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Final Report

Coliseum BART Station
Station Modernization Program
Conceptual Design Plan

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Acknowledgments

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1.0 Introduction

This conceptual design plan (the "Plan") documents a comprehensive effort to modernize the Coliseum Bay Area Rapid Transit (BART) Station in East Oakland, which opened with the first BART line on September 11, 1972. BART is currently conducting a Station Modernization Program that invests resources into the core system and surrounding areas to serve increased transit ridership and enhance the quality of life around stations. In combination with BART's collaborative station area planning work and Transit-Oriented Development (TOD) program, these station improvements will help support the Plan Bay Area vision. Plan Bay Area is a long-range integrated transportation and land use / housing policy framework initiated by the Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission (MTC) to develop a Sustainable Communities Strategy for accommodating future population growth through 2040 and reducing vehicle emissions in the San Francisco Bay Area.

Station Modernization will improve the look, feel, and usability of BART stations for riders, as well as enhance the safety and comfort of the work environment for BART employees. The program addresses all aspects of the stations, including buildings, escalators and elevators, circulation and signage, plazas and waiting areas, climate control and ventilation, lighting and ambient environment, and other station equipment upgrades.

The Coliseum BART Station Conceptual Design Plan has been undertaken to thoroughly assess the station's needs and develop scenarios tied to the local development and funding context that would make substantive upgrades to the station. The Plan establishes a comprehensive vision to address the needs of the station's users and the surrounding community through beautification, improved access, and enhanced capacity. The Plan presents a unique set of improvements that respond to the station's existing needs and projected growth in the surrounding area.

A large redevelopment and reinvestment plan in the surrounding area, "Coliseum City", calls for extensive growth in the area and new event venues; it also calls for a strategic response at Coliseum BART Station to accommodate current and future new riders and thereby support the vision of the project.

In coordination, BART has initiated the Plan to understand future access, capacity and operational issues at Coliseum Station, reflecting the vision of the City of Oakland's Coliseum Area Specific Plan. Underlying analysis has been conducted to evaluate passenger flows between the station platforms and the concourse at street level, considering the need for potential expansion and new vertical circulation elements. Accessibility, urban design, sustainability, security, and architectural considerations also inform the goal of modernizing the station.

This Plan details both capacity and modernization improvements for the station, identifying various scenarios, providing preliminary cost estimates, and identifying next steps. The Plan should serve as a flexible framework, providing a basis for the next phase of studies and more detailed design work for the identified improvements.

1.1 Project Team and Stakeholders

BART has engaged a team of engineers, planners and architects from AECOM and FMG Architects to develop and assess strategies for modernizing Coliseum Station. The team solicited input from stakeholders in preparation of the Plan. These include interdepartmental BART staff engagement, the City of Oakland, Alameda-Contra Costa County Transit (AC Transit), which operates local bus transit services; as well as the Coliseum City development team. The stakeholders attended meetings to identify existing conditions and needs, and discuss and vet proposed improvements.

1.2 Existing Conditions

1.2.1 Station Characteristics

Coliseum is an elevated BART station located in East Oakland, surrounded by light industrial uses on the west and a residential neighborhood on the east. The station provides a connection between the BART system and Oakland International Airport, as well as the Amtrak Capitol Corridor Coliseum Station. The station serves its namesake, the Oakland Alameda County Coliseum Complex (Coliseum Complex), which is comprised of Oakland Coliseum and Oracle Arena.

The Coliseum Complex covers 120 acres west of the station and includes parking for 10,000 vehicles. Oakland Coliseum is an outdoor stadium that seats approximately 64,000 patrons. The facility serves as the home field of the Oakland Athletics ("A's") Major League Baseball (MLB) team and the Oakland Raiders National Football League (NFL) team. Additionally, the outdoor venue hosts other events such as soccer matches, motorsports, and concerts. Oracle Arena is an indoor arena that seats approximately 19,000 patrons. It currently operates as the home court of the Golden State Warriors, a National Basketball Association (NBA) team. The arena also hosts concerts, family shows, and other sporting events.

Figure 1 shows the greater station area, which includes the Coliseum Complex on the west and station parking facilities on the east. The station is sandwiched on the west by San Leandro Street, a major arterial street, and on the east by Snell Street and the Union Pacific (UP) Oakland Subdivision, a railroad that is infrequently used. On the north and south, the station is bounded by 69th Avenue and Hegenberger Road, respectively. 69th Avenue connects under the elevated BART guideway and has a crossing at grade with the UP Oakland Subdivision. Hegenberger Road crosses over the UP Oakland Subdivision, the BART guideway, and San Leandro Street via an overpass.

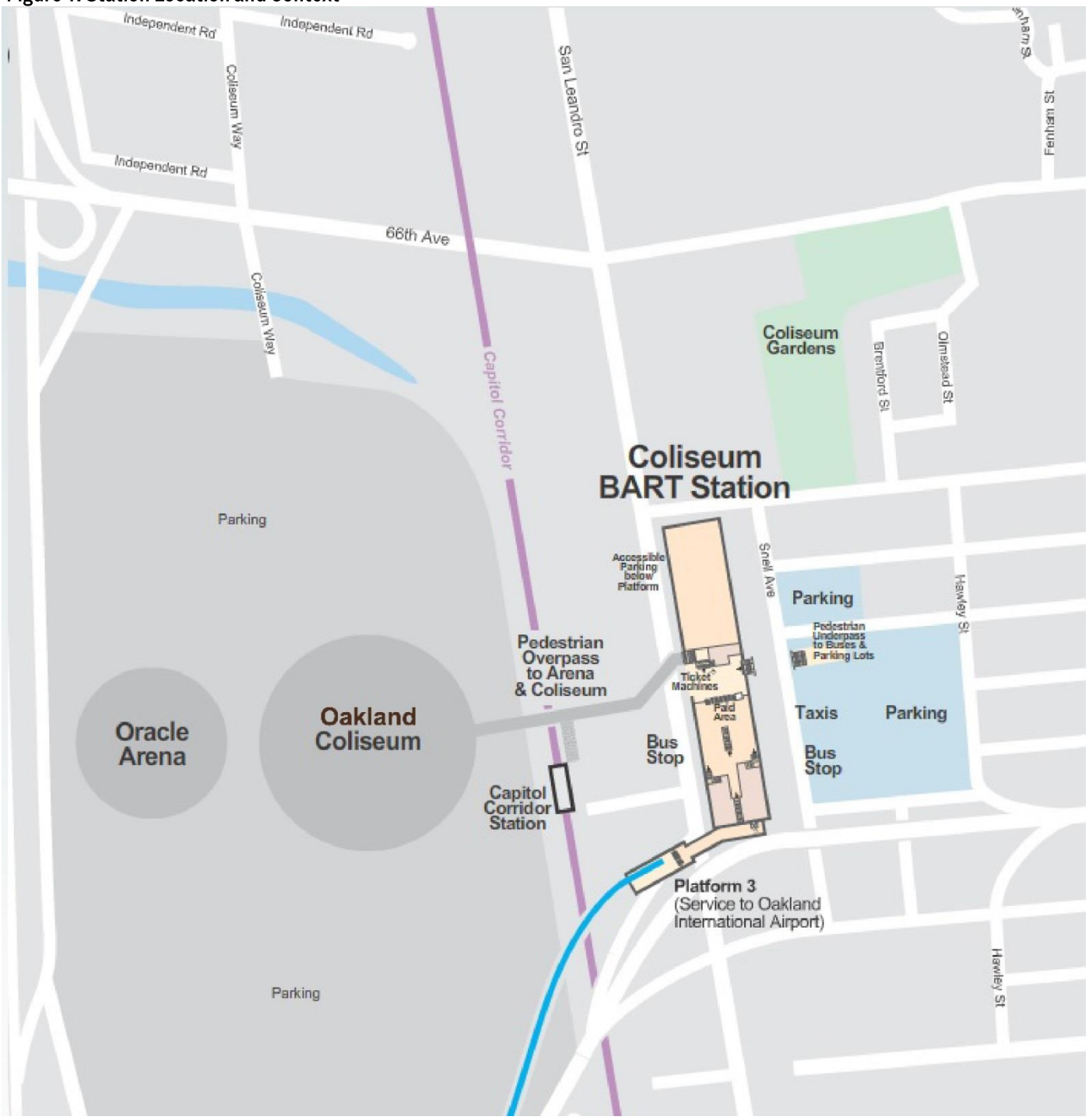
Coliseum Station connects to the Oakland International Airport Station via the Oakland Airport Shuttle Train Service (OAK Shuttle), an automated guideway system. Because this cable-drawn system with smaller vehicles differs from the conventional rail rapid transit technology employed on BART's other lines, the system has a separate platform accessed by an elevated walkway over San Leandro Street at the south end of the station. This connection was recently completed in 2014.

Another, much longer elevated pedestrian walkway connects the north end of the station with the Coliseum Complex, crossing over San Leandro Street, the UP Niles Subdivision railroad tracks, as well as Damon Slough, a tidal wetland connected to San Leandro Bay. This walkway provides direct pedestrian access between the station and the Coliseum Complex, and also connects BART riders to the Amtrak Capitol Corridor Coliseum Station, located on the UP Niles Subdivision.

The station features parking facilities located east of Snell Street between 70th Avenue and Hegenberger Road, which are connected to the station via an underground pedestrian walkway that passes under the UP Oakland Subdivision track.

The station has a street-level concourse and two elevated platform levels. The level directly above the concourse provides access to a center platform with "Platform 1" on the west and "Platform 2" on the east. Platform 1 serves southbound trains on the Fremont – Daly City and Dublin/Pleasanton – Daly City lines, while Platform 2 serves northbound trains. "Platform 3" is accessed at the south end of the Platform 1 & 2 level via a pedestrian walkway over San Leandro Street and provides service to the OAK Shuttle. This Plan focuses on improvements main concourse and center Platform 1 & 2 (referred to as 'the platform' throughout this report).

Figure 1: Station Location and Context



The concourse level of the station features a single paid area with one fare gate array of 13 devices, summarized in **Table 1**. In addition, Platform 3 functions as a "free area", as riders from Oakland International Airport do not pass through fare gates before boarding OAK Shuttle trains. Once arriving at Coliseum Station, OAK Shuttle riders process tickets at the Platform 3 level to travel to other BART stations or to exit Coliseum Station. In the reverse direction, customers originating elsewhere in the BART system exit the fare gates to access Platform 3. As shown in **Table 1**, the Platform 3 fare gate array has nine devices.

Table 1: Station Fare Gate Arrays

Array	Location	Fare Gates				
		Entry-only (E)	Exit-only (X)	Reversible (R)	Accessible (AFG)	Total
Array 1	Concourse Level	1	1	10	1	13
Array 2	Platform 3	1	1	4	3	9
Total		**2**	**2**	**14**	**4**	**22**

Source: BART, 2015.

Two stairways and two escalators transition passengers between the paid area of the concourse and the Platform 1 & 2 level. An elevator outside of the paid area also connects between the concourse and platform levels. A stairway, two escalators and an elevator connect between the Platform 1 & 2 and Platform 3 levels.

