj 06	A-01 A-02 A-03	Glass Partition repair	Repair broken glass partition(s) in locations as indicated. Review to see if reason why EM has repeatedly more broken panels than Montgomery Sta.	Proj: 3	\$\$\$\$ (\$500k-\$1M)
Wayfinding, Signage & Real-time displays	Proj 13	ALL: Concourse Platform	Replacement/ additional Wayfinding signage	<ul style="list-style-type: none"> -Replace broken wayfinding sign on walls and ceilings -Redesign platform level wayfinding/station identification signs to increase visibility -Need signage for where to board short trains -Add/repair/update emergency exit signage -Replace signs referencing "R1" and "R2" with "Platform 1" and "Platform 2" -Install signage for no bicycles on escalators -Add wayfinding to Bike Station -Fix Emergency Exit signs that don't match. -Provide signage to Bike Station that is more clear (currently missing info) -Add "No Bikes on Escalator" signs 		\$\$ (\$10k-\$100k)
Wayfinding, Signage & Real-time displays	Proj 14	ALL: Concourse Platform	Remove old signage clutter	<ul style="list-style-type: none"> -Remove or replace old sign clutter (e.g. paper copies/instructions/directions that are no longer applicable) at location indicated (e.g. Ticket Vending Machines, Station Agent Booths) -Remove glue backing from previously peeled off signs or consider sign replacement -Remove or replace old/worn down regulatory signage (No smoking, No eating, etc.) 		\$\$ (\$10k-\$100k)
Station Brightening, Appearance & Sightline Improvements	Proj 35	ALL:Concourse	Reconsider Advertising @ Concourse	Remove existing advertising from beams (hanging) and other non-integrated locations	Proj: 16, 38, 39	\$ Under \$10K
Station Brightening, Appearance & Sightline Improvements	Proj 36	A-02	Improve Concourse Sightlines	<p>Improve Concourse Sightlines by removing/relocating items that block views:</p> <ul style="list-style-type: none"> -Remove and/or update triangular information kiosk materials, garbage containers and other freestanding items to other locations (out of main passenger circulation areas) -Move distracting advertisement adjacent to TVMs to other locations (if possible consolidate or convert to digital formats) -Move garbage containers located in sightlines or in congested areas to along walls (out of the way) 	Proj: 35, 40	\$ Under \$10K

Table 8: Embarcadero Implementation Package 1 – Early Wins (continued)

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
Station Brightening, Appearance & Sightline Improvements	Proj 40	A-02	Remove newspaper kiosks (free areas between agent booths)	Concourse Level: -Replace or install newsstand booth with smaller replacement and place against wall; consolidate newspaper kiosks -Patch/ repair floor as needed		\$\$ (\$10k-\$100k)
Station Brightening, Appearance & Sightline Improvements	Proj 46	ALL:Concourse	Remove unused accessories	Remove Outdated Accessories/ Fixtures including: -Ashtrays -broken/unused hand sanitizer kiosks		\$ Under \$10K
MEP/ Utility	Proj 59		Utility cabinet door	Close and/or repair utility cabinet door		\$ Under \$10K
Maintenance & Repair	Proj 61	ALL: Concourse	Clean up graffiti and/or glass etching	Clean up graffiti and/or glass etching		\$ Under \$10K
Maintenance & Repair	Proj 63	A-01 A-02 A-03	Renovate Walk-off mats to avoid tripping hazard	Ensure flush surface to avoid tripping hazard (e.g. tape around rug/carpet tiles)		\$ Under \$10K
Maintenance & Repair	Proj 66	A-02	Bike Station Grating	Grate wall is dirty and needs more regular cleaning than typical BART station cleaning program		\$ Under \$10K
Platform Improvements	Proj 54	A-06 A-07	Platform seating replacement	Remove/ replace existing terrazzo round benches (BART Platform level) with new benches having a smaller footprint to improve circulation/ queuing space. Provide deterrents on new benches to prevent patrons from lying down. Patch flooring as needed where benches removed.	Proj: 55	\$\$ (\$10k-\$100k)
Maintenance & Repair	Proj 67	ALL: Platform	Platform Floor Decal Replacement	Replace worn down floor decals		\$ Under \$10K
Maintenance & Repair	Proj 69	ALL: Platform	Trackway Advertising maintenance	Secure all advertising panels along platform walls. Bolts from existing panels have fallen off onto third rail.		\$ Under \$10K
ADA Compliance	Proj 09	ALL: Concourse Platform	Improve Signage for ADA compliance	Bring all Braille signage into CA2 compliance including: -Add elevator signage where missing and include CA2-compliant braille -Make elevator access signage consistent within station(s) and include CA2-compliant braille -Replace bathroom signs on door and include CA2-compliant braille -Remove lift not in use to avoid confusion, or provide signage (with CA2 braille) indicating that it is not in use, or repair -Add CA2-compliant braille sign at emergency exit	Proj: 8	\$ Under \$10K

Table 8: Embarcadero Implementation Package 1 – Early Wins (continued)

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
ADA Compliance	Proj 10	ALL: Concourse Platform	Install Cane Detection / Other warning devises per ADA requirements	-Install cane detector where emergency telephone boxes, utility boxes, water fountains, fire alarms, stairwells etc. protrude from the wall. Consider replacing metal box detectors on platforms. -Replace worn yellow striping on stairs -Add texture to platform at top of stairs to indicate about to enter stairwell		\$\$ (\$10k-\$100k)
ADA Compliance	Proj 12	ALL: Concourse Platform	Bring Station Amenities/Service areas into ADA compliance	-Move public phones to ADA-compliant height (48" or less) -Lower counters to between 28" and 34" in height. Minimum 36" width. -Place wheelchair-accessible ticket entry sign in more visible location, replace old signage, and place braille at reachable height -Add accessible door entry -Provide accessible door opening mechanism (kick-plate or press-plate door actuator)		\$\$ (\$10k-\$100k)
Maintenance & Repair	Proj 64	ALL: Concourse	Fix debris caused by TVM receipts	Address ticket/receipt trash on floors in front of ticket vending machines (e.g. wall mounted fixture to catch trash) Introduce receipt-less vending		\$ Under \$10K
Maintenance & Repair	Proj 65	ALL: Concourse	Exposed Electrical Outlets	Remove or cover exposed old electrical outlets to avoid patrons using them to charge electronics		\$ Under \$10K
Escalator & Elevators	Proj 22	ALL: Concourse Platform	Elevator & Escalator Maintenance	-Replace missing floor number on elevator jamb -Clean rusty or dirty elevator door (replace) -Repair escalator handrail -Replace faded elevator call buttons -Replace wood core escalator balustrade (improve customer experience) -Refresh floor indicator paint on inside of elevators -Replace elevator door with glass/transparent door		\$\$ (\$10k-\$100k)
Station Brightening, Appearance & Sightline Improvements	Proj 29	A-01A-02A-03	Lighting Maintenance	-Clean filthy fixtures (walls & ceilings) -Replace broken light bulbs & fixtures (walls & ceilings)		\$\$ (\$10k-\$100k)
Station Brightening, Appearance & Sightline Improvements	Proj 33	A-01A-02A-03	Add'l Concourse Storage Area	Install storage cabinets to keep temporarily unused garbage containers, cleaning equipment, caution signage, cones, or informational materials out of sight		\$\$ (\$10k-\$100k)

Table 8: Embarcadero Implementation Package 1 – Early Wins (continued)

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
Station Brightening, Appearance & Sightline Improvements	Proj 37	A-01 A-02 A-03	Additional Vending Machines	Add a Ticket Exchange and/or Ticket Vending Machine (as needed) at location indicated. Add Change Machine (as needed) Add ATM machines - 2 locations one at each end of Concourse - flush-mt within TVM wall Remove any existing free-standing ATM, Vending units Consolidate UPS/Package Service boxes to built-in wall locations		\$\$ (\$10k-\$100k)
Station Brightening, Appearance & Sightline Improvements	Proj 47	A-02	Install Wall Plaques	Install station wall plaques and lighted signs for granite sidewalls on Concourse. Coordinate with existing project (plaques are already ordered)		\$\$ (\$10k-\$100k)
Station Brightening, Appearance & Sightline Improvements	Proj 31	A-01 A-02 A-03	Electrical & security devices	Remove duplicate security camera(s) & exposed wire(s)	Proj: 3	\$\$ (\$10k-\$100k)
Station Brightening, Appearance & Sightline Improvements	Proj 43	ALL:Concourse	Wall/Floor Repair	Repair water damage in ceiling/wall. Repair staining on floor. Shave and polish dark-color granite wall/floor finish as needed (most locations in good condition).	Proj: 58, 63	\$\$ (\$10k-\$100k)
Public Art	Proj 57	A-01 A-02 A-03	Public Art opportunities	Introduce "iconic" public art features (potential locations): A) On ceiling/ vault sidewalls along length of Concourse (ceiling spine) B) On Concourse floor in free area of main hall (2 locations - between Muni & BART areas) C) Central Concourse area at new grating/wall panels (covering existing unused areas) D) Central Concourse granite side walls		\$\$\$ (\$100k-\$500k)
MEP/ Utility	Proj 60	A-01	Mech Room Access	More direct access needed to mechanical rooms at West end of Concourse (Col 3E-6E) including changing from single to double doors		\$\$ (\$10k-\$100k)
Bike Improvements	Proj 51	A-01 A-02 A-03	Improve Bike Access	Install stair channels to facilitate bicycle circulation (6 entry locations from street to concourse levels)		\$\$ (\$10k-\$100k)
Station Brightening, Appearance & Sightline Improvements	Proj 34	A-06A-07	Platform Trackway Walls	Brighten platform area (re-painting of platform walls)		\$\$\$ (\$100k-\$500k)

Table 9: Embarcadero Implementation Package 2 – Elevator Upgrades

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
2. Elevator Upgrades						
Escalator & Elevators	Proj 24	A-03 A-05 A-07	Relocate existing stair & infill of Concourse floor	Replace existing stair going from Concourse to BART Platform at Col line 21, relocating to East wall (near Col line 22). Construct infill decking to allow backup access to stair from Muni level. Infill Concourse Floor to provide access. Modify and extend paid area barrier and east fare gate array to enclose.	Proj: 24, 25, 26, 27	\$\$\$\$\$\$ (\$3M-\$6M)
Escalator & Elevators	Proj 25	A-03 A-05 A-07	Install New Elevator	Install new elevator (near Col line 21) -between BART Paid area and BART Platform	Proj: 25, 26, 27	\$\$\$\$\$\$ (\$3M-\$6M)
Escalator & Elevators	Proj 27	A-02	Replace existing Concourse-Platform elevator	Existing Elevator at Center of Station: -Replace existing elevator (new elevator should accommodate gurney). -Change hoistway to clear glazing to improve safety/security. -Install new Fare Gates at Concourse to require access from inside paid area	Proj: 24, 25, 26, 28	\$\$\$\$ (\$1M-\$3M)
Escalator & Elevators	Proj 28	A-05 A-07	Elevator Machine Room	Construct new machine room for existing elevator on BART Platform to increase reliability. Preferred location is under BART stair/escalator on MUNI level to save space at BART platform.	Proj: 24, 25, 26	\$\$\$\$ (\$500k-\$1M)
Escalator & Elevators	Proj 23	A-09	Install New Street Level Elevators and Remove Existing	Install new elevator from Street Level to Concourse Level at two locations - one each on the north and south station walls. Remove existing elevator on north side of station to allow for installation of new stair and escalator to Street Level.		\$\$\$\$\$\$ (\$3M-\$6M)
Escalator & Elevators	Proj 23b	A-09	New Escalator and Stairs to Street Level	Install new escalator and stair from Street Level to Concourse Level at two locations. Include street level canopy providing weather protection and secure enclosure.	Proj: 23	\$\$\$\$\$\$ (\$3M-\$6M)

Table 10: Embarcadero Implementation Package 3 – Pedestrian Circulation Upgrades

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
3. Pedestrian Circulation Upgrades:						
Platform Improvements	Proj 55	A-06 A-07	Platform sightline & storage improvements	Consolidate space under escalator trusses & construct new (permanent) storage closets to house the variety of "loose" items currently kept under escalators. Remove freestanding maps/wayfinding and integrate into wall panel of new closets to decrease clutter and free up platform queuing space. Remove janitorial closet adjacent to central elevator. Relocate third rail trip switches.	Proj: 54	\$\$ (\$10k-\$100k)
Fare Evasion	Proj 01	A-01 A-02 A-03	Fare evasion strategy	<ul style="list-style-type: none"> -Secure gates to avoid fare evasion. -Install next generation fare gates. -Increase height of railings between paid/unpaid areas to 5' tall glass barriers per latest BFS standard. -Add fare gates at location indicated to Mitigate fare evasion (elevators are currently used to bypass fare gates) -Eliminate obscure or redundant ADA access gates 	Proj: 2, 6	\$\$\$\$ (\$500k-\$1M)
Safety & Security	Proj 02	A-01 A-03	Ensure existing Concourse Guardrail meets UBC standards	Ensure existing guard rail meets UBC standards in height or install new railing. High priority due to safety concerns. Confirm dimensions and replace or modify to meet code.	Proj: 1, 6	\$\$\$ (\$100k-\$500k)
ADA Compliance	Proj 11	ALL: Concourse Platform	Bring handrails into ADA compliance	Handrails required to extend 12" at top and/or bottom of stairs and/or ramp and width no more than 1.25 - 1.5"		\$\$\$ (\$100k-\$500k)
Safety & Security	Proj 24.1	A-07	SFFD platform storage locker	Relocate SFFD storage facilities from freestanding locker to new storage room integrated under east end-of-platform stair. Coordinate with design of stair (project 24)		\$\$ (\$10k-\$100k)

Table 11: Embarcadero Implementation Package 4 – Side Aisle Upgrades

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
4. Side Aisle Upgrades:						
Station Brightening, Appearance & Sightline Improvements	Proj 38	A-01 A-02 A-03	Renovate "Side Aisle" (TVM/ Alcove / Building entry areas) - near term solutions	<ul style="list-style-type: none"> -Cover wall-mounted abandoned phone booths with stainless steel plates (short-term). -Remove free-standing empty phone kiosks and associated signage. -Cover up closed off mezzanine building entrances with stainless steel plates backed up by wood or other material -Utilize closed off/blank panel areas as temporary solution to accommodate for need storage (until permanent locations determined and new storage built-outs can be constructed) 	Proj: 63, 64	\$\$ (\$10k-\$100k)
Station Brightening, Appearance & Sightline Improvements	Proj 41	A-01 A-03	Ceiling Renovation - drop ceiling areas (side-aisles)	Replace existing ceiling "grate" panels with new to brighten space (drop-clg areas at side).	Proj: 38, 58, 63	\$\$\$\$ (\$500k-\$1M)
Station Brightening, Appearance & Sightline Improvements	Proj 48	A-01 A-02 A-03	Station Gateway spaces	<ul style="list-style-type: none"> Redesign corners of concourse at portals to eliminate emergency doors, redesign more elegant chain wall solution, and integrate better/more durable floor mats that complements proposed canopy installation -If emergency doors need to remain - they should be upgraded to have push bars -Currently the escalator cabinets at exits block potential access to back of house space and/or create an inaccessible zone that cannot be cleaned, but is visible to patrons. 		\$\$\$\$ (\$1M-\$3M)
Station Brightening, Appearance & Sightline Improvements	Proj 39	A-01 A-02 A-03	Renovate "Side Aisle" (TVM/ Alcove areas) - longer term solutions	<ul style="list-style-type: none"> Renovate Concourse "Side Aisle" areas (4 locations total) including: -Removing abandoned booths (Ticket booths, Ticket transfer machines, etc.) -New wall finish and TVM array treatment -New Ceiling finish & lighting design (entry areas to street) -Infill under utilized areas (blank spaces) with new passenger amenities/retail -Refurbish "dead" stainless panel walls & provide built-in storage areas 	Proj: 63, 64	\$\$\$\$ (\$1M-\$3M)

Table 12: Embarcadero Implementation Packages 5-10 – Ceiling Components, Vertical Circulation Upgrades, Platform Screen Doors and Side Platforms

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
5. Platform Level Ceiling Components:						
Platform Improvements	Proj 52		Platform Lighting	Upgrade Platform Lighting. Currently dark in a few areas. Coordinate with existing BART lighting projects already underway. May be useful to wait to tie this to screen door installation when lighting levels will again need study.	Proj: 53	\$\$\$\$ (\$500k-\$1M)
Station Brightening, Appearance & Sightline Improvements	Proj 32	A-06 A-07	New Platform Lighting Systems	-Renovate platform lighting over passenger & trackway areas (to improve brightness/levels). Incorporate lighting improvements already planned		\$\$\$\$\$\$ (\$3M-\$6M)
6. Concourse Level Ceiling Components:						
Station Brightening, Appearance & Sightline Improvements	Proj 30	A-01 A-02 A-03	New Concourse Lighting systems	Improve lighting at location indicated (see plans)		\$\$\$ (\$100k-\$500k)
Station Brightening, Appearance & Sightline Improvements	Proj 42	A-01 A-02 A-03	Ceiling Renovation - main areas	Concourse Level "main hall" ceiling where vault extends up above structure. New ceiling & lighting treatment on entire "spine" of station (full ceiling length from East to West). Coordinate with SFMTA proposed ductwork to make sure clean appearance.		\$\$\$\$ (\$1M-\$3M)
7. Platform Vertical Circulation Upgrades:						
Escalator & Elevators	Proj 26	A-08 A-10	Install New Stairs to BART center platform	Convert single escalator locations to paired stair/escalators (2 locations) running from BART Paid area down to BART center Platform	Proj: 23, 24, 25, 27	\$\$\$\$\$\$ (\$3M-\$6M)
8. Platform Edge Doors:						
Platform Improvements	Proj 53	A-11 A-12	Platform screen doors	New Platform Screen doors at BART Platform level	Proj: 52, 56	\$\$\$\$\$\$ (\$3M-\$6M)
Platform Improvements	Proj 56	A-06 A-07	Edge Tile replacement	Replace edge strip tiles. Existing are decaying, broken (BART Platform).	Proj: 53	\$\$ (\$10k-\$100k)
9. Eastbound Side Platform:						
Capacity Expansion	Proj 71		Eastbound side platform	Construct eastbound side platform and vertical circulation		
10. Westbound Side Platform:						
Capacity Expansion	Proj 72		Westbound side platform	Construct westbound side platform and vertical circulation		

Table 13: Embarcadero Independent Implementation Package A – Wayfinding

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
A. Wayfinding						
Wayfinding, Signage & Real-time displays	Proj 18	ALL: Concourse Platform	Agent Booth signage	-Install signs at closed/part-time Station Agent booths providing guidance on where to find Station Agent -Improve/replace "Station Agent Assistance" sign -Provide directional signage to find Station Agent phones -Provide signage to distinguish between Station Agent phones and public pay phones	Proj: 19	\$\$ (\$10k-\$100k)
Wayfinding, Signage & Real-time displays	Proj 15	ALL: Concourse Platform	Wayfinding & Real-time Planning	-Plan and install comprehensive wayfinding system for bicyclists and pedestrians -Work with local transit agency to Improve real-time info screen content--information is missing or outdated -Install Nextbus signage for BART feeder routes -Provide bus schedules and information	Proj: 16, 35	\$\$ (\$10k-\$100k)
Wayfinding, Signage & Real-time displays	Proj 16	A-01 A-02 A-03	Additional Real-time display concepts	Better real-time info to hopefully alleviate passengers rushing to platform (causing congestion) -New real-time displays at Concourse locations where ad panels removed (free area between agent booths) -Better integration of advertising, videos, digital messages & real-time displays at Concourse "side-aisle" locations (4 locations)	Proj: 35	\$\$\$\$ (\$500k-\$1M)
Wayfinding, Signage & Real-time displays	Proj 17	ALL: Concourse Platform	Advertising & Banners	Implement (station specific) advertising policy so there is no ambiguity about where ads will be permitted	Proj: 16	\$\$ (\$10k-\$100k)

Table 14: Embarcadero Independent Implementation Packages B-D – Back Rooms and Retail, Restrooms and Station Agent Booths