1.2.2 Ridership

1.2.2.1 2008 BART Station Profile Study

The *2008 BART Station Profile Study* estimated that 6,332 riders per day entered the Coliseum Station on an average weekday. Of all riders entering Coliseum Station, 59 percent (3,746 riders) indicated that they were coming from non-home-based locations. The majority of the station's non-home-based trips (43 percent) were trips made to Oakland International Airport. Since the Study was conducted prior to OAK Shuttle service, these trips would now be shifted to the new OAK Station. Of the remaining non-home based riders, 38 percent were coming from work and 19 percent from other origins (school, personal errands and visits, etc.)

Of the 2,586 home origin riders (41 percent of riders), 73 percent were trips to work, 10 percent to school, and the remaining for other destinations.

Most home-based station users (68 percent) travel to and from the station by car, with 49 percent driving alone, 15 percent being dropped off, and the remaining four percent carpooling. The majority of non-home based trips (69 percent) are made to the station by bus or other forms of public transit. The travel mode to the station for both home and non-home origins is summarized in **Figure 2**.

Figure 2: Travel Mode to Station (2008 BART Study)

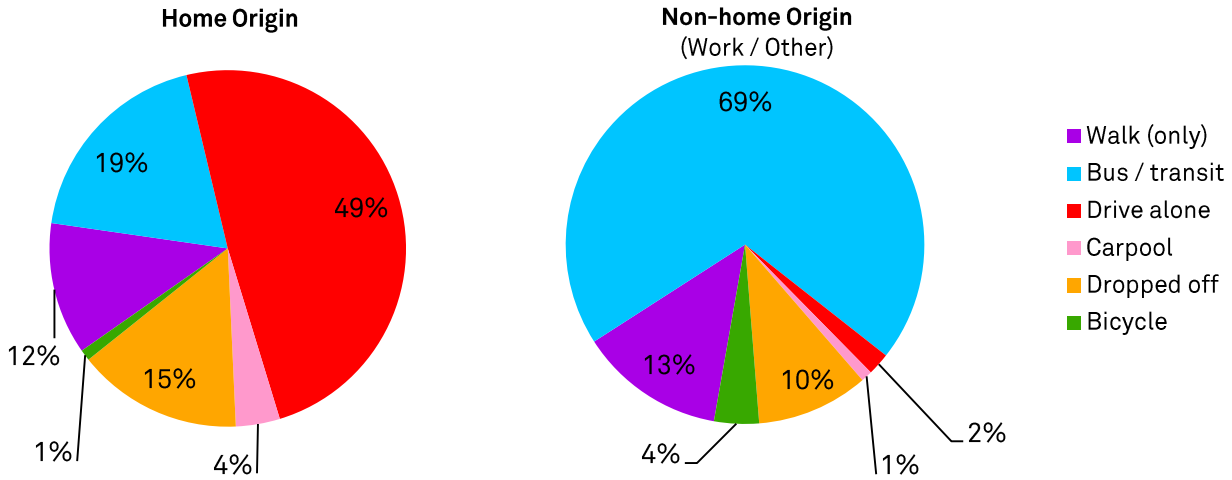
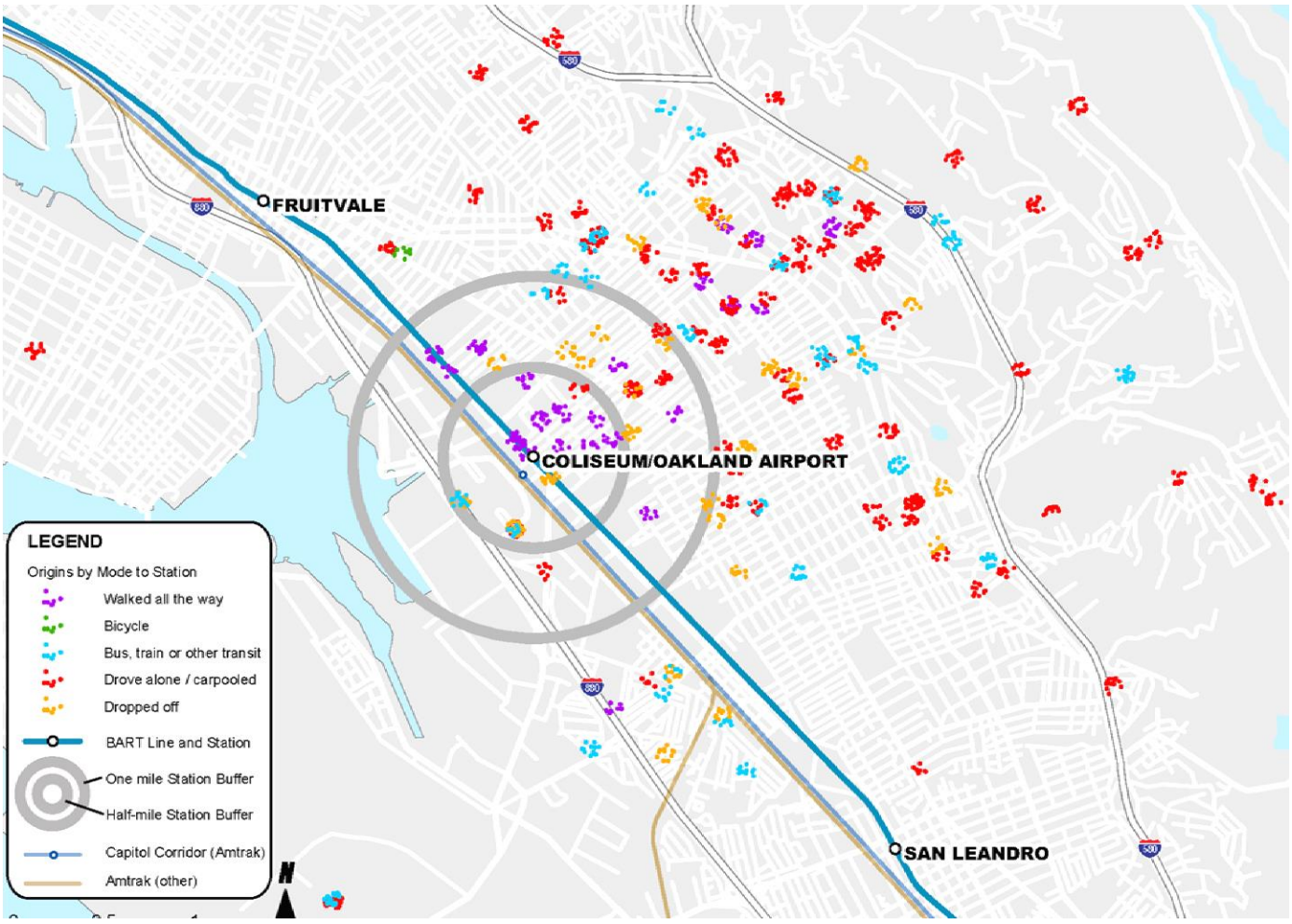


Figure 3 provides an overview of the home locations of weekday riders who entered the BART system at Coliseum Station. Not surprisingly, riders who walked to the station originated in areas closest to the station, concentrated in the neighborhoods situated east of the station. Riders who accessed the station by bicycle were concentrated further northeast of the station in the Fruitvale neighborhood. Riders using other transit modes to get to the station came from a wider catchment area, but primarily east of the station, including points along the International Boulevard and MacArthur Avenue corridors beyond the adjacent neighborhoods.

Figure 3: Home Locations of Coliseum Station Riders (2008)



Sources: ESRI, 2008 BART Station Profile Study.

1.2.2.2 2012 Ridership

Assessment of ridership demand and capacity analysis for the Plan are based on fare gate data collected on a representative non-event weekday (Thursday, November 15, 2012), which recorded a total of 7,038 entries at Coliseum Station. This represents an increase of 11 percent over ridership volumes identified in the *2008 BART Station Profile Study* (6,332 average weekday entries), or about 2.8 percent annual growth over the four-year interval. The increase reflects a rebound in employment in both Oakland and San Francisco, a surge in population in East Oakland driven by the increased demand for affordable housing, and an increase in popularity of the Oakland International Airport among travelers.

1.2.2.3 Event Ridership

Unlike most BART stations, which experience their highest passenger volumes during commute hours, Coliseum Station sees its greatest ridership before and after events at the Coliseum Complex. **Figure 4** shows typical event day conditions.

To determine "typical" event conditions for analysis, both the event type and event day were considered. Ridership is spread over a longer period prior to an event, as attendees do not arrive all at once. Peaking occurs after the event's conclusion, as attendees more or less leave at the same time. Oakland Raiders football games attract the largest crowds, but typically occur on weekends when overall BART ridership is lower. On the other hand, the Oakland A's and the Golden State Warriors play on weeknights, and pre-game ridership often coincides with peak hour commute activity.

To cover representative scenarios, several potential event dates in fall 2012 were considered, discarding any dates when service anomalies were recorded. Ultimately, ridership demand and capacity analysis were conducted for the following dates:

- On the evening of Thursday, October 11, 2012, the PM peak hour coincided with a 6:30 pm Oakland A's game vs. the Detroit Tigers (attendance: 36,393) as well as the pre-game peak hour for the 7:30 pm Golden State Warriors' preseason game vs. Maccabi Haifa at Oracle Arena (attendance: 8,237). This represents a pre-game condition that, while less "peaked", also includes commuters returning to Coliseum Station from their workplaces. It also reflects a situation when both venues are hosting events.

- On the afternoon of Sunday, November 18, 2012, the Oakland Raiders played the New Orleans Saints. The game began at 1:05 pm with an estimated attendance of 56,880. The post-game activity following this game is representative of the highest ridership and greatest peaking that the station experiences.

Average ridership characteristics for event day ridership in 2014 for baseball and football games are summarized in **Table 2**.

Table 2: Coliseum Station BART Ridership – 2014 Event Day Characteristics

	Oakland Athletics Baseball Game	Oakland Raiders Football Game
Average share of BART Riders among all attendees	18%	21%
Average number of Event Riders	4,671	11,632
Highest Share of BART Riders	47% (Coinciding with Event at Oracle Arena)	23%
Highest Number of Event Riders	10,842 (Vs. Giants)	12,730
Riders During Event Rush Hour	4,500* pre-game	11,100 post-game

Source: BART, 2015.

Note: *Adjusted from City estimates to reflect 40,000 baseball stadium for weeknight.

Figure 4: Event Day Attendance

Source: http://zackhample.mlblogs.com

Source: athleticsnation.com

Source: http://www.subwaynet.com/bart/coliseum

Source: http://zackhample.mlblogs.com

1.3 Coliseum City Overview

The City of Oakland's planning department has developed the Coliseum Area Specific Plan (hereafter referred to as the "Specific Plan"), which was analyzed in the Coliseum Area Specific Plan Final Environmental Impact Report (February 20, 2015) (hereafter referred to as the "Specific Plan FEIR"). Following a public review period, the Specific Plan FEIR was certified and the Specific Plan adopted by the Oakland City Council on March 31, 2015.

The Specific Plan calls for substantial redevelopment, intensification and diversification of land uses at the Coliseum Complex site and its surroundings. Among other scenarios, the Specific Plan supports the Coliseum City Master Plan vision. This "Coliseum City" would function as an active urban district, with office space and housing in addition to event venues of regional significance. BART is considered key to the development plans, with employees commuting by transit to reach its workplaces, and residents using BART to reach destinations elsewhere in the region. With implementation of the Specific Plan, BART ridership at Coliseum Station would grow considerably over the next two decades.