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
B. Back Rooms and Retail						
Station Brightening, Appearance & Sightline Improvements	Proj 45	A-02	Clean up of Retail / Amenity spaces	Upgrade Customer Service Booth/Retail Shop Consolidate Clipper Card both and Transit Store booth with 1 entity servicing both Flower Shop has posters that don't match any station design sensibility (haphazard) Coffee vendor has "sidewalk" signage that blocks circulation Coffee vendor has large underutilized "storage" area with haphazard rolling door		\$\$\$ (\$100k-\$500k)
Station Brightening, Appearance & Sightline Improvements	Proj 49	A-09	Amenity Spaces at Center of Concourse	Several options for potential new amenity/staff/retail spaces at center of Concourse level. 1) Existing Fire Control Center space (which is being relocated) is available for possible retail, break room or storage. 2) Area housing outdated phone bank & lockers could be converted to new program relatively easily.		\$\$\$\$ (\$500k-\$1M)
Safety & Security	Proj 07	A-02	Fire Command Center	Redesign Fire Command Center space. Redesign open area behind Fire Control Center for possible retail, break room or storage. EMP room to replace FCC		\$\$\$ (\$100k-\$500k)
Safety & Security	Proj 24.2	A-07	BART police - tunnel entrance monitoring facilities	Provide SFBART monitoring facilities at east end of platform - either video or video + a small staff enclosure.		\$\$ (\$10k-\$100k)
Maintenance & Repair	Proj 62	ALL: Concourse	Improve trash/utility storage	Improve dumpster storage & reduce visibility to public: -Increase Storage for dumpsters, utility closet and janitorial equipment -Locate dumpsters in enclosures away from the pedestrian zone	Proj: 24	\$\$\$ (\$100k-\$500k)
C. Restrooms						
ADA Compliance	Proj 08	A-02	Re-open Public Restroom	Remodel to provide single-occupant single-sex accessible restrooms for men and women, update to ADA requirements	Proj: 3, 9	\$\$\$ (\$100k-\$500k)
D. Station Agent Booths						
Operations/ Employee Environment	Proj 19	A-02	Renovate/ Replace BART station agent booths	Upgrade/Replace BART Station Agent Booths: -Enlarge to allow two people to occupy comfortably. -Ensure proper operation of security gates and utilities. -Replace floors as needed. -Remove clutter and debris from top of booth.	Proj: 18	\$\$\$\$ (\$1M-\$3M)

Table 15: Embarcadero Implementation Plan – Stationwide Systems Upgrades and Street Level Walls

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
<i>Stationwide Systems Upgrades</i>						
Operations/ Employee Environment	Proj 20	ALL: Concourse Platform	PA System	Adjust the PA volume in the station so it is audible and Muni/BART systems are coordinated where appropriate		\$\$ (\$10k-\$100k)
Safety & Security	Proj 03	ALL: Concourse Platform	New Security Cameras	Install security cameras at indicated areas, loop to police station Remove visual obstructions around pay stations (or other indicated area) to improve visibility, reduce mischief. Add cameras to mitigate narrow corridors, potential hiding places, and blind corners.	Proj: 5, 7, 31	\$\$\$ (\$100k-\$500k)
Safety & Security	Proj 04	ALL: Concourse Platform	Station Electrical	Address station electrical system problem causing light outages		\$\$\$\$ (\$500k-\$1M)
Safety & Security	Proj 05	ALL: Concourse Platform	Emergency Lighting	Install emergency lighting	Proj: 3	\$\$\$\$ (\$1M-\$3M)
MEP/ Utility	Proj 58	ALL: Concourse Platform	Fire Sprinkler Replacement	Replacement of all fire sprinkler nozzles (per code requirements)	Proj: 30, 41, 42	\$\$\$ (\$100k-\$500k)
Station Brightening, Appearance & Sightline Improvements	Proj 44	ALL	Station Specific Retail Guidelines	Implement RETAIL policy & design guidelines so there is no ambiguity about where retail will be permitted, required hours of operation, and permitted finishes	Proj: 40, 45	\$\$\$ (\$100k-\$500k)
MEP/ Utility	Proj 70	ALL: Concourse Platform	Address Station Ventilation issue	Renovation of Fan Room area for improvement of Station ventilation (existing fan room location- West side of station)		\$\$\$\$\$\$ (\$3M-\$6M)
<i>Implemented by Another Project</i>						
Maintenance & Repair	Proj 68	ALL: Street Entries	Street Level Walls (to be completed under canopy project)	Repair / Replace chipped & damaged stone wall panels (Street level at Station entries). Some panels are chipped exposing brackets and structure to elements. Determine if repair is already included in canopy project scope.		\$\$ (\$10k-\$100k)

7.4 Montgomery Implementation Plan

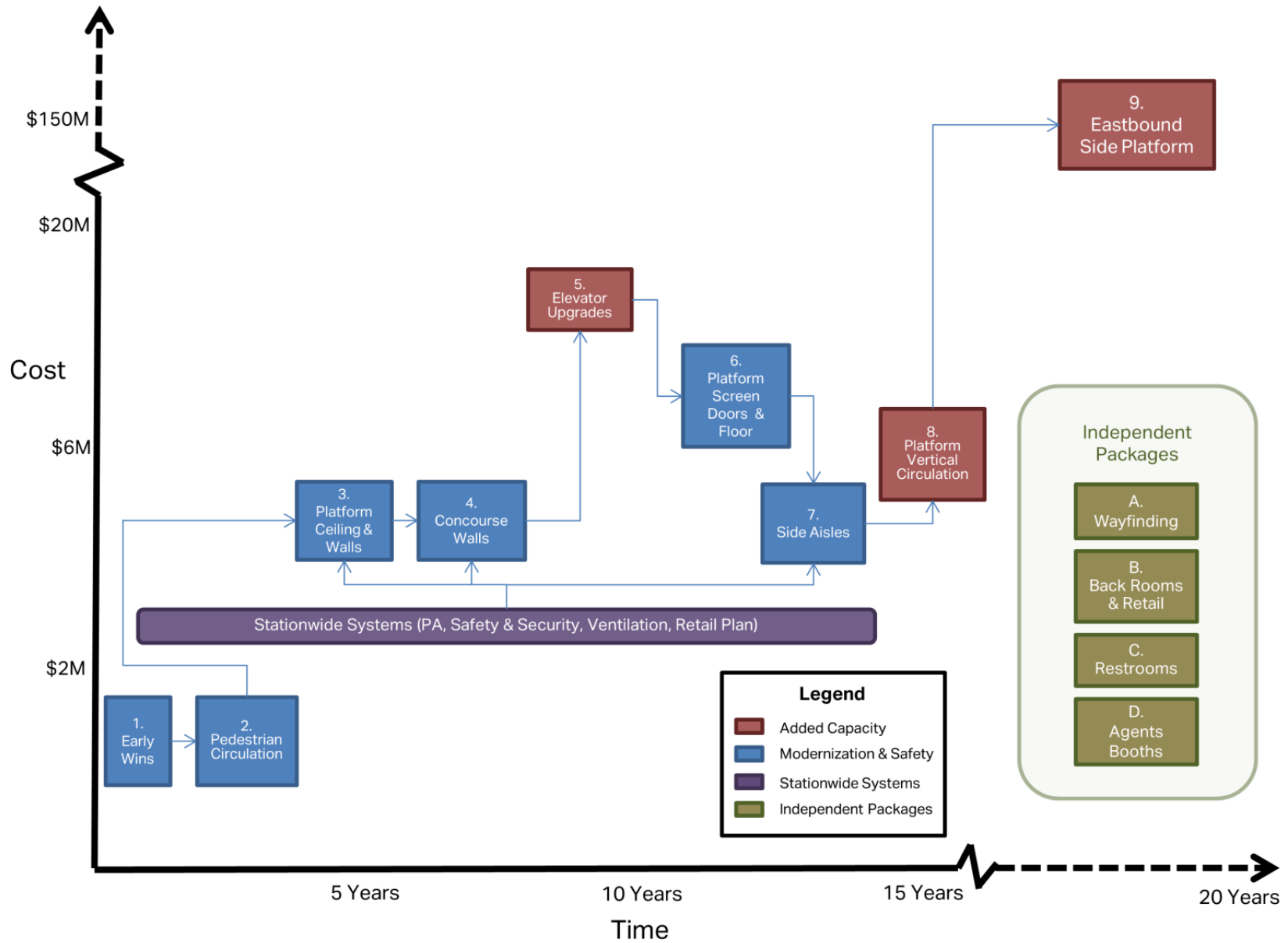
The capacity and modernization plan for Montgomery has nine sequential packages, as illustrated in **Figure 82**. As in the corresponding **Figure 81** for Embarcadero, relative cost is shown on the vertical axis with the lowest cost at the bottom. Elapsed time from the present is shown on the horizontal axis, starting from the left. Sequencing is indicated by the lines and arrows connecting the packages. Packages that include expansion of vertical circulation capacity are shown in red.

Early wins would start immediately, followed by pedestrian circulation upgrades. Master design for the stationwide systems would begin shortly so that they would be complete prior to final design of the platform ceiling and walls upgrades. Installation of the stationwide systems would continue throughout the implementation of Packages 3, 4, and 7.

Following the concourse wall upgrades, the focus would shift to elevator upgrades, followed by installation of platform screen doors and a new platform floor in Package 6. If funding became available to replace the platform floor finish earlier, this project may be advanced separately from the platform screen doors.

Next, the side aisle upgrades would be completed prior to construction of new stairs and escalators between the concourse and the platform. The eastbound side platform would be constructed last. The independent packages are shown in their own box, which has no relation to their cost or timing. The projects comprising each package, their relation to other projects, and relative cost are shown in **Table 16** through **Table 25**.

Figure 82: Montgomery Implementation Plan



Source: AECOM, 2016

Table 16: Montgomery Implementation Package 1 – Early Wins

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
1. Early Wins:						
Wayfinding, Signage & Real-time displays	Proj 12	ALL: Concourse Platform	Replacement/ additional Wayfinding signage	<ul style="list-style-type: none"> -Replace broken wayfinding sign on walls and ceilings -Redesign platform level wayfinding/station identification signs to increase visibility -Need signage for where to board short trains -Add/repair/update emergency exit signage -Replace signs referencing "R1" and "R2" with "Platform 1" and "Platform 2" -Install signage for no bicycles on escalators -Add signage to indicate "UP" and "DOWN" escalators -Replace "elevator is behind you" graphic signs with clear wayfinding to the elevator -Repair sign securing devices--needs additional screws, bolts, adhesive, or other securing material 		\$\$ (\$10k-\$100k)
Wayfinding, Signage & Real-time displays	Proj 13	ALL: Concourse Platform	Remove old signage clutter	<ul style="list-style-type: none"> -Remove or replace old sign clutter (e.g. paper copies/instructions/directions that are no longer applicable) at location indicated (e.g. Ticket Vending Machines, Station Agent Booths) -Remove glue backing from previously peeled off signs or consider sign replacement -Remove or replace old/worn down regulatory signage (No smoking, No eating, etc.) -Replace old schedules and maps (2011 and older) with updated information and repair frames -Replace broken "Add Fare" sign -Remove old "Watch the Gap" or "telephone" signs 		\$\$ (\$10k-\$100k)
Station Brightening, Appearance & Sightline Improvements	Proj 26	ALL: Concourse	Lighting Maintenance	<ul style="list-style-type: none"> -Clean filthy fixtures (walls & ceilings) -Replace broken light bulbs & fixtures (walls & ceilings) 		\$\$ (\$10k-\$100k)
Station Brightening, Appearance & Sightline Improvements	Proj 31	A-01 A-02	Remove Concourse Sign Piers / Advertising Cases to Expose columns	Remove existing advertising sign piers (4 locations @ each centroid = 8 total)	Proj: 15, 32, 35, 36	\$\$\$ (\$100k-\$500k)

Table 16: Montgomery Implementation Package 1 – Early Wins (continued)

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
Station Brightening, Appearance & Sightline Improvements	Proj 32	A-01 A-02	Improve Concourse Sightlines	Improve Concourse Sightlines by removing/relocating items that block views: -Remove and/or update triangular information kiosk materials, garbage containers and other freestanding items to other locations (out of main passenger circulation areas) -Move distracting advertisement adjacent to TVMs to other locations (if possible consolidate or convert to digital formats) -Remove advertisements covering glass partitions to improve personal security concerns	Proj: 31, 36	\$ Under \$10K
Station Brightening, Appearance & Sightline Improvements	Proj 32b	ALL: Concourse Platform	Remove unused accessories	Remove Outdated Accessories/ Fixtures including: -Ashtrays -broken/unused hand sanitizer kiosks		\$ Under \$10K
Station Brightening, Appearance & Sightline Improvements	Proj 37	ALL: Concourse	Ceiling Maintenance	Replace/ repair/ or clean existing ceiling panels on Concourse	Proj: 36, 38, 53, 59	\$\$ (\$10k-\$100k)
MEP/ Utility	Proj 54		Utility cabinet door	Close and/or repair utility cabinet door		\$ Under \$10K
Maintenance & Repair	Proj 56	ALL: Concourse	Clean up graffiti and/or glass etching	Clean up graffiti and/or glass etching		\$ Under \$10K
Maintenance & Repair	Proj 60	A-01 A-02	Renovate Walk-off mats to avoid tripping hazard	Ensure flush surface to avoid tripping hazard (e.g. tape around rug/carpet tiles)	Proj: 34, 35	\$ Under \$10K
Platform Improvements	Proj 47	A-03 A-04	Platform seating replacement	Remove/ replace existing terrazzo round benches (BART Platform level) with new benches having a smaller footprint to improve circulation/ queuing space. Provide deterrents on new benches to prevent patrons from lying down. Patch flooring as needed where benches removed.	Proj: 28, 29, 30, 45, 46, 48	\$\$\$ (\$100k-\$500k)
ADA Compliance	Proj 08	ALL: Concourse Platform	Improve Signage for ADA compliance	Bring all Braille signage into CA2 compliance including: -Add elevator signage where missing and include CA2-compliant braille -Make elevator access signage consistent within station(s) and include CA2-compliant braille -Replace bathroom signs on door and include CA2-compliant braille -Remove lift not in use to avoid confusion, or provide signage (with CA2 braille) indicating that it is not in use, or repair -Add CA2-compliant braille sign at emergency exit	Proj: 7	\$ Under \$10K

Table 16: Montgomery Implementation Package 1 – Early Wins (continued)

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
ADA Compliance	Proj 09	ALL: Concourse Platform	Install Cane Detection / Other warning devises per ADA requirements	-Install cane detector where emergency telephone boxes, utility boxes, water fountains, fire alarms, stairwells etc. protrude from the wall. Consider replacing metal box detectors on platforms. -Replace worn yellow striping on stairs -Add texture to platform at top of stairs to indicate about to enter stairwell		\$\$ (\$10k-\$100k)
ADA Compliance	Proj 11	ALL: Concourse Platform	Bring Station Amenities/Service areas into ADA compliance	-Move public phones to ADA-compliant height (48" or less) -Lower counters to between 28" and 34" in height. Minimum 36" width. -Place wheelchair-accessible ticket entry sign in more visible location, replace old signage, and place braille at reachable height -Add accessible door entry		\$\$ (\$10k-\$100k)
Maintenance & Repair	Proj 61	ALL: Concourse	Fix debris caused by TVM receipts	Address ticket/receipt trash on floors in front of ticket vending machines (e.g. wall mounted fixture to catch trash) Introduce receipt-less vending	Proj: 34, 35	\$ Under \$10K
Escalator & Elevators	Proj 21	ALL: Concourse Platform	Elevator & Escalator Maintenance	-Replace missing floor number on elevator jamb -Clean rusty or dirty elevator door (replace) -Repair escalator handrail -Replace faded elevator call buttons -Replace wood core escalator balustrade (improve customer experience)		\$\$ (\$10k-\$100k)
Station Brightening, Appearance & Sightline Improvements	Proj 33	A-01 A-02	Additional Vending Machines	Add a Ticket Exchange and/or Ticket Vending Machine (as needed) at location indicated. Add Change Machine (as needed) Add ATM machines - 2 locations one at each end of Concourse - flushmt within TVM wall Remove any existing free-standing ATM, Vending units		\$\$ (\$10k-\$100k)
Station Brightening, Appearance & Sightline Improvements	Proj 34	A-01 A-02	Renovate "Side Aisle" (TVM/ Alcove areas) - near term solutions	Cover wall-mounted abandoned phone booths with stainless steel plates (short-term) and redesign wall (long-term). Remove free-standing empty phone kiosks and associated signage.	Proj: 60, 61	\$\$ (\$10k-\$100k)
Station Brightening, Appearance & Sightline Improvements	Proj 27	ALL: Concourse	Remove Redundant Electrical & Security devices	Remove duplicate security camera(s) & exposed wire(s)	Proj: 3	\$\$ (\$10k-\$100k)
Maintenance & Repair	Proj 59	ALL: Concourse Platform	Repair areas of water intrusion/ staining	Clean or replace stained floor Clean or resurface dirty and grimy stairs, repaint where worn	Proj: 37, 38, 53	\$\$ (\$10k-\$100k)

Table 16: Montgomery Implementation Package 1 – Early Wins (continued)

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
Public Art	Proj 49	A-01 A-02 A-03 A-04 A-05 A-06	Public Art opportunities	Introduce "iconic" public art or placemaking features (potential locations): A) On ceiling/columns at "Centroid" to take advantage of circular focal point floor pattern (Concourse "Centroid" areas - 2 locations) B) Hallway "portal" connection between West/East sides of station (adjacent to relocated Mech/Utility spaces - requires Capacity alterations first) C) Hallway "portal" connection at Sansome/Sutter Exit D) Concourse side aisle (on ceiling/walls) at vaulted locations E) Bart Platform Level new floor finish /column covers F) Bart Platform Level column covers Cost shown are coordination estimates (Art budget - NIC)	Proj: 30, 36, 45, 50, 51	\$\$\$ (\$100k-\$500k)
Public Art	Proj 50	A-03 A-04	Public Art @ Platform Column Covers	Replace existing advertising on Platform Col covers with public art/ architectural installation (all locations) Cost shown are demo/prep & design coordination estimates (Art budget - NIC)	Proj: 49, 51	\$\$ (\$10k-\$100k)
Public Art	Proj 51	A-01 A-02	Public Art @ Concourse Column Covers	Replace existing advertising on Concourse Col covers with public art/ architectural installation (Concourse Level: 4 Cols x 2 locations = 8 total). Cost shown are demo/prep & design coordination estimates (Art budget - NIC)	Proj: 49, 50	\$ Under \$10K
Bike Improvements	Proj 44	A-01 A-02	Improve Bike Access	Install stair channels to facilitate bicycle circulation (6 entry locations from street to concourse levels)	Proj: 14	\$\$ (\$10k-\$100k)

Table 17: Montgomery Implementation Package 2 – Pedestrian Circulation Upgrades

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
2. Pedestrian Circulation Upgrades:						
Fare Evasion	Proj 01	A-01 A-02	Fare evasion strategy	-Secure gates to avoid fare evasion. -Install next generation fare gates. -Increase height of railings between paid/unpaid areas to 5' tall glass barriers per latest BFS standard. -Add fare gates at location indicated to Mitigate fare evasion (elevators are currently used to bypass fare gates)	Proj: 2, 6	\$\$\$\$ (\$500k-\$1M)
Safety & Security	Proj 02	ALL: Concourse Platform	Ensure existing Concourse Guardrail meets UBC standards	Ensure existing guard rail meets UBC standards in height or install new railing. High priority due to safety concerns. Confirm dimensions and replace or modify to meet code.	Proj: 1, 6	\$\$\$ (\$100k-\$500k)
ADA Compliance	Proj 10	ALL: Concourse Platform	Bring handrails into ADA compliance	Handrails required to extend 12" at top and/or bottom of stairs and/or ramp and width no more than 1.25 - 1.5"		\$\$\$ (\$100k-\$500k)
Escalator & Elevators	Proj 36	A-01 A-02	Open up Centroid Areas	Concourse "Centroid" (2 locations) -Remove existing kiosk & retail spaces which limit circulation and block views -Move retail to side aisle areas (consolidate/reduce qty or operators) -Clean/patch/repair floor after removal of retail/kiosks	Proj: 15, 32, 35, 37, 38, 41, 42	\$\$\$ (\$100k-\$500k)
Station Brightening, Appearance & Sightline Improvements	Proj 29	A-03 A-04	Platform Sidewall removal	-Demo one bay width of Platform wall next to each stair/esc area to improve visibility/wayfinding. -Touch-up wall/ceiling where demo occurs -Similar project what was done at Powell (under 2008 Modernization scope)	Proj: 28, 30, 45, 46, 47, 48	\$\$\$\$ (\$500k-\$1M)