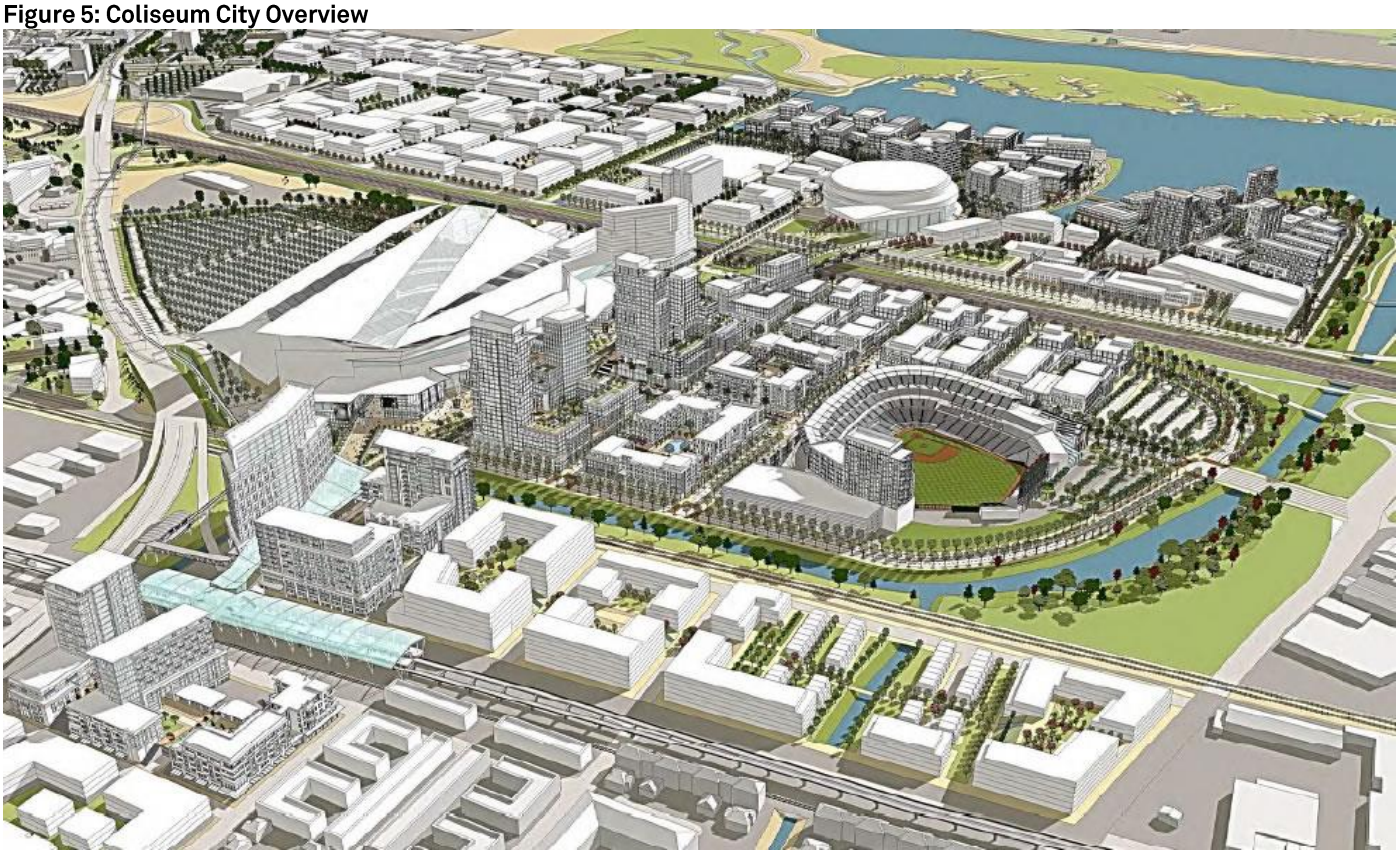
The following sections provide an overview of Coliseum City and ridership projections for 2035 based on the development program.

1.3.1 Master Plan and Specific Plan Vision and Development Program

The *Specific Plan* aims to guide the future development of the Coliseum Complex site and adjacent areas across I-880, including Oakland Airport Edgewater Business Park. The Specific Plan encompasses approximately 800 acres, bounded by 66th Avenue on the north, San Leandro Street on the east, Hegenberger Road on the south, and San Leandro Bay and Oakland International Airport on the west. A rendering from the Coliseum City Master Plan is presented in **Figure 5**.

The *Specific Plan* aims to leverage existing development assets, particularly regional transit infrastructure (including BART, Capitol Corridor and AC transit services), into a comprehensively planned mixed-use district that will retain the existing sports franchises, attract sustainable new jobs and economic development, and provide new housing opportunities.

Figure 5: Coliseum City Overview



Source: JRDV Architects, Coliseum City Innovation Gateway, Draft Master Plan Report (July 2013).

This artist's rendering shows a vision for Coliseum City looking southwest in the direction of Oakland International Airport. Coliseum Station appears in the lower left corner (see curved glass roof over elevated BART tracks). A number of high-rise buildings would be oriented along an axis running west from Coliseum Station to the west side of I-880. An NFL stadium (large-scale, planar roof structure) would be situated along the south side of this axis; the MLB stadium would be located to the north, abutting Damon Slough; and the Oracle Arena would be located west of I-880.

The *Specific Plan* area is subdivided into five distinct zones as illustrated in **Figure 6**:

- Sub-Area A – Sports, Retail and Transit District;
- Sub-Area B – Mixed-use Waterfront Residential District and "Innovation Gateway" Science and Technology District;
- Sub-Area C – Technology Support District;
- Sub-Area D – Airport and Logistics District; and,
- Sub-Area E – Airport and Logistics District.

As shown in **Figure 6**, Coliseum Station and the Coliseum Complex are located in Sub-Area A. This area would include 2.5 million square feet of non-residential development, featuring a 131,000-seat Multipurpose Event Center (comprised of a 72,000 seat NFL stadium, 39,000-seat MLB stadium, and a 20,000-seat NBA stadium), 4,000 housing units, and 875 hotel rooms.

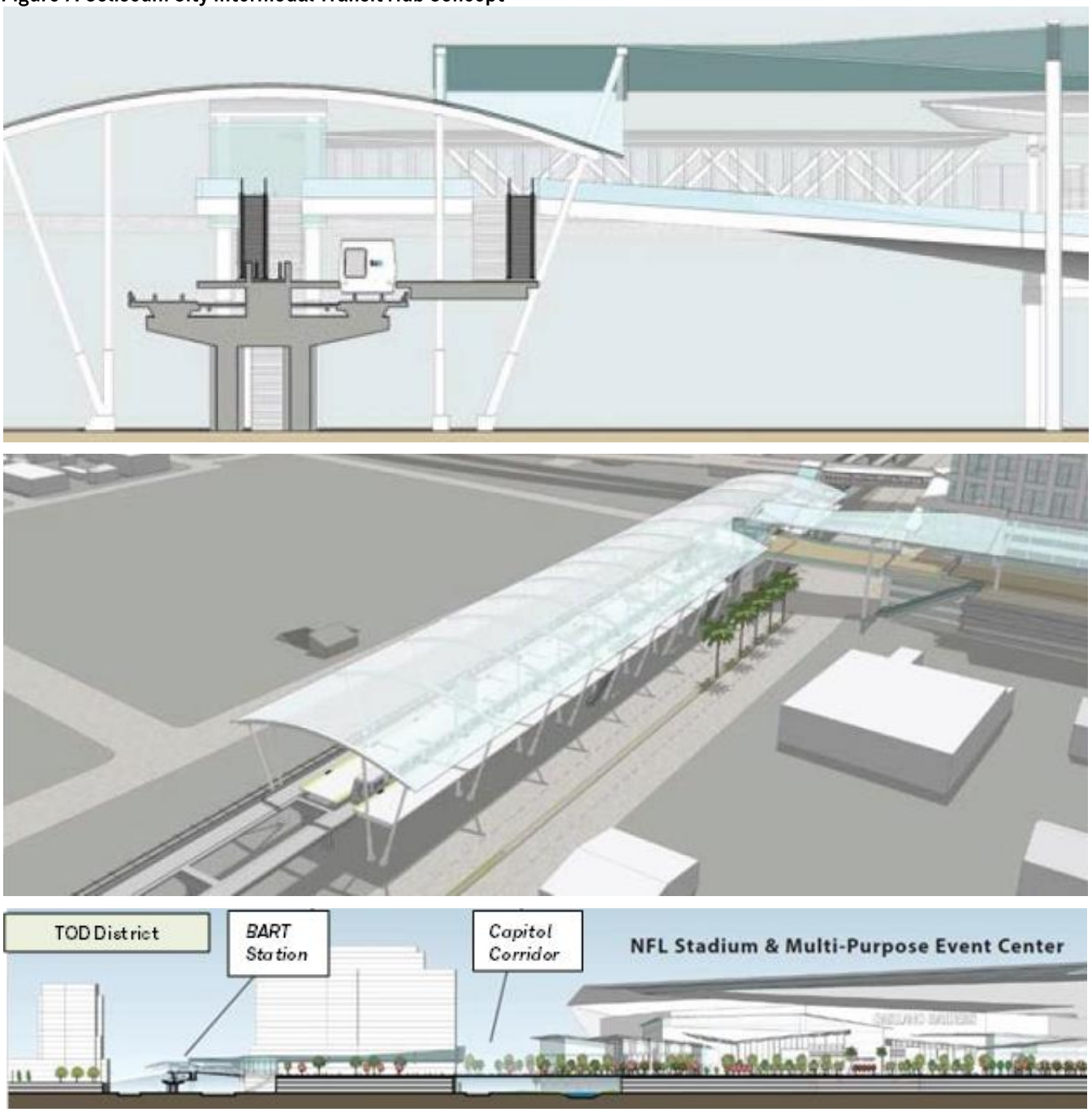
Figure 6: Coliseum City Specific Plan Sub-Area Map

The Specific Plan focuses on TOD that includes the development of an Intermodal Transit Hub that would link BART, Capitol Corridor, the OAK Shuttle, AC Transit buses and a new elevated streetcar connector. In the Master Plan vision, the Intermodal Transit Hub would feature an additional BART station platform to accommodate event and ridership growth, a new elevated "High Line" connection that would link the BART and Capitol Corridor stations to Coliseum City, a new BART station entrance with fare gates at the High Line level, and improved amenities such as an iconic station roof.[1]

Figure 7 depicts the Coliseum Station and Intermodal Hub concept as envisioned by the Master Plan.

[1] City of Oakland, JRDV Architects, Forest Enterprises, AMP, HKS Architects, Coliseum City Innovation Gateway, Draft Master Plan Report, (July 2013).

Figure 7: Coliseum City Intermodal Transit Hub Concept



Source: Top and Center – JRDV Architects, Coliseum City Innovation Gateway, Draft Master Plan Report (July 2013);
Bottom – City of Oakland, Coliseum Area Specific Plan (adopted January 2015).

1.3.2 Projected 2035 Ridership

The Specific Plan considers the impacts of development projects in the surrounding area on ridership at the station. Given the increase in residential, commercial and entertainment envisioned for the area surrounding Coliseum Station, ridership demand is expected to increase substantially.

1.3.2.1 Commute (Non-Event) Ridership

The Coliseum Area Specific Plan estimates that there will be 28,500 entries to Coliseum Station during a typical non-event weekday in the horizon year of 2035. This represents an increase in station activity of 104 percent as compared with today, or a 4.5 percent per annum increase over 2012 ridership volumes. **Table 3** provides a summary of existing (2013) and future (2035) ridership, with totals of station entries and exits.

Table 3: Coliseum Station 2035 Ridership – Weekday Non-Event

Scenario	Daily (Entries and Exits)	Weekday AM Peak Hour		Weekday PM Peak Hour	
		Entries	Exits	Entries	Exits
Existing Year (2013)	14,500	300	800	800	400
Future Year (2035)	28,500	1,700	1,600	1,700	2,000
Increase	**104%**	**467%**	**100%**	**115%**	**409%**

Source: Coliseum Area Specific Plan, 2015.

1.3.2.2 Event Ridership

Existing event ridership reflects the fare gate data collected on the representative event scenario dates of October 11, 2012 (weekday event) and November 18, 2012 (weekend event). Peak hour event ridership of over 8,000 (pre-event exits) and 7,000 (post-event entries) dwarfs typical weekday peak hour ridership. Weekday and weekend event ridership is presented in Table 4. The existing overall BART mode split for A's and Raiders games is around 18 percent for weekday events and 21 percent for weekend events. About 60 percent of event attendees exit the station during the hour immediately prior to the start of an event and about 52 percent of event attendees enter the station during the hour immediately following the end of an event.

In the future year, increases in event ridership would not be driven by the overall land use changes and growth expected in the station area, but rather by growth in event attendance and/or a greater mode shift in favor of BART. For future event ridership, venues seating 40,000 and 70,000 are assumed for the A's and Raiders, respectively. It is also expected that more fans would take BART in the future year. The assumptions used in the transportation impact analysis for the Specific Plan FEIR result in a mode split of 29 percent for weekday events and 28 percent for weekend events.

Ridership projections in the 2035 horizon year for both the weekday pre-game peak hour (5:15 to 6:15 PM) and weekend post-game peak hour (3:45 to 4:45 PM) conditions were determined based on the Specific Plan FEIR assumptions. This results in a 14 percent increase in station exits in the weekday pre-event peak hour and a 70 percent increase in station entries in the weekend post-event peak hour over existing volumes (these entries and exits reflect all trip purposes, not only trips related to an event). The ridership increases result from the slightly higher BART mode share (3 percent increase for weekday events and 9 percent increase for weekend events) and attendance (3,600 person increase for weekday events and 13,200 person increase for weekend events) that is assumed in the future (2035) event conditions scenarios.

Table 4 provides a summary of existing (2013) and future (2035) ridership in the pre-event and post-event peak hour. Totals of all station entries and exits are presented, regardless of whether they are event-related or not. As the weekday pre-event and

weekend post-event represent the scenarios of highest ridership demand, entries and exits were not calculated for the weekday post-event or weekend pre-event conditions in 2035.

Table 4: Coliseum Station 2035 Ridership – Pre-Event and Post-Event Peak Hour Conditions

Scenario	Pre-Event		Post-Event	
	Entries	Exits	Entries	Exits
Existing Year (2013)				
Weekday Event	403	8,206	5,033	173
Weekend Event	434	6,010	7,066	413
Future Year (2035)				
Weekday Event	1,800	9,567		
Weekend Event			12,048	643

Source: AECOM, 2015.

Notes:

Weekday event ridership pre-game peak hour = 5:15 PM to 6:15 PM
Weekday event ridership post-game peak hour = 9:30 PM to 10:30 PM
Weekend event ridership pre-game peak hour = 11:45 PM to 12:45 PM
Weekend event ridership post-game peak hour = 3:45 PM to 4:45 PM

1.4 Opportunities

On November 4, 2014, Alameda County residents voted to pass Ballot Measure BB to support the 2014 Alameda County Transportation Expenditure Plan (the "TEP"). Measure BB renews the existing 0.5 percent transportation sales tax approved in 2000 and increases it by 0.5 percent, thus dedicating a full one percent sales tax to fund the TEP. The Alameda County Transportation Commission (ACTC) controls the use of the generated tax revenue.[2] The TEP is a 30-year plan that will expand and improve transportation services throughout Alameda County, dedicating 48 percent of net revenue to BART, bus, commuter rail, and senior and youth transit investments.

The TEP identified a preliminary allocation of $40 million to community development investments that would improve connections to jobs and schools within the Coliseum Station area. These funds provide considerable opportunities for station improvements, including station modernization, TOD within the surrounding area, and general upgrades to pedestrian/bicycle facilities within the station area.

Additional funds that could serve the Coliseum Station area include the acquisition and preservation of the UP Oakland Subdivision right-of-way (UP ROW) as a bicycle and pedestrian facility. Funding for this could be part of the Rail Preservation allocation and/or the East Bay Greenway allocation. Not only would this support non-motorized access to the station, but it would also allow grade-level access between the station and its parking facilities and the neighborhood to the east. The existing underground passageway, which is difficult to maintain and supervise and presents an obstacle to mobility-challenged customers, could then be closed. In addition, if future station expansion calls for a new platform or track on the east side of the station, this would be enabled by the UP ROW preservation. The active railroad track that currently is in place precludes any such expansion.

1.5 Needs Assessment

1.5.1 Early Wins

"Early Wins" refer to relatively small-scale, low-cost interventions that could be implemented in the short term ("early") to modernize the station. These projects represent "low-hanging fruit" that, despite a low level of investment, would result in significant improvements ("wins") in the station's operation and appearance. Implementation of these Early Wins projects at the Coliseum station would:

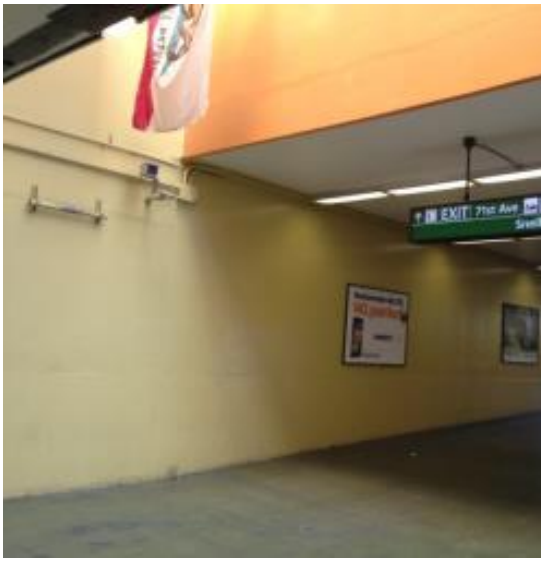
- **Brighten the station** to improve the overall cleanliness, attractiveness, and functionality of the station;
- **Enhance the visibility** of the existing station entrance;
- **Improve sightlines and pathways** to facilitate passenger movement within the station;
- **Refurbish flooring** on concourse and platform levels;
- **Mitigate pigeon activity**;
- **Repaint doors, panels and hardware** to provide a fresher, brighter appearance; and,
- **Replace/repair lighting elements.**

[2] *Alameda County Transportation Commission*, "Measure B," accessed June 13, 2016. Online: http://www.alamedactc.org/measureb

The first of these improvement efforts, station brightening, was completed in advance of the OAK Shuttle opening in fall 2014. The station brightening program was a coordinated effort through BART's Operations Department and the Office of Planning and Development that included elements such as deep cleaning, maintenance, painting, partial pigeon mitigation, replacing of lighting elements, and other minor improvements and beautification of the station.

Figure 8 illustrates the completed station brightening effort, showing before and after comparisons of the underground pedestrian passageway, inside the station concourse, and at the station entrance.

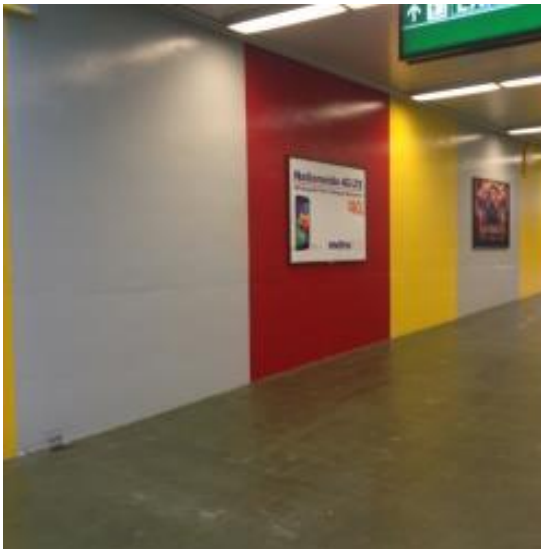
Figure 8: Recently Completed Early Wins – Station Brightening

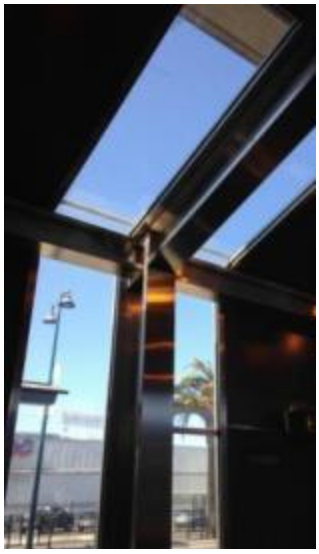


Before


Before

Before


After


After


After

1.5.2 Capacity Analysis

The ridership projections presented in **Table 3 (in section 1.3.2.1)** show that the total number of customers entering and exiting Coliseum Station is expected to increase by approximately 14,500 station entries per day (104 percent growth) by 2035. This suggests that the station will require substantial capacity improvements in the future, which may include additional fare gates, stairways, escalators and expanded platform capacity.

To understand the impacts of this future growth, ridership data was modeled using Legion SpaceWorks pedestrian simulation software. This application provides output in the form of maps showing average pedestrian density and video clips showing simulated pedestrian flows over a defined period.

The colored areas of the density maps show where pedestrian flows occur, in each case during the peak fifteen minutes of the AM peak hour. Pedestrian flow was analyzed using a Level of Service (LOS) concept, a qualitative description of the available standing space, perceived comfort and safety, and the ability to maneuver from one location to another. Pedestrian LOS ranges from LOS A, which indicates free flow or excellent conditions, to LOS F, which indicates congested or overloaded conditions. The LOS criteria for the train platform are summarized in **Table 5.**

Table 5: Pedestrian Level of Service

Level of Service	**Average Area per Passenger** (square feet)
A	> 35
B	> 25 and ≤ 35
C	> 15 and ≤ 25
D	> 10 and ≤ 15
E	> 5 and ≤ 10
F	< 5

Source: Transportation Research Board, Transit Capacity and Quality of Service Manual, Second Edition (2003).

1.5.2.1 Modeling Outcomes for Existing Condition

Figure 9 and **Figure 10** show density maps of the station concourse during the existing AM peak hour and PM peak hour, respectively. The colors in the figures correspond to the average pedestrian density over the fifteen-minute peak of the peak period, ranging from blue to red. Blue represents LOS grade A, with an average of over 35 square feet of circulation space available for each person, while red represents LOS F, with less than 5 square feet per person.