Table 18: Montgomery Implementation Packages 3-4 – Platform Level Ceiling and Walls and Concourse Level Walls

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
3. Platform Level Ceiling and Walls:						
Station Brightening, Appearance & Sightline Improvements	Proj 28	A-03 A-04	Platform Ceiling & Lighting	-Renovate platform ceiling over passenger & trackway areas to dramatically improve passenger spaces (inverse of current dark appearance). -Install new lighting fixtures over trackway & platform space -Incorporate the temporary lighting improvements already planned	Proj: 29, 30	\$\$\$\$\$ (\$3M-\$6M)
Station Brightening, Appearance & Sightline Improvements	Proj 30	A-03 A-04	Refinish Platform Trackway Walls	Replace Platform trackway wall finish with new to improve Platform level appearance and differentiate the appearance of Montgomery from Powell for passenger (improves wayfinding without signage)	Proj: 28, 29, 45, 48	\$\$\$ (\$500k-\$1M)
4. Concourse Level Walls:						
Station Brightening, Appearance & Sightline Improvements	Proj 38	ALL: Concourse	Ceiling/ Wall Repair	Repair water damage in ceiling/wall	Proj: 36, 38, 53, 59	\$\$\$ (\$100k-\$500k)

Table 19: Montgomery Implementation Packages 5-6 – Elevator Upgrades and Platform Screen Doors and Floor

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
5. Elevator Upgrades						
Escalator & Elevators	Proj 25	A-05 A-07 A-09	Install New Elevator (Muni Paid area)	Install new 3 stop elevator (West end of station) -Primary operation to serve MUNI passengers (Muni Paid area <-> MUNI Platform). - Install fare collection equipment to accommodate backup service of BART platform level.	Proj: 24, 25b, 58	\$\$\$\$\$ (\$3M-\$6M)
Escalator & Elevators	Proj 24	A-06 A-08 A-10	Replace existing BART Concourse-Platform elevator	Replace existing elevator (East end of station) with new 3-stop elevator. -Change hoistway to clear glazing to improve safety/security. -Primary operation to serve BART passengers (BART Platform<->Concourse skipping Muni level) - Install fare collection equipment to accommodate backup service of MUNI platform level.	Proj: 24, 25b, 58	\$\$\$\$ (\$1M-\$3M)
6. Platform Screen Doors and Floor:						
Platform Improvements	Proj 45	A-03 A-04	Replace platform floor finish	Replace existing brick tile floor with new light colored terrazzo or marble flooring. (BART Platform passenger areas)	Proj: 28, 29, 30, 46, 47, 48	\$\$\$\$\$ (\$3M-\$6M)
Platform Improvements	Proj 46	A-09 A-10	Platform screen doors	New Platform Screen doors at BART Platform level	Proj: 28, 29, 30, 45, 47, 48	\$\$\$\$\$ (\$3M-\$6M)
Platform Improvements	Proj 48	A-03 A-04	Edge Tile replacement	Replace edge strip tiles. Existing are decaying, broken (BART Platform).	Proj: 45, 46, 47	\$\$ (\$10k-\$100k)

Table 20: Montgomery Implementation Package 7 – Side Aisle Upgrades

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
7. Side Aisle Upgrades:						
Station Brightening, Appearance & Sightline Improvements	Proj 39	A-06	Renovate Sutter/Sansome Exit Hallway	Create "portal" aesthetic to differentiate space from the rest of the concourse. Renovate with new ceiling/wall treatment and new lighting. Opportunity for large scale public art improvement.		\$\$\$\$ (\$500k-\$1M)
Escalator & Elevators	Proj 22	A-05	Install New Elevator	Install new elevator between street level & concourse level (1-qty: between near Col 5W)	Proj: 23	\$\$\$\$ (\$1M-\$3M)
Escalator & Elevators	Proj 25d	A-05:A-10	Install New Stair to Street Level from Sutter/Sansome hallway	Install new stair to street level from new extension of Sutter/Sansome Exit Hallway under street. Coordinate sidewalk opening location with SFMTA / Better Market Street curb realignment project.		\$\$\$\$\$ (\$3M-\$6M)
Station Brightening, Appearance & Sightline Improvements	Proj 35	A-01 A-02	Renovate "Side Aisle" (TVM/ Alcove areas) - longer term solutions	Renovate Concourse "Side Aisle" areas (4 locations total) including: -Removing abandoned booths (Station Agent Booths, Ticket booths, Ticket transfer machines, etc.) -New floor finish -New wall finish and TVM array treatment -New Ceiling finish & lighting design -Infill under utilized areas (blank spaces) with new passenger amenities/retail	Proj: 60, 61	\$\$\$\$\$ (\$1M-\$3M)

Table 21: Montgomery Implementation Packages 8-9 – Additional Stairs and Escalator and Eastbound Side Platform

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
8. Additional Stairs and Escalator:						
Escalator & Elevators	Proj 25b	A-05:A-10	Install New End-of-Platform Stairs	Install new stairs from the Concourse level to the BART platform level, with a landing at MUNI platform level. Each end of station: - at Col 10W - between Col 8E - 10E		\$\$\$\$\$ (\$3M-\$6M)
Escalator & Elevators	Proj 23	A-06 A-08 A-10	Install New Escalator to BART platform	Install new escalator to BART center platform - between Col 4E-7E		\$\$\$\$\$ (\$3M-\$6M)
Escalator & Elevators	Proj 25c	A-05:A-10	Install New Stair to BART platform	Install new stair to BART center platform - between Col 4E-7E	Proj: 24, 25	\$\$\$\$\$ (\$3M-\$6M)
9. Eastbound Side Platform:						
Operations/ Employee Environment	Proj 18b	A-06	New BART station agent booth (East location)	New agent booth in new location to accommodate Capacity scope improvements. Install extended barrier to enclose paid area, and relocate fare gate array.		\$\$\$\$ (\$1M-\$3M)
Station Brightening, Appearance & Sightline Improvements	Proj 40	A-05 A-06	Renovate Hallway between West & East sides of Concourse	Create "portal" aesthetic to differentiate space from the rest of the concourse. Renovate with new ceiling/wall treatment and new lighting. Opportunity for large scale public art improvement. Capacity project anticipates relocating Concourse "free area" to North side of station so this project should wait and be integrated with those partition changes		\$\$\$ (\$500k-\$1M)
Capacity Expansion	Proj 62	ALL: Concourse / Platform	Eastbound Side Platform	Construct eastbound side platform and related vertical circulation		

Table 22: Montgomery Independent Implementation Package A – Wayfinding

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
A. Wayfinding						
Wayfinding, Signage & Real-time displays	Proj 17	ALL: Concourse	Agent Booth signage	-Install signs at closed/part-time Station Agent booths providing guidance on where to find Station Agent -Improve/replace "Station Agent Assistance" sign -Provide directional signage to find Station Agent phones -Provide signage to distinguish between Station Agent phones and public pay phones	Proj: 18	\$\$ (\$10k-\$100k)
Wayfinding, Signage & Real-time displays	Proj 14	ALL: Concourse Platform	Wayfinding & Real-time Planning	-Plan and install comprehensive wayfinding system for bicyclists and pedestrians -Work with local transit agency to Improve real-time info screen content- information is missing or outdated -Install Nextbus signage for BART feeder routes -Provide bus schedules and information	Proj: 15, 44	\$\$ (\$10k-\$100k)
Wayfinding, Signage & Real-time displays	Proj 15	A-01 A-02	Additional Real-time display concepts	-New real-time displays at current Concourse sign-pier locations where ad panels removed (4 locations @ each centroid = 8 total) -Better integration of advertising, videos, digital messages & real-time displays at Concourse "side-aisle" locations (4 locations) New real-time ceiling "scroll" at Concourse Centroid areas (2 locations)	Proj: 31	\$\$\$\$ (\$500k-\$1M)
Wayfinding, Signage & Real-time displays	Proj 16	ALL: Concourse Platform	Designate Advertising & Banner locations	Implement (station specific) advertising policy so there is no ambiguity about where ads will be permitted	Proj: 15	\$\$ (\$10k-\$100k)

Table 23: Montgomery Independent Implementation Package B – Back Rooms and Retail

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
B. Back Rooms and Retail						
Operations/ Employee Environment	Proj 20	A-01	Renovate Station Break Room	Install new or repair existing plumbing New carpentry work needed Repair/replace floors Repair/replace paint Repair/replace furniture Repair/replace small items		\$\$ (\$10k-\$100k)
Station Brightening, Appearance & Sightline Improvements	Proj 42	A-01	Upgrade Retail / Amenity space	Upgrade Customer Service Booth/Retail Shop	Proj: 55	\$\$\$ (\$100k-\$500k)
Safety & Security	Proj 06	A-01 A-02	Reprogram Concourse unused space in public areas	Reduce Concourse station "dead areas" by expanding Storage/MEP/Utility/ Utility to East (area between Muni paid area and exist Mech space) and to West (into unused BART paid area)	Proj: 1, 2, 39, 52	\$\$\$\$ (\$500k-\$1M)
Station Brightening, Appearance & Sightline Improvements	Proj 43	A-02	NEW/ RELOCATED Retail / Amenity spaces	Install new retail/amenity stall in under-utilized concourse side-aisle space	Proj: 33,35	\$\$\$\$ (\$500k-\$1M)
Station Brightening, Appearance & Sightline Improvements	Proj 43-ALT	A-01	NEW/ RELOCATED Retail / Amenity spaces	Install new retail/amenity stall in location of existing restrooms -highest traffic exit	Proj: 33,35	\$\$\$\$ (\$500k-\$1M)
Maintenance & Repair	Proj 58	ALL: Concourse	Improve trash/utility storage	Improve dumpster storage & reduce visibility to public: -Increase Storage for dumpsters, utility closet and janitorial equipment -Redesign of closed off ticket vending machine area adjacent to elevator where dumpsters are currently stored -Locate dumpsters in enclosures away from the pedestrian zone	Proj: 24	\$\$\$ (\$100k-\$500k)
MEP/ Utility	Proj 55	ALL: Concourse	Future retail/amenity build out	Upgrade infrastructure to support non-transit functions (coffee shops, future retail, etc.)	Proj: 42	\$\$\$ (\$100k-\$500k)