Intuitively, warmer colors are found where one would expect the greatest concentrations of pedestrians – at fare gates or at the foot of stairways or escalators. Pedestrians slow down at these locations, and if there are enough pedestrians, they will start to crowd together as they transition to a slower speed. Given enough crowding, queues will form and pedestrians may have to stop and wait before enough space ahead of them clears to allow them to move forward. The figures show the heaviest concentration of passengers at the station entrance, where there is activity of customers transferring between bus and BART within a relatively confined space. Note that with the opening of the OAK Shuttle, AirBART bus passengers no longer wait near the entrance, reducing this concentration.

Figure 11 and **Figure 12** show density maps of the station concourse during the representative pre-event and post-event peak 15 minutes, respectively. Compared with the existing AM and PM peak hour density maps, the pre-event and post-event peak hour density maps show higher levels of concentration in the north end of the concourse approaching the elevated pedestrian walkway, and on the walkway itself. In the post-game condition, crowding at the base of the stairways and the up escalator is also observed.

Figure 9: Existing AM Peak 15-Minute Period Non-Event Density Map – Concourse Level

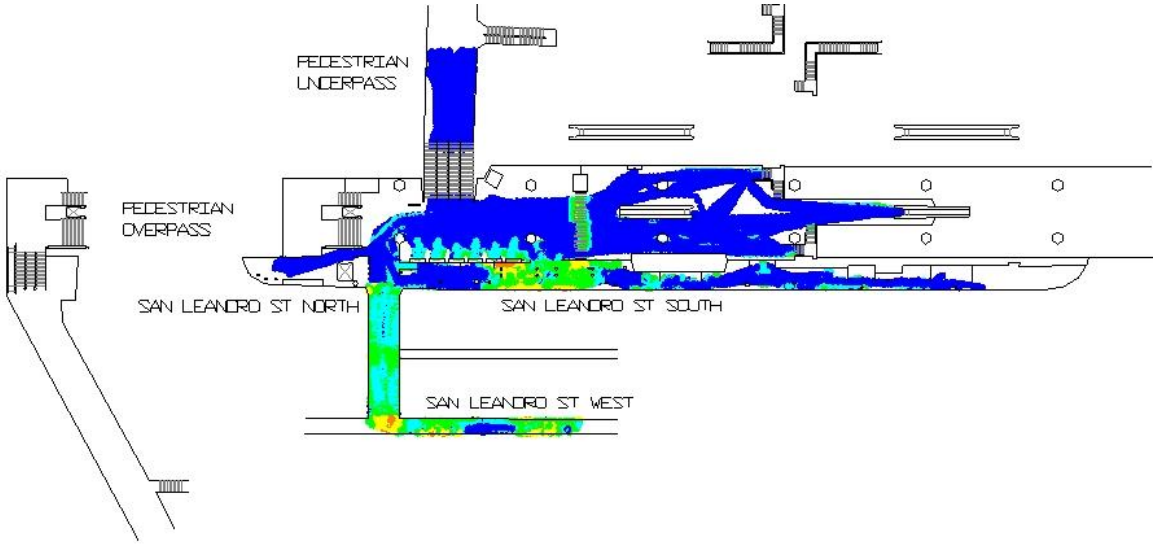
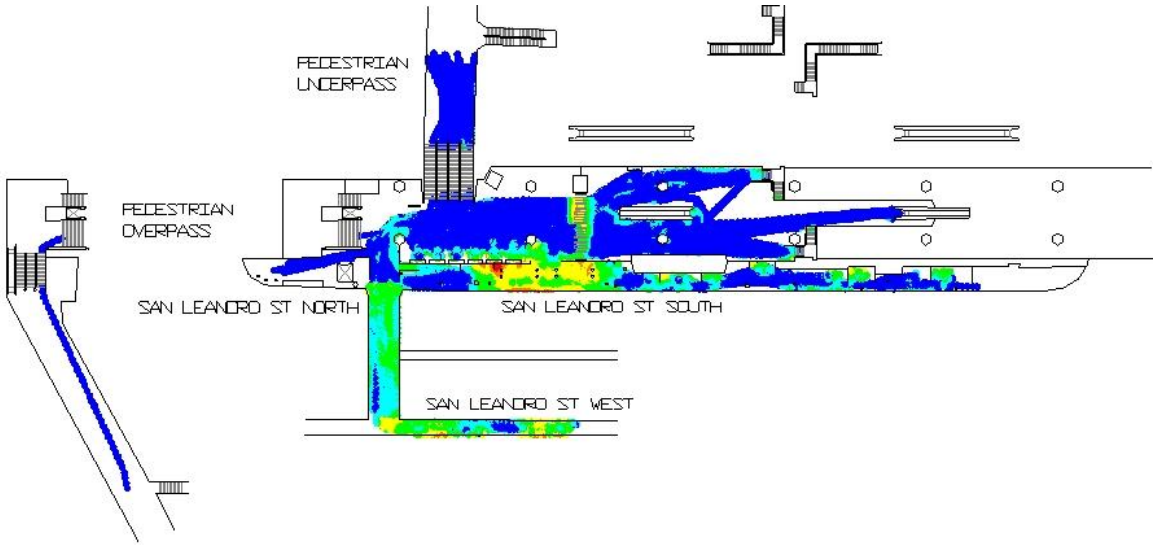


Figure 10: Existing PM Peak 15-Minute Period Non-Event Density Map – Concourse Level



LOS	A	B	C	D	E	F
sq ft / person	> 35	> 25 and ≤ 35	> 15 and ≤ 25	> 10 and ≤ 15	> 5 and ≤ 10	< 5

Figure 11: Weekday Pre-Event Peak 15-Minute Period Density Map – Concourse Level

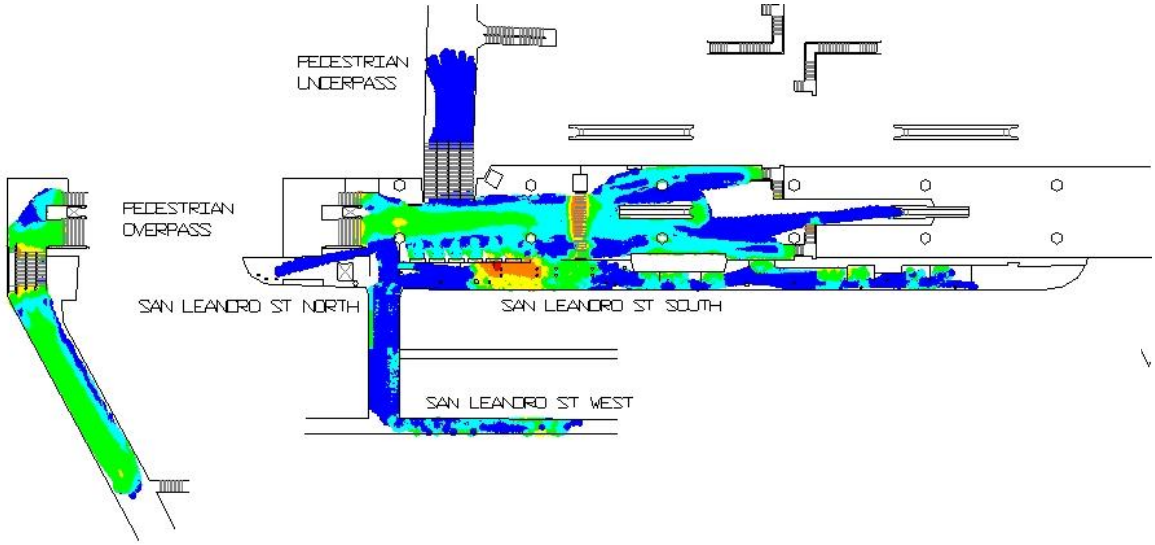
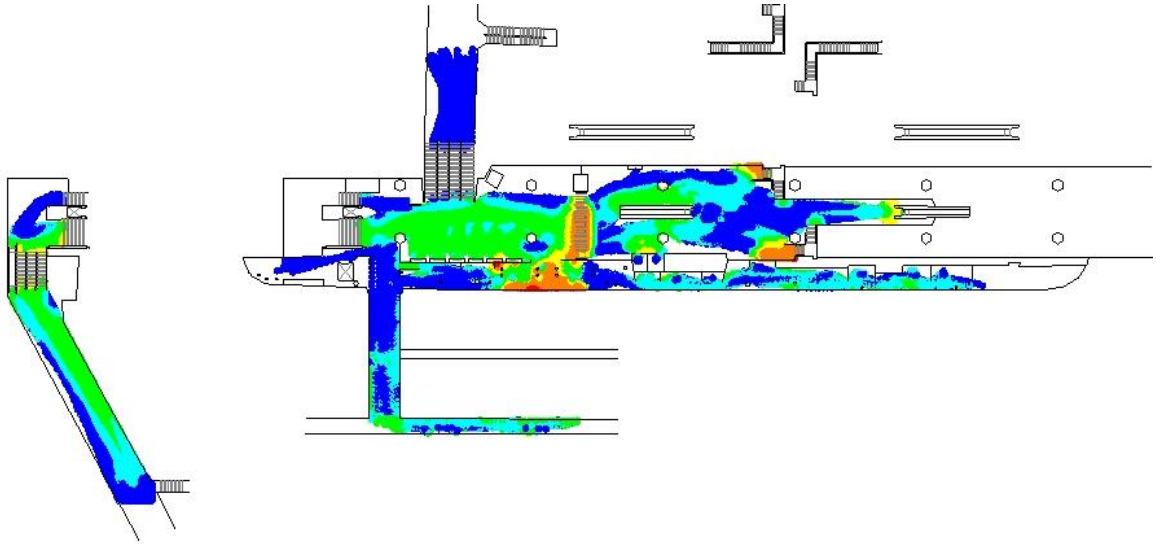


Figure 12: Weekend Post-Event Peak 15-Minute Period Density Map – Concourse Level



LOS	A	B	C	D	E	F
sq ft / person	> 35	> 25 and ≤ 35	> 15 and ≤ 25	> 10 and ≤ 15	> 5 and ≤ 10	< 5

Figure 13 and **Figure 14** show density maps of the platform level during the existing AM peak 15-minute period and PM peak 15-minute period, respectively. Not surprisingly, the AM map shows the highest concentrations of customers around the up escalator toward the south end of the platform. This reflects the tendency of customers to remain in the immediate area of where they arrive on the platform, rather than distribute themselves more evenly along the full length of the platform. In the PM peak hour, customers from all cars of a train are alighting to the platform, resulting in a more even distribution. Crowding is not observed at the down escalator toward the north end of the platform.

Figure 13: Existing AM Peak 15-Minute Period Non-Event Density Map – Platform Level

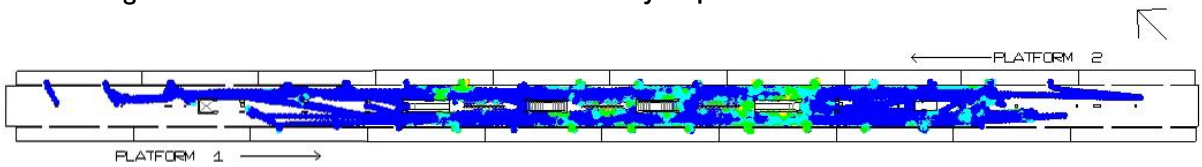


Figure 14: Existing PM Peak 15-Minute Period Non-Event Density Map – Platform Level

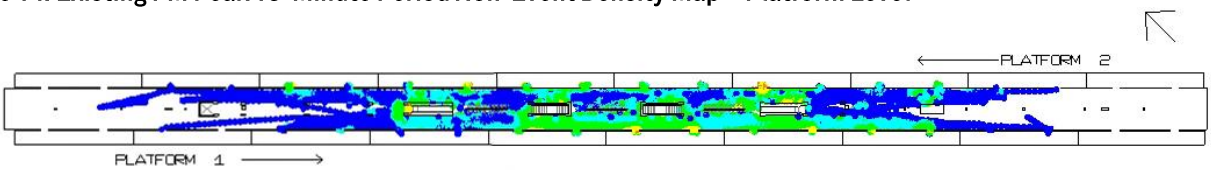


Figure 15: Weekday Pre-Event Peak 15-Minute Period Density Map – Platform Level

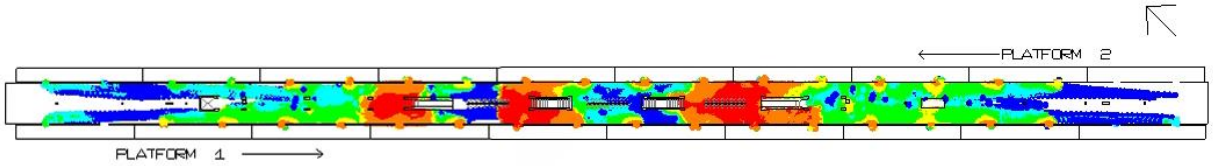
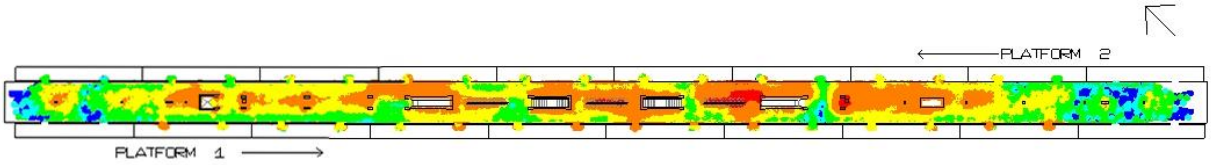


Figure 16: Weekend Post-Event Peak 15-Minute Period Density Map – Platform Level



LOS	A	B	C	D	E	F
sq ft / person	> 35	> 25 and ≤ 35	> 15 and ≤ 25	> 10 and ≤ 15	> 5 and ≤ 10	< 5

Figure 15 and **Figure 16** show density maps of the platform level during the representative pre-event and post-event peak 15-minute period, respectively. In the pre-event condition, the areas of greatest crowding (red) are at the top of the stairways and down escalator. This reflects a surge of eventgoers proceeding to the concourse after train arrivals. This crowding is relatively short-lived, as eventgoers have room to disperse once they reach the concourse level (cooler colors in **Figure 11**).

In the post-event condition, the areas of crowding are more consistently observed and not confined only to the areas at the top of the stairways or escalator. Blue and green areas at the platform ends indicate that there is opportunity to spread out more of the crowding and relieve the congested areas around the vertical circulation elements in the middle of the platform.

1.5.2.2 Crowd Management

Consultation with Coliseum Station staff provided insight into operations during event conditions. As attendees tend to arrive over a longer period of time prior to an event, there are few problems in accommodating crowds as they move from the platform to the concourse level and proceed through the fare gates to access the elevated pedestrian walkway to the Coliseum Complex. However, the single escalator operating in the down direction and the stairways connecting the platform and the concourse are "pinch points" (see **Figure 15**).

In the post-event condition, pedestrian flow is much more peaked as attendees are leaving the Coliseum Complex more or less at the same time. Customers encounter crowding as they approach the fare gates and must queue to use ticket vending machines or the station restrooms once they have entered the paid area (see **Figure 12**). While the escalator at the south end of the concourse is operated in the "up" direction, thus maximizing the space within the paid area of the concourse to hold crowds, this escalator is accessed by a constricted corridor.

The station platform is relatively narrow and the large footprint of windscreens and storage cabinets exacerbates this condition. The escalator landing at the platform level is a relatively confined area, limited by the platform canopy columns, and customers tend to remain in this area after reaching the platform, rather than spread out to use the full capacity of the platform. As a result, crowding can become unsafe and station staff has had to resort to metering pedestrian flow to the platform by temporarily blocking access to the escalator or turning the escalator off. **Figure 16** shows a modeled condition where customers "cluster" (orange areas) to allow "paths" (green areas) for free movement; in practice, station staff need to be deployed to the platform to direct customers to move out of the upper escalator landing area to maintain pedestrian flow.

Station staff must strike a difficult balance between keeping the platform crowding under control and minimizing delay and frustration experienced by customers at the concourse level, who may be held back from reaching the platform. Customers who are intoxicated or are animated by the outcome of a game increase the volatility of this post-event condition.

The following have been suggested as **potential crowd management measures**:

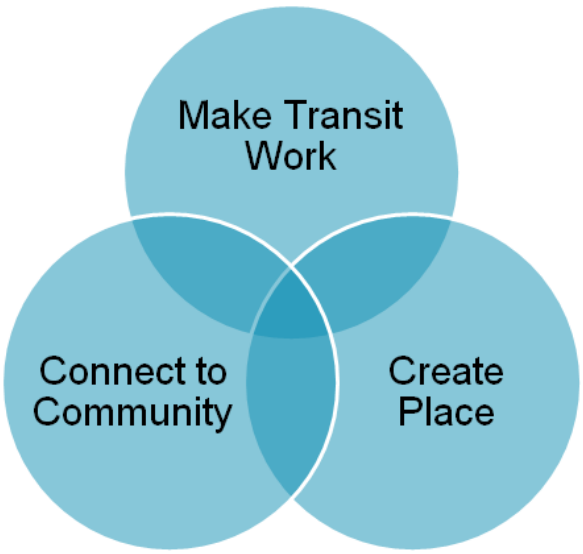
- Encourage customers to spread out along the platform by **removing or relocating obstructions** and providing shelter under an extended canopy;
- Implement **additional vertical circulation** (stairways, elevator) at the less-crowded ends of the platform;
- Install **enhanced wayfinding** to distribute customers more evenly as they proceed through the station;
- Provide **real-time information** to inform customers of crowding conditions, easing their anxiety about catching their train. If installed at the Coliseum Complex end of the elevated pedestrian walkway, customers could be encouraged to wait for crowds to diminish before proceeding to the station.
- Increase available **platform** area.

2.0 Project Goals and Objectives

2.1 Station Modernization Goals

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. BART has the following overriding goals for station modernization program: Make Transit Work, Connect to Community, and Create Place. These goals and their supporting objectives were presented to the BART Board of Directors in spring 2014. The relationship of these goals is illustrated conceptually in **Figure 17**.

Figure 17: Station Modernization Goals



The goals are articulated below and supported by measurable actions that can be taken in an effort to achieve the goals:

- **Make Transit Work**
  Ensure the BART system is reliable and has the capacity to meet customer and employee needs.
  - Maintain reliability
    Protect investment in existing system through systematic replacement of aging components and infrastructure, with an emphasis on positive customer experience.
  - Increase station capacity
    Optimize the BART system's ability to meet projected ridership increases by increasing BART's capacity to carry passengers.
  - Improve employee environment
    Ensure that the BART workforce has the tools and space that they need to support a healthy, safe, and productive workplace.
  - Advance sustainability
    Reduce BART's environmental footprint through implementation of sustainable and cost-effective techniques such as conserving resources, lowering greenhouse gas emissions, and reducing maintenance costs.

- **Connect to Community**
  Improve the connectivity to and within BART stations and connect to the community by responding to their priorities. Ensure BART investments align with regional goals and future growth, and are equitable.

  - Connect BART
    Maximize connectivity and facilitate multi-modal access to stations and within station areas, including transit, walking and biking.

  - Expand universal design
    Improve universal design of BART stations and access to stations to provide access for all in accordance with the Americans with Disabilities Act (ADA).

  - Incorporate community input
    Respond to the community and customer input regarding which improvements are perceived as most important.

- **Create Place**
  Encourage the BART station to integrate into the surrounding community and contribute to the community's livability, safety and vitality.

  - Enhance customer experience
    Contribute to beautification, comfort, and placemaking (e.g., art, architecture, ambience) to enhance livability and vitality at stations, and to support regional goals.

  - Ensure safety and security
    Enhance customer and system, real and perceived safety and security.

  - Leverage partnerships
    Protect the investment in rail transit through strategic partnerships and leveraging outside funding to match BART investments.

2.2 Coliseum Station Design Objectives

The modernization goals are reflected in three primary design objectives for Coliseum Station:

- an up-to-date facility that **improves the customer experience**, including better management of crowding and pedestrian flows;
- an integrated transit property that **establishes seamless connections** to the surrounding community and new development opportunities; and
- an intermodal station that **promotes non-auto mode share**.

2.2.1 Improve the Customer Experience

Coliseum Station has been serving the surrounding community, Coliseum and Arena eventgoers, and air travelers for four decades – and in certain areas, this age shows. Improvements have been identified to upgrade essential systems, remove unnecessary or redundant elements to reduce visual clutter, and make station spaces more attractive and welcoming.

Because of the station's unique function not only as a commuter station, but also as an event destination and intermodal facility, it experiences varied pedestrian flows and regular crowding. The Plan introduces improvements to better manage event crowds and direct station users more confidently to their train, event, or "last mile" mode. Strategies to maximize platform capacity and customer distribution, additional vertical circulation capacity, and concourse-level reconfiguration all address these objectives.

2.2.2 Establish Seamless Connections

Sandwiched between a number of transportation corridors and facilities, pedestrian connections between Coliseum Station and its surroundings are challenged. The Plan identifies ways to better connect to the surrounding community. A reorganized and decluttered San Leandro Street frontage is proposed to enhance the quality of BART to bus transfers; improvements to the underground passageway to access the surrounding neighborhood and parking would improve customer safety and comfort, and address the needs of the mobility-challenged. If the opportunity arises through UP ROW acquisition, the Plan envisions a new east side ground-level station entrance to replace the underpass as well.

Future development opportunities, such as the proposed Coliseum City, call for an additional level of connective elements. The plan identifies a new elevated pedestrian walkway to make a direct link to the proposed development, as well as thoughtful urban design that guides customers to and from new workplaces and housing, entertainment and venues, and a host of transit modes.