Table 24: Montgomery Independent Implementation Packages C-D – Restrooms and Station Agent Booths

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
C. Restrooms						
ADA Compliance	Proj 07	A-01	Re-open Public Restroom	Remodel to provide single-occupant single-sex accessible restrooms for men and women, update to ADA requirements	Proj: 3, 8	\$\$\$ (\$100k-\$500k)
ADA Compliance	Proj 07-ALT	A-02	New Public Restroom	(ALTERNATE LOCATION for Item 7) -Add new single-occupant single-sex accessible restrooms for men and women per ADA requirements in reconfigured fare counting space. -Allows for new Retail/Amenity space to occupy the existing restroom location (which is a higher traffic area) -Allow for easier transition to the future capacity scope (existing location will need to be relocated to allow for FREE-AREA passage)	Proj: 3, 8	\$\$\$\$ (\$500k-\$1M)
D. Station Agent Booths						
Operations/ Employee Environment	Proj 18	A-01 A-02	Renovate/ Replace BART station agent booths	Upgrade/Replace BART Station Agent Booths: -Enlarge to allow two people to occupy comfortably. -Ensure proper operation of security gates and utilities. -Replace floors as needed. -Remove clutter and debris from top of booth.	Proj: 17	\$\$\$\$ (\$1M-\$3M)

Table 25: Montgomery Implementation Plan – Stationwide Systems Upgrades

Category	Project #	Applicable Area	Project Name	Project Description	Project Dependencies	Estimated Cost
<i>Stationwide Systems Upgrades</i>						
Operations/ Employee Environment	Proj 19	ALL: Concourse Platform	PA System	Adjust the PA volume in the station so it is audible and Muni/BART systems are coordinated where appropriate		\$\$ (\$10k-\$100k)
Safety & Security	Proj 03	ALL: Concourse Platform	New Security Cameras	Install security cameras at indicated areas, loop to police station Remove visual obstructions around pay stations (or other indicated area) to improve visibility, reduce mischief	Proj: 5, 7, 27	\$\$\$ (\$100k-\$500k)
Safety & Security	Proj 04	ALL: Concourse Platform	Station Electrical Maintenance	Address station electrical system problem causing light outages		\$\$\$\$ (\$500k-\$1M)
Safety & Security	Proj 05	ALL: Concourse Platform	Install Emergency Lighting	Install emergency lighting	Proj: 3	\$\$\$\$\$ (\$1M-\$3M)
MEP/Utility	Proj 53	ALL: Concourse	Fire Sprinkler Head Replacement	Replacement of all fire sprinkler heads (per code requirements)	Proj: 36, 37, 38, 59	\$\$\$ (\$100k-\$500k)
Station Brightening, Appearance & Sightline Improvements	Proj 41	ALL	Develop Station Specific Retail Guidelines	Implement RETAIL policy & design guidelines so there is no ambiguity about where retail will be permitted, required hours of operation, and permitted finishes. -Integrate with existing Transmart contract as much as possible, but modernization effort attempts to create better visual connections through the station and to open the public free area for circulation (which aides BART's safety/security goals).	Proj: 36, 42, 55	\$\$\$ (\$100k-\$500k)
MEP/Utility	Proj 52	A-06	Address Station Ventilation issue	New Fan Room area for improvement of Station ventilation (created in space taken from public concourse by Proj 29) and Duct/trench to fresh air intake location: sidewalk or integrate with entrance TBD.	Proj: 39	\$\$\$\$\$ (\$3M-\$6M)

7.5 Next Steps

The following additional tasks were identified as "next steps" in executing the capacity implementation strategy and modernization concept plan. In many cases, these components require additional and ongoing coordination or policy discussion. Further detail on "next steps" items is provided in Technical Memorandum #8 ("Recommended Alternative Concept and Construction & Phasing Strategy").

The "next steps" are organized in groups of near-term (within 10 years), middle-term (5-15 years out), and long term (10-20 years out), generally reflecting the implementation of related projects as presented in Section 7.3 and Section 7.4.

7.5.1 Near-Term Next Steps

Near-term next steps should be addressed immediately to facilitate the completion of near-term projects (within 10 years) and inform the implementation of middle-term and long-term projects. The near term next steps are the following:

- Coordination with SFMTA will be needed throughout all phases of implementation, beginning with near-term projects within the next ten years.
- Considerations for a BART-Muni Connection at Embarcadero, though a long-term project, should be built into the relocation of the east end stairway for implementation of the new elevator at Embarcadero, a near-term project.
- Wayfinding is another area of coordination between BART and SFMTA, as well as MTC and other transit providers. Some components are currently underway and need to be coordinated within a comprehensive strategy.
- The implications of climate change and station flooding on the stations are not yet well understood, prompting investigation in the near-term to shape capacity and modernization improvements.
- In the spring of 2016, BART will initiate a pilot program that will develop strategies to influence passenger demand.
- Phase 1 of the Transbay Transit Center (the above-ground bus facility) is scheduled for completion in 2017, at which time discussion of Phase 2 (the underground rail station) may be renewed. The pedestrian tunnel connecting to Embarcadero is part of this second phase.
- In 2018, BART will negotiate a new Advertising Franchise Agreement.

The steps listed above are described in more detail in the following paragraphs.

Coordination with SFMTA

Station-wide elements such as ceilings, walls, and concourse floors would be upgraded as a whole, and BART and SFMTA would need to work out cost-sharing arrangements. For discontinuous elements that are wholly within the Muni paid area, SFMTA can work with BART.

Security cameras represent an area where better coordination between BART and SFMTA is vital. There should be one system shared between both agencies instead of the two redundant and uncoordinated systems that are currently in place, with little concern for how they are integrated into the station architecture. Newer cameras that are more compact and less intrusive should be the standard.

BART and SFMTA also need to coordinate with respect to elevator operations and projects. The elevator modifications at both stations to provide a primary platform elevator serving the Muni platform level would provide direct benefits to Muni Metro. Currently, only a single platform elevator is provided at each station, shared between BART and Muni Metro. These

modifications would benefit to Muni Metro passengers and help to deter fare evasion. Coordination with SFMTA is critical to successful execution of these projects and can help establish political and financial support for these improvements.

Various agreements between BART and Muni will likely be needed as part of the planning, design / engineering, funding, construction, and operation / maintenance of the proposed capacity enhancements at both stations. These agreements could include, but would not be limited to, the following:

- A memorandum of understanding (MOU) establishing a collaborative framework to plan and design capacity enhancements, such as relevant design and engineering standards, roles and responsibilities for obtaining environmental clearance, etc.
- Cost sharing agreements to reduce BART's financial commitments toward capacity enhancements that benefit both BART and Muni.
- Temporary agreements to facilitate construction or installation of capacity enhancements, which may affect Muni Metro service and operations, such as track closures during or outside of the revenue service window, relocation of concourse-level Muni equipment such as ticket vending machine (TVM) vaults, etc.

BART and Muni already have various agreements governing existing station facilities and equipment, such as roles and responsibilities with regard to cleaning, maintenance, and security / surveillance. These agreements would also be amended as needed to include new facilities and equipment.

Direct BART-Muni Connection

Currently, passengers wishing to transfer between BART and Muni Metro in the Market Street Subway must ascend to exit the fare gates at concourse level and enter the other system. A direct BART–Muni connection would involve the creation of platform-to-platform connections between BART and Muni Metro by removing existing barriers and installing new fare gates. BART is focusing on providing a connection at Civic Center Station, which is less congested and has more platform space available to accommodate the necessary improvements.

In particular, automatic fare collection (AFC) equipment and queuing and run-off zones as shown in **Figure 83** require space at BART and / or Muni Metro platform levels. The current and future capacity constraints at Embarcadero Station make Civic Center Station a better location for prioritizing such a connection.

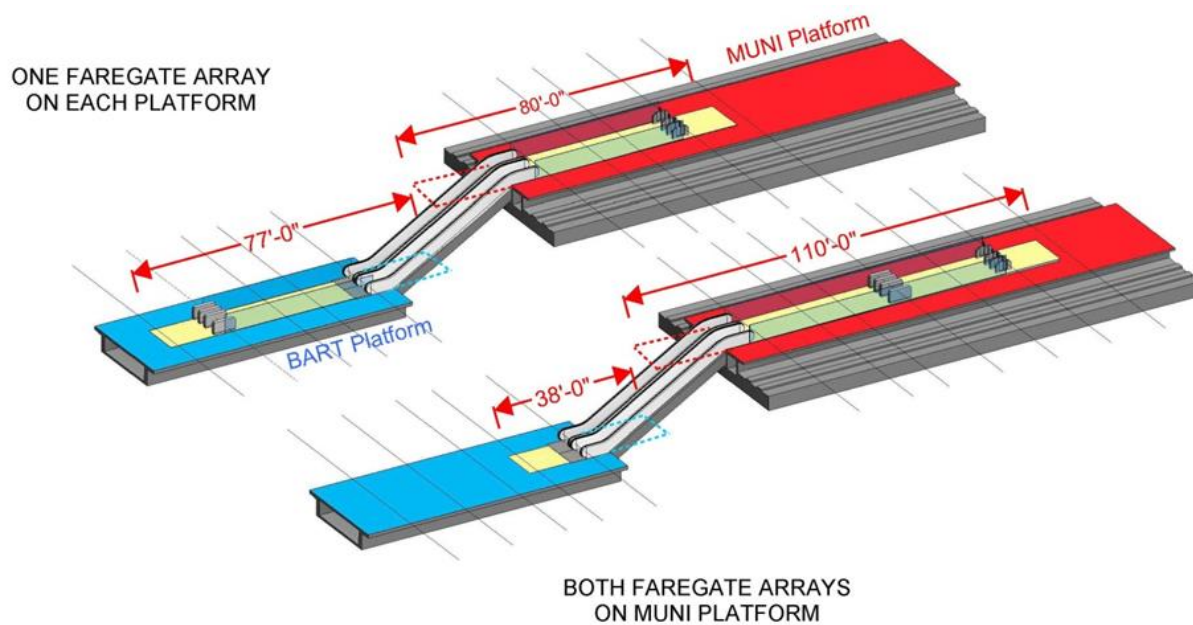
Further study and coordination with SFMTA are recommended to better determine how a BART–Muni Connection might be achieved at Embarcadero Station. Specifically, the following areas need additional effort in conceptual planning and design:

- *Design and engineering.* Conceptual design and engineering is needed to determine the preferred option for achieving a connection. Use of existing vertical circulation elements, use of new platform-to-platform vertical circulation, or replacement of existing straight-run vertical circulation elements with paired elements all present possible design solutions. For example, new vertical circulation could be designed to facilitate an eventual connection by matching the Muni platform height to landings or stair treads.
- *Ticketing and fare collection.* BART and Muni Metro fare structures are distinct, and while a Clipper card is compatible with both systems, a direct platform-to-platform transfer could require a separate set of fare gates for each operator. The need for ancillary fare collection equipment (e.g., add fare machines and ticket vending machines) should be evaluated, as well as the need for a staffing presence for security / surveillance, passenger assistance, and other duties.