2.2.3 Promote Non-Auto Mode Share

Improving access for non-auto passenger trips to and from BART is critical to meeting ridership goals and serving customer needs. The Plan aims to strengthen multi-modal and universal access to Coliseum Station and promote a safe and comfortable passenger experience. The *BART Station Access Guidelines* (2003) prioritize access modes in the following order:

- Walking
- Transit
- Bicycle
- Pick-up / Drop-off
- Vehicle Parking

Originally conceived as an auto-oriented, park-and-ride station, this no longer fits Coliseum Station's diversified customer profile. While auto access will continue to be supported, the Plan focuses on improving the pedestrian experience, accommodating customers with bikes, and facilitating transfers to other modes. Considering the OAK Shuttle, frequent AC Transit services, a Capitol Corridor station, as well as a potential Coliseum City streetcar, the Plan identifies opportunities to capitalize on these complementary modes and make Coliseum Station a regional gateway to the BART system.

2.3 Conceptual Plan Topics

Proposed station improvements are organized into the following conceptual plan topics:

- Basic Improvements, State of Good Repair, and Facility Upgrades
- Safety
- Capacity
- Access Improvements
- Sustainability
- Placemaking, Aesthetics, Amenities

The sections that follow present key modernization initiatives and improvement projects.

2.3.1 Basic Improvements, State of Good Repair, and Facility Upgrades

Increase station functionality by improving and maintaining essential elements and systems, building upon the Early Wins and station brightening described in **Section 1.5.1**. Specific improvements include:

- **New LED lighting fixtures**
  New, more modern LED lighting fixtures would complement new ceiling elements and other furnishings to update the overall station appearance.

- **Upgrade Station Agent booth**
  The concourse-level station agent booth would be upgraded to conform to BART's latest standards. The updated station agent booth design is larger, more ergonomic and outfitted with modern equipment to meet the agents' needs.

- **Upgrade public restrooms**
  The concourse-level public restrooms would be expanded with stalls to provide greater capacity.

- **Improved public address system**
  The station's informational and emergency announcement system would be upgraded with features for the disabled and controls that power off the public address system when not in use, coordinated with overall systemic improvements.

- **Complete pigeon mitigation**
  Implementation of mitigation measures to discourage pigeons from roosting within the station. Strategies would include removal of baffles and installation of glass panels in place of pigeon netting around the concourse level between the wall and the roof.

2.3.2 Safety and Security

Address platform safety issues and enhance real and perceived sense of security. Specific improvements include:

- **Crime prevention through environmental design strategies**
  Better lighting and decluttered sightlines help to create an environment that inherently discourages criminal activity and increases the sense of security perceived by customers.

- **Reduce fare evasion**
  Lock and alarm swing gates and emergency exits; enable station agent control. Additional improvements to reduce fare evasion could include 100 percent smart card implementation and new, taller electronic (vs. pneumatic) fare gates, pending BART systemwide decision on these elements.

- **Platform screen doors**
  Platform screen doors (**Figure 18**) would improve safety by preventing customers from entering the BART trackways. This improvement also has capacity benefits noted in the following section.

Figure 18: Platform Screen Door Examples

Higashi Ikebukuro Station in Tokyo, Japan
Source: Kambayashi, 2012. Some Rights Reserved.
https://flic.kr/p/cuQb97

Tamanduatei Station, São Paulo, Brazil
Source: Diego Torres Silvestre, 2011. Some rights reserved.
https://flic.kr/p/96uH6b

- **Improve escalator signage**
  Signage would be provided along escalators to inform passengers of restrictions, such as no bicycles on escalators. Additionally, messages would also be provided in braille to accommodate the visually impaired.

- **Upgrade Closed Circuit Television**
  Upgrading video surveillance within the station area and expanding coverage to the north and south ends of the platform would improve passenger security, especially during off-peak periods.

2.3.3 Capacity

Increase capacity to meet today's demand as well as potential future demand from Coliseum City residents and employees. Specific improvements include:

- **Removal or relocation of platform elements**
  Platform storage cabinets and windscreens currently have a large footprint on a relatively narrow platform. Removing or relocating these obstacles would help to disperse crowds more evenly along the platform, reducing crowding at the edge of the platform.

- **Platform screen doors**
  Platform screen doors would effectively expand the platform by making the yellow safety strip along the platforms available for customer waiting and circulation. BART is exploring the use of platform screen doors to improve the capacity at the platform level at other stations with capacity issues. The outcome of those considerations will influence the decision for implementing platform screen doors at Coliseum Station.

- **An additional platform**
  Future ridership increases may fully exceed the capacity of the existing platform. An additional platform would meet future demand and outfit the station for additional growth.

- **Additional vertical circulation elements**
  Additional stairways, escalators and elevators would facilitate movement between the concourse and platform levels and ease existing bottlenecks. Additional vertical circulation would also be necessary to serve a new elevated pedestrian walkway to the proposed Coliseum City.

- **New north end paid area**
  A new paid area at the north end of the station concourse would allow new vertical circulation to access the underutilized north platform end and enclose the existing platform elevator within the paid area, an ongoing fare evasion problem.

- **Expanded platform canopy coverage**
  A full platform canopy at the platform level would encourage customers to spread out along the platform. Customers avoid the exposed outer ends of the platform, contributing to crowding around the vertical circulation elements. This would especially benefit OAK Shuttle passengers who must access Platform 3 by negotiating the south end of Platform 1 & 2 without shelter.

2.3.4 Access Improvements

Facilitate access with new connections and more intuitive use of existing spaces, walkways, and passages. Specific improvements include:

- **Real-time transit displays**
  Comprehensive real-time information incorporated throughout the station would provide a considerable increase in passenger amenity, reducing anxiety about missing a connection. Real-time transit information would also help control crowds following events at the Coliseum Complex.

- **Implement Station Wayfinding Program**
  An important component of distributing access is implementation of new wayfinding and signage within the station to direct passengers to nearby destinations.

- **Station Area Map**
  A station area map would highlight pedestrian and bicycle facilities within the vicinity of the station, and support wayfinding to attractions within the surrounding community.

- **Enhanced directional signage and placemaking**
  Implement signage beyond BART's standard wayfinding program that creates place within the station and in the surrounding community. Examples are shown in **Figure 19**.

Figure 19: Directional Signage at Fruitvale Village

Source: Eric Fredericks, 2006. Some rights reserved.
https://flic.kr/p/5P5fsF

Source: The Atlantic City Lab, 2012.
http://www.citylab.com/design/2012/01/surprisingly-complex-art-wayfinding/1088/

- **Improved east-side station access**
  The existing underground passage providing access to the station from the east would be made fully accessible and more attractive. If the UP ROW is acquired for trail use, a ground-level east-side entrance would represent a dramatic improvement for access and circulation.

- **Explore potential for High Line Connection**
  The provision of a High Line connection to the east side of the station (in addition to improved west side connection) is included as part of future TOD plans.

- **Upgraded San Leandro Street frontage**
  Unnecessary elements would be removed from the sidewalk area along San Leandro Street and bus shelters would be relocated to ensure a clear walking path and provide a better environment for BART to bus transfers.

- **Relocate concession stand on concourse level**
  The current location of the concession stand hinders circulation within the station area. Relocating the stand would improve sightlines and increase concourse capacity.

- **Provision of additional bicycle rack and/or bicycle lockers**
  Existing bicycle rack usage would be monitored to determine the need for additional bicycle facilities, which could potentially be located in the pedestrian underpass or at the south end of the concourse outside of the station. Bicycle racks can feature creative designs to increase sense of place, as shown in **Figure 20**.

Figure 20: Bicycle Rack Designs that Create Place

Source: Lynn Gardner, 2011. Some Rights Reserved.
https://flic.kr/p/9ertdG

Source: Don O'Brien, 2012. Some Rights Reserved.
https://flic.kr/p/czyve5

2.3.5 Sustainability

BART seeks to incorporate sustainable materials and technologies into station improvements to conserve natural resources, increase the life-cycle value of station infrastructure, and protect the reliability of the public's investment in BART. The *2008 BART Strategic Plan* highlights sustainability as a core value and focuses on techniques and business practices that improve operations and enhance quality of life for Bay Area residents. The Plan identifies the following sustainability improvements:

- **Water efficiency**
  All fixtures throughout the station would be upgraded to be water-efficient. Replacement of conventional plumbing fixtures with modern, low-flow designs could achieve water savings of up to 60 percent.

- **Energy-efficient lighting**
  Substantial energy savings would be achieved by replacing existing lighting with LED fixtures, light timers, and daylight sensors.

- **Energy-efficient vertical circulation**
  Escalators designed to operate at 20 percent speed in "sleep mode" would save energy during off-peak hours. Escalator motors could be equipped with regenerative power systems to reduce heat dissipation and feed electricity back into the station's power system for other uses.

- **New recycling and trash receptacles**
  Existing trash receptacles would be replaced with a uniform, space-efficient design that considers security precautions and maintenance needs. New recycling receptacles would be installed as part of BART's pilot initiative to integrate recycling within the stations.

- **"Green" station finishes**
  Materials and site furnishings made from recycled products would be installed as appropriate to achieve BART's sustainability goals.

2.3.6 Placemaking, Aesthetics, Amenities

Preparation of the Plan has coincided with the emerging Coliseum City development plans, which BART can leverage to dramatically improve the sense of place at the station. In the near term, opportunities have been identified to improve overall appearance, upgrade station amenities, and include features to establish place. Specific improvements include:

- **Formalized walls**
  Informal fencing encloses portions of the concourse perimeter, creating void spaces that collect trash and give the station an unattractive, unfinished appearance. Formalized walls would dignify these areas and offer an opportunity to incorporate art.

- **New public art**
  Art is incorporated into the glass walls of the new Coliseum Station platform for the OAK Shuttle. New complementary works of art could be installed in the spaces of the original station to activate the station, enhance wayfinding, and reflect the community.

- **More clearly defined entrances**
  The station lacks a prominent entrance along San Leandro Street. In conjunction with proposed reconfigurations, the entrance could be more clearly defined and echo other station components, such as the platform canopies.

- **Urban design that forges connections between the station and its surroundings**
  Pedestrian connections between Coliseum Station and its surroundings are challenged by grade changes, street and railroad infrastructure, and the lack of a sense of place, which could be addressed by thoughtful urban design.

3.0 Conceptual Scenarios

3.1 Context for Conceptual Scenarios

The Coliseum City development plans would radically change the character and activity in the greater Coliseum Complex area. As introduced in **Section 1.3**, the 800-acre development site may include 2.5 million square feet of non-residential development, 4,000 housing units, 875 hotel rooms, as well as a 131,000-seat multipurpose event center (at three venues). Without regional transit service, development of this entirely new urban district would introduce unsustainable levels of auto traffic on I-880 and East Oakland streets and inordinate quantities of parking at the Coliseum City site.

BART is thus an essential component to the success of Coliseum City, and the development would cause ridership at Coliseum Station to effectively double (including overall background growth, as presented in **Table 3**). Proposed new stadiums would not be directly adjacent to the station, but rather west of the UP Niles Subdivision railroad tracks and extending as far as the other side of I-880. Currently, access to the Coliseum Complex (also west of the UP Niles Subdivision) depends on an elevated pedestrian walkway that is considered unattractive and inadequate for event crowds.

The Coliseum City developers have introduced the concept of a pedestrian spine that would be located nearer to the south end of the station. This facility would also be elevated above street level, but would be higher (above the BART guideway) and wider. It would extend through the core of Coliseum City, touching down on the west side of I-880. This prominent axis, dubbed “the High Line” at this planning stage, would improve the pedestrian experience and maximize the number of BART riders willing to walk between the BART station and locations in Coliseum City.