- *Fire and life safety coordination.* Currently, BART and Muni have independent control over their own emergency procedures and fire / life safety systems. A direct platform-to-platform connection would, however, require greater coordination in these areas than currently exists between the two agencies.
- *Special event operations.* A direct platform-to-platform transfer could be particularly useful during events in Mission Bay, although it is expected that the Central Subway will attract a substantial share of this traffic. Safety measures may be needed for the narrow catwalks at Muni platform level and special provisions for fare collection may also be required (many special event passengers purchase paper fare media).

Figure 83: BART-Muni Connection Space Requirements

Space requirements for a straight-run platform-to-platform connection between Muni and BART platform levels



Source: Robin Chiang & Co., 2015

Wayfinding

Ongoing coordination is desirable to ensure that wayfinding systems at the two stations are compatible (and, preferably, consistent) with wayfinding systems outside of the stations at street level or at nearby transit facilities. Embarcadero Station, in particular, will be directly connected to the Transbay Transit Center and is within short walking distance of the Ferry Terminal. Standardized wayfinding systems should reinforce these transit facilities as a single, large hub connecting a range of local, regional, and intercity public transportation providers.

As high-density, mixed-use redevelopment takes place in the surrounding neighborhoods, wayfinding should also adequately direct passengers to the range of non-transit facilities and amenities nearby. Periodic evaluations may be necessary to ensure that wayfinding systems are up to date and adequately meeting the needs of passengers.

Climate Change and Station Flooding

Recent studies conducted by the Metropolitan Transportation Commission (Adaptation to Rising Tides: Transportation Vulnerability and Risk Assessment Pilot Project, 2011) and BART (Climate Change Adaptation Assessment Pilot, 2013) have assessed assets of the BART system for the development of adaptation strategies specific to sea-level rise, downpour, and flooding.

The studies identified vulnerable assets near the bay shore, including stations, trackway, traction power substations and train control rooms. Embarcadero and Montgomery stations, which lie in close proximity to San Francisco's waterfront, would be expected to share some of the vulnerabilities identified in these studies for other BART assets. These vulnerabilities may represent a considerable risk to BART, since the stations are the system's two busiest.

Future study building upon the pilot projects already completed will need to identify the specific climate change impacts that may affect BART operations at Embarcadero and Montgomery, and develop appropriate adaptation strategies and projects. An example of projects to address station flooding are sump pumps for water mitigation, for which space would need to be allocated.

Strategies to Influence Passenger Demand

BART commissioned a study in 2008 to look at demand management solutions such as pricing strategies to influence passenger behavior, such as by encouraging off-peak travel or shifting ridership to other, less-constrained stations. In particular, the study concluded that pricing schemes at Embarcadero and Montgomery stations could defray the need for major capital investments to increase capacity at either station by ten or more years.

While pricing schemes such as peak-period surcharges could shift travel behavior, they could also be complicated by social equity considerations, as they would likely have a greater impact on low-income riders. Additional study is also needed to ascertain the political feasibility of fee-based demand management solutions and what measures should be implemented, if necessary, to mitigate social equity concerns.

In the spring of 2016, BART will initiate a systemwide off-peak incentives pilot program to address train crowding. This pilot aims to shift peak travel on BART outside of peak times through the provision of direct cash incentives to BART passengers who have flexibility in working hours. The effects of the pilot program on train and station crowding will be assessed early in 2017.

Transbay Transit Center Pedestrian Tunnel

The design and construction of a proposed pedestrian tunnel connecting the Transbay Transit Center and Embarcadero Station is being led separately by the TJPA. The recommended alternative concept for Embarcadero Station is designed to be compatible with such a connection, if it eventually moves forward to construction.

However, additional study is required to determine how the tunnel would be operated on a day-to-day basis, including requirements for maintenance, security, and emergency management, as well as who would be responsible for the associated duties. A future memorandum of understanding between BART/SFMTA/TJPA is needed to set governance of all items.

In the past, BART has expressed concerns about such a connection creating a large influx of non-passengers in the existing station concourse. While passenger flow simulations conducted as a part of this study did not indicate that concourse-level circulation was a significant constraint at Embarcadero Station, further study and pedestrian modeling are recommended to determine future passenger and non-passenger flows as well as life-safety exiting.

Advertising

Advertising throughout the BART system is managed through contracts with a master vendor. This master plan proposes that locations intended for advertising placement be reviewed and revised in preparation for the next Advertising Franchise Agreement in 2018. The review cycle provides an opportunity to evaluate current advertising locations and identify where advertising locations can be changed to accommodate the Wayfinding or Art programs.

Beyond the current review cycle, BART's Marketing & Research Department intends to explore modernizing the advertising infrastructure in ways that add light and complement the overall vision of this master plan. This would include reviewing the placement of ads and studying industrywide formats such as backlit and internally illuminated digital ads.

BART's advertising guidelines govern the design of advertising displays at the two stations. In some cases, modernization projects will remove advertising at one or both stations to enhance sightlines, reduce physical and visual clutter, and improve passenger flow. In other cases, modernization projects will enhance or relocate advertising and integrate it better with station retail. Advertising is an important source of revenue to support BART's primary duty in providing public transportation, and high-quality advertising designs can enhance the look and feel of stations.

Recognizing these distinct benefits, ongoing policy discussion may be necessary to determine where opportunities exist to enhance advertising at the two stations in light of capacity and modernization needs. Such discussions should be timed to occur before renewal of the advertising contract. Conflicts with upgrades to wayfinding, ticketing equipment, or other needs should be avoided. Instead, coordinated, integrated solutions with wayfinding, station retail, and other key station components should be explored where feasible.

7.5.2 Middle-term Next Steps

Middle-term next steps should be addressed 5-15 years out in conjunction with middle-term projects slated for implementation during this period. These include:

- Development of a comprehensive approach to station retail and station design would benefit the middle-term implementation of upgraded or relocated retail spaces.
- Free Speech policy discussions will need to inform the middle-term implementation of upgraded or relocated retail / amenity spaces.

These steps are described in more detail below.

Station Retail

Retail locations throughout the BART system are managed through contracts with a master vendor. Several legacy retail vendor locations remain throughout the system as well. At present, locations for the master vendor's outlets are being negotiated on a station by station basis. BART's Real Estate Department intends to develop guidelines for retail deployment.

BART's stated preference for busy stations such as Embarcadero and Montgomery is to give priority to transit operations over vendors including the following:

- clear sight lines between entrances, ticket vending machines and fare gates;
- clear sight lines between fare gates and exits;
- clear sight lines between station agent booths, ticket vending machines and fare gates;

- clear sight lines between passengers and wayfinding signs; and
- clear sight lines between passengers and major circulation systems.

BART would benefit from a comprehensive approach to station retail and station design, with greater focus on how to implement better-integrated and higher-quality design than has been achieved in previous retail projects. Station retail provides a stable revenue source for BART and enhances the quality of BART's service by bringing quality goods and services to passengers. Retail can also indirectly improve crowding and passenger flow by providing attractive alternatives to waiting at platform level.

Ongoing coordination is necessary to determine the best opportunities for providing retail and service amenities within each station. Discussions with potential third-party operators or individual retail vendors should quantify needed upgrades to station systems such as utilities and plumbing. Potential locations should be carefully considered in light of proposed capacity and modernization needs at both stations. The desire to increase or enhance station retail should also be balanced with the need to maintain orderly operations and minimize disruptions to concourse-level circulation.

Free Speech

Expressive activities within BART stations are regulated by a permitting process and are subject to published rules. Such activities are prohibited in paid areas of BART stations, but are allowed in free areas upon issuance of a permit. Activities that present an unreasonable danger to the safety of the permit applicant, BART's passengers or staff, or the general public are prohibited. Activities that interfere with passenger access or circulation or otherwise obstruct BART's orderly functions are also prohibited. While the District's Expressive Activity rules and permitting guidelines state clear priorities for use of space, the evaluation of locations appears to be ad hoc.

BART expects that the free areas at both Embarcadero and Montgomery stations will become more constrained as ridership grows and operational needs such as additional ticketing equipment or passenger amenities such as station retail take precedence. Subsequent policy discussion may be required to determine how BART can adequately accommodate expressive activities at these stations in light of capacity and modernization needs.

This plan proposes that a station-specific planning process be applied to define locations within stations where expressive activities are most suitable. In addition to the stated criteria of ensuring security, preventing delays and inconvenience and minimizing congestion, such a study might also consider preservation of clear sightlines in station transition zones where passengers need maximum access to information.

7.5.3 Long-term Next Steps

Long-term next steps are related specifically to new side platforms, slated for implementation 10-20 years out. Though classified as long-term, some may be addressed sooner as part of studies to further validate the side platform concept or because of their connection to other projects, such as Better Market Street. The long-term next steps include:

Ventilation

Both stations were constructed with two separate ventilation systems: one to evacuate smoke in the event of a fire in the station, and a second to supply outside air for comfort cooling and ventilation to the station interior.

Emergency Ventilation

The emergency ventilation systems are assumed to be functioning as designed. Performance of the system would need to be modeled in relation to major station configuration changes such as implementation of any of the side platforms or the new

concourse-to-center platform stair opening proposed for Montgomery. Modeling may determine that additional street level intake and exhaust structures would be required.

Additionally, BART Engineering has called attention to the requirement that proposed side platform door systems would need to allow for free airflow between the trainway and platform area, and that the sidewalls adjacent to the Embarcadero concourse-to-street level stairs need to remain open to airflow as well.

Mechanical Ventilation

At both Montgomery and Embarcadero stations the fresh air supply systems are not fully functional. At Montgomery the system is deactivated due to the presence of asbestos, while at Embarcadero the system does not function properly, possibly due to clogging of filters with dust.

Space requirements, upgrade potential, and modification needs to meet current requirements for ventilation will need to be part of future studies. Other factors for future study include:

- Temperature – interior temperatures at both stations can rise to uncomfortable levels. Increased ridership contributes additional heat to the environment. Even when functioning, the original ventilation systems were not designed to manage heat from any retail operations.
- Air quality – supply intake locations of the original systems are located at street level in the middle of Market Street. Options for access to cleaner sources of intake air include elevated structures in the sidewalk zone – either free-standing or integrated with entrance canopies, and potential integration with SFMTA platforms in the center of Market Street.
- Fan / Filter / Ducting / Controls – At Montgomery, the proposed north side free corridor will require relocation of the existing fan and filter room. A 2014 BART study considered criteria and options for the renovation of the Powell Station ventilation system. The space planning proposed at Montgomery would accommodate a system similar that considered for Powell, but no mechanical design work has been performed for either Montgomery or Powell.

Side Platform Construction Method and Better Market Street

Both the perimeter soil mix wall approach and the mined tunnel approach are fundamentally compatible with the proposed side platforms and associated vertical circulation at both stations. As such, a decision to apply one construction method or the other need not be made at this stage of the process, especially given the consideration that the start of construction for the side platforms is still at least 15 years away.

The Constructability and Construction Staging Analysis (2009), which focused primarily on cost and construction feasibility, identified Mined Tunneling as the preferred method. However, the physical implications of that study have not been evaluated and vetted by this project nor by BART.

Given the need to coordinate with other transportation investments such as the Better Market Street project, further study is recommended to determine which construction method is preferable and whether or not some cost reduction synergies can be achieved through coordinated implementation. In particular, streamlining construction activities and scheduling to minimize the need for rework or redundant work should be a cost-efficiency priority.

The mined tunnel approach offers distinct advantages with respect to minimized street-level impacts and reducing noise and dust from construction activities. While the mined tunnel approach requires focused control to minimize the effects of groundwater and ground settlement, the perimeter soil mix wall has several key (but not insurmountable) shortcomings related to utility relocation or protection and conflicts with existing building foundations and basements.

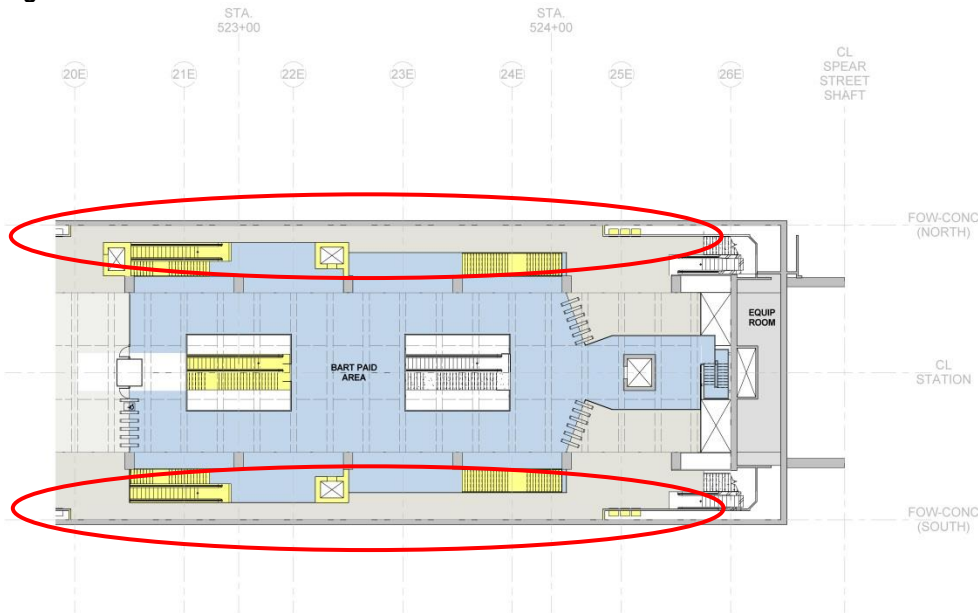
In general, however, mined or bored tunnel approaches can be more costly in terms of direct construction costs compared to more disruptive cut-and-cover solutions such as the perimeter soil mix wall approach. Depending on the ultimate design selected for Better Market Street, construction of those improvements may result in minor disruptions at street level independent of the proposed side platforms at the two stations, which could justify a perimeter soil mix wall approach if construction activities can be appropriately coordinated between the two projects.

Free-Area Corridors at Embarcadero

The recommended alternative concept for Embarcadero Station incorporates a “unified paid area” configuration, which substantially reduces the width of free-area corridors around the perimeter of the concourse level. These four corridors provide critical functions for concourse-level circulation, including providing access to the Muni Metro paid area and to ticket vending machines.

Figure 84 shows the east end of the concourse with the two narrowed free-area corridors on either side of the unified paid area circled; a similar condition results at the corresponding pair of locations on the west end of the concourse.

Figure 84: Free-Area Corridors at Embarcadero



Source: Robin Chiang & Co., 2015

The recommended alternative concept makes the conservative assumption that the existing structural boundary wall would remain; however, the chase wall in the area affecting the corridor would be removed. The chase wall is a non-structural wall containing recesses for ticket vending machines and other equipment. It also serves to conceal conduits and utilities running longitudinally through the station. Removal of the chase wall would allow use of the full width, perhaps with a minimal finish over the interior face of the structural wall.

However, even with removal of the chase wall, the clearance width of the side corridors would be as narrow as 4'-8". Further analysis is needed to determine potential means of mitigating this deficiency through design refinement. Potential solutions could include expanding the station box outward at concourse level to expand the free area at the most constricted pinch points, but this would require a comprehensive evaluation of associated engineering concerns.

Construction feasibility will also be a major determinant of what can and cannot be achieved in the final configuration. In relation to the clear width attainable at the concourse level free corridor, there are basic differences between the two side platform construction methods noted in the previous section:

- The mined tunnel method does not inherently require major near-surface excavation and construction, leaving the existing perimeter box wall largely in place.
- The perimeter soil mix wall method would most likely require that a new perimeter box wall be constructed. The least disruptive location to place the new wall would be outside of the existing concourse level wall, on the property line side. Utility relocation and significant sidewalk disruptions to accommodate the construction of this new wall may come with the benefit of readily allowing expansion of the concourse width by several feet on each side.

Platform Door Design and Implementation

Installation of platform doors at both stations requires coordination with several systemwide initiatives, such as the new Fleet of the Future railcars and the Train Control Modernization Program (TCMP). Platform doors could be implemented under the existing train control system, but the existing railcar fleet would need to be retrofitted with the necessary equipment to control the platform doors. With the TCMP upgrades, platform doors could either continue to be controlled by the train, or control could be transferred to the wayside system.

Given that the Fleet of the Future program aims for a full replacement of BART's fleet, additional investments to make existing cars compatible with platform door systems at the two stations may not be practical or desirable. As platform doors are not currently used in the BART system outside of the fully-automated Oakland Airport Connector, new operational procedures and protocols would need to be established.

Additional research is also needed to determine a preferred door design. Platform doors can be built at various heights, ranging from half-height to full enclosure. The potential merits and demerits of each design should be carefully considered with respect to cost, constructability, and other concerns such as station and tunnel ventilation. A detailed technology survey will be required to address these issues.

Platform Operating Schemes

The platform operating schemes selected for this analysis represent an attempt to best distribute passenger flows and normalize platform crowding while minimizing customer confusion, but do not rule out the possibility of implementing alternative schemes. Further study will likely be necessary to determine the optimal operating scheme, particularly as more information becomes available regarding general trends in ridership growth system-wide and new ridership generated by the completion of current extension projects (e.g., Warm Springs Extension, Berryessa Extension, and eBART).

At Embarcadero, some potential operating schemes, such as the approach where doors open on both sides, with all loading from one side, and all exiting to the other side, may require consideration of additional vertical circulation capacity on the exiting platform. Such a scheme may not function well with the recommended alternative concept, because all passengers would be exiting from one platform. Other operating schemes distribute exiting passengers over two platforms. If all passengers exited to one platform, substantial escalator and stair queues would form unless additional vertical circulation is provided. With additional vertical circulation capacity, a one platform for exiting scheme may be viable and provide secondary benefits, such as reduced dwell time.

One alternative scheme for Embarcadero is to add a single side platform in the eastbound direction only; this would address the issue regarding the constrained free-area corridors described in the previous section. Future analysis of platform operating schemes should consider and model this alternative to determine if a westbound side platform is ultimately necessary.

Appendices

Appendix A – List of Tech Memos

Appendix B – Project Lists

Appendix C – Summary Chart of Key Characteristics

Appendix A – List of Tech Memos

Technical Memorandum #1: Goals and Objectives

Technical Memorandum #2: Evaluation Framework

Technical Memorandum #3: Base Information

A: Existing Conditions

B: Future Projects

C: Development, Land Use and Travel Demand

D: Institutional Setting

Technical Memorandum #4: Community Workshop #1 Outreach Summary

Technical Memorandum #5: Opportunities and Constraints Analysis

Technical Memorandum #6: 3-D Digital Illustrations

Technical Memorandum #7: Platform Operations Analysis

Technical Memorandum #8: Recommended Alternative Concept and Construction & Phasing Strategy

Technical Memorandum #9: Community Workshop #2 Outreach Summary

Appendix B – Project Lists

Appendix C – Summary Chart of Key Characteristics