The interface of the High Line with Coliseum Station must act as a Transit Hub and is crucial to the success of Coliseum City as well as to meeting the goals and objectives expressed in the Plan. Therefore, BART considered some urban design approaches to developing an active hub. As a starting point for considering the design of the Transit Hub, attractive urban spaces where pedestrians undergo a significant change in levels (given the three-story grade change from the High Line to ground level) were considered, as shown in **Figure 21**. These successful examples in San Francisco and Seattle show the potential for pedestrian connections to become memorable destinations in their own right.

Transit Hub sketches were developed, building on the Coliseum City Master Plan, to brainstorm potential connectivity between Coliseum City and Coliseum Station, exploring several possible scenarios. As shown by the **Figure 21** examples, the sketches identified ways for pedestrians to move from the High Line to the street – both for purposes of street activation as well as distributing passengers to the ground floor entrance. Pedestrians that encounter queuing at the High Line fare gates also have intuitive access to the concourse at street level. Attractive spaces at the High Line, ground level and between would comfortably “hold” surges of crowds following an event.

Figure 21: Urban Public Spaces with Significant Grade Change

Figure 22 through **Figure 24** illustrate one concept for the Transit Hub that would connect the High Line at the center of the station for better distribution, rather than at the south end where the circulation to the OAK Shuttle is accommodated (as included in the Master Plan). This Transit Hub concept is integrated into and activated by TOD, and provides direct access to Capitol Corridor.

As shown in **Figure 22**, pedestrians from the High Line would proceed directly from Coliseum City (bottom of figure) to BART fare gates, entering a new paid area at High Line level (blue) to access both the existing Platform 1 & 2 and new west side platform, as well as Platform 3 ("OAK").

This concept also would gradually transition pedestrians to Platform 1 & 2 level as illustrated in **Figure 23**. Fare gates at the far end would provide access to the new side platform only, and an opening in the circulation space would provide a "window" to the ground level and accommodate escalators.

At ground level, shown in **Figure 24**, pedestrians would find generous circulation spaces along San Leandro Street, allowing access to buses and crosswalks to reach a newly-configured street-level station entrance. The concept envisions that the UP ROW would be converted to a regional trail, allowing a free-area pass-through to the east side of the station.

This concept and the other Transit Hub sketches were initial brainstorming exercises and not all elements were carried forward in the Station Modernization Concept.

Figure 22: Transit Hub Concept – Upper Concourse Center Connection

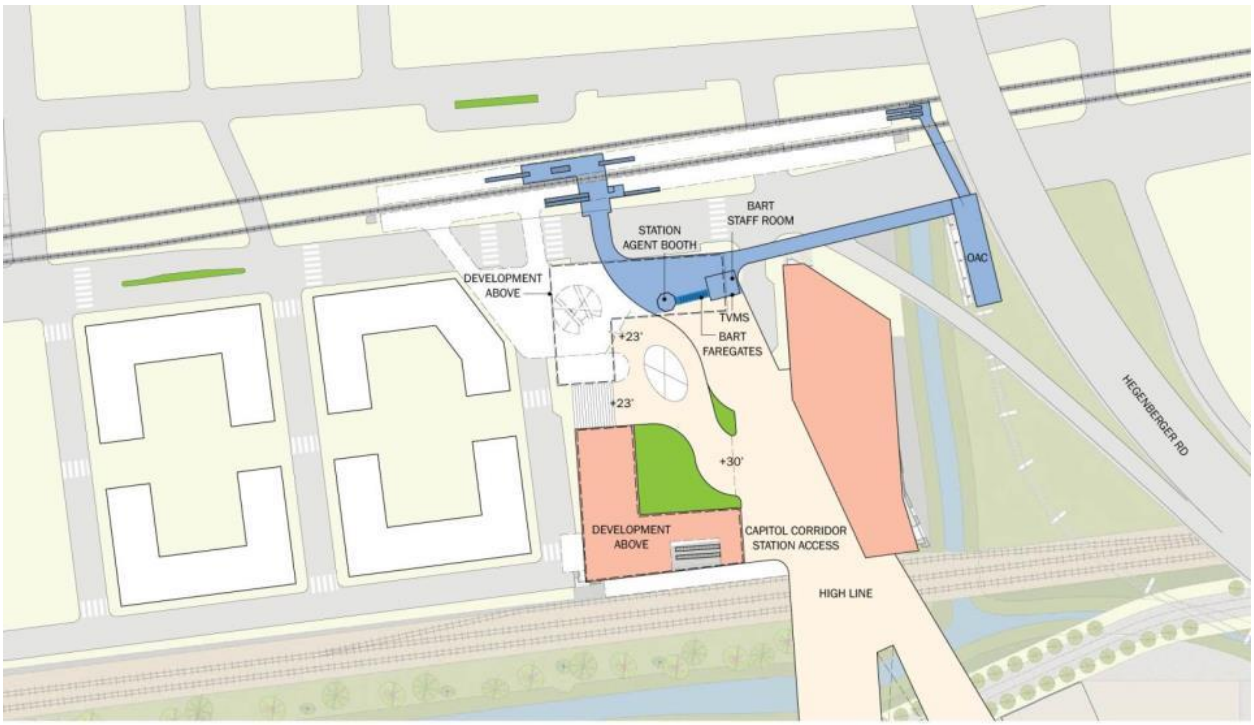


Figure 23: Transit Hub Concept – Platform Center Connection

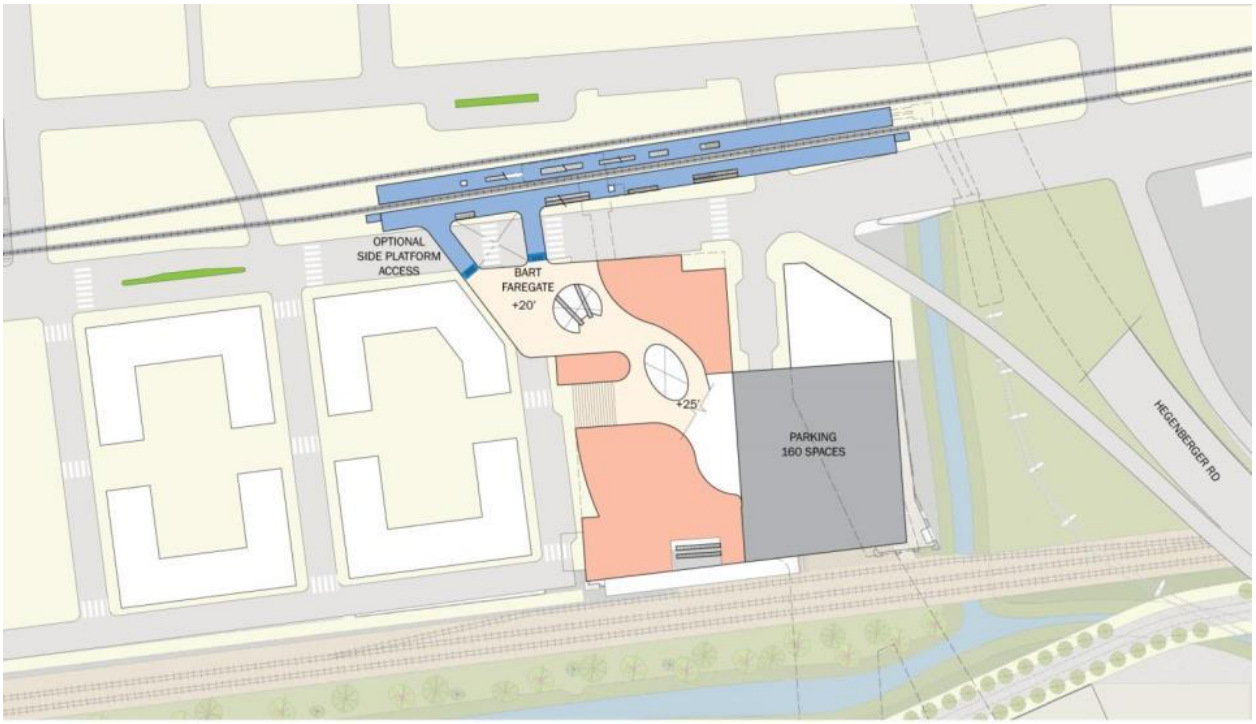
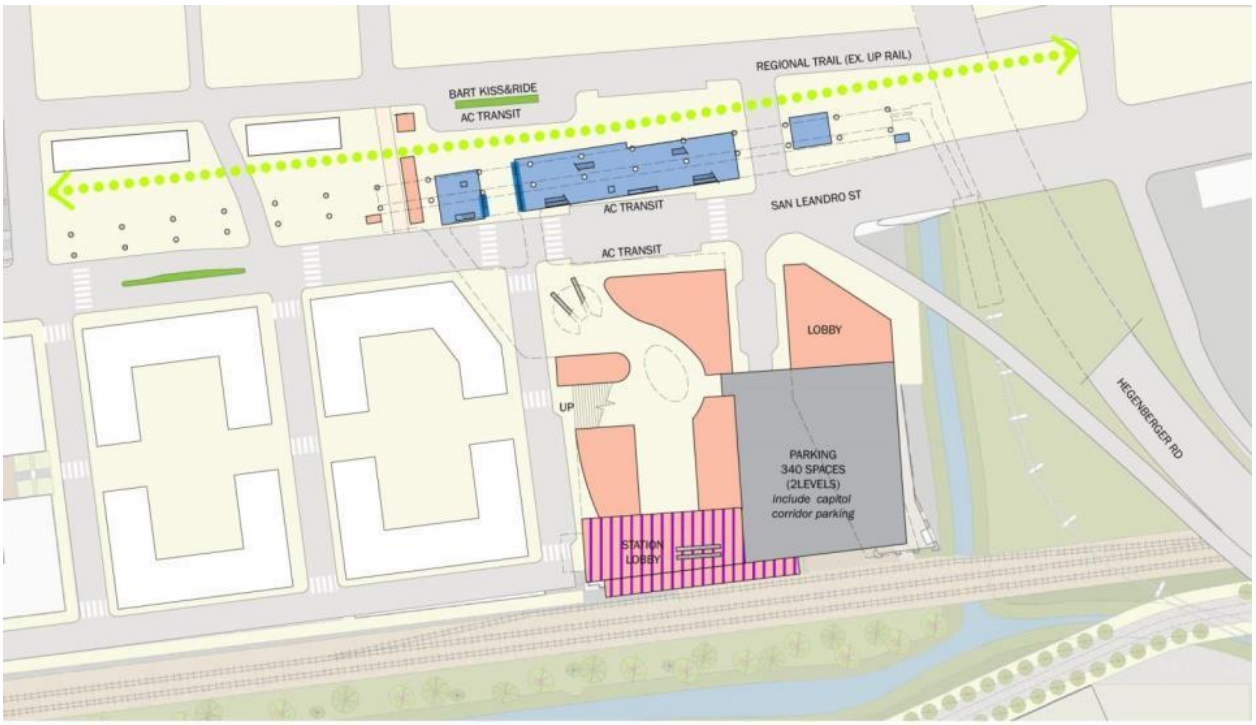


Figure 24: Transit Hub Concept – Ground Level Center Connection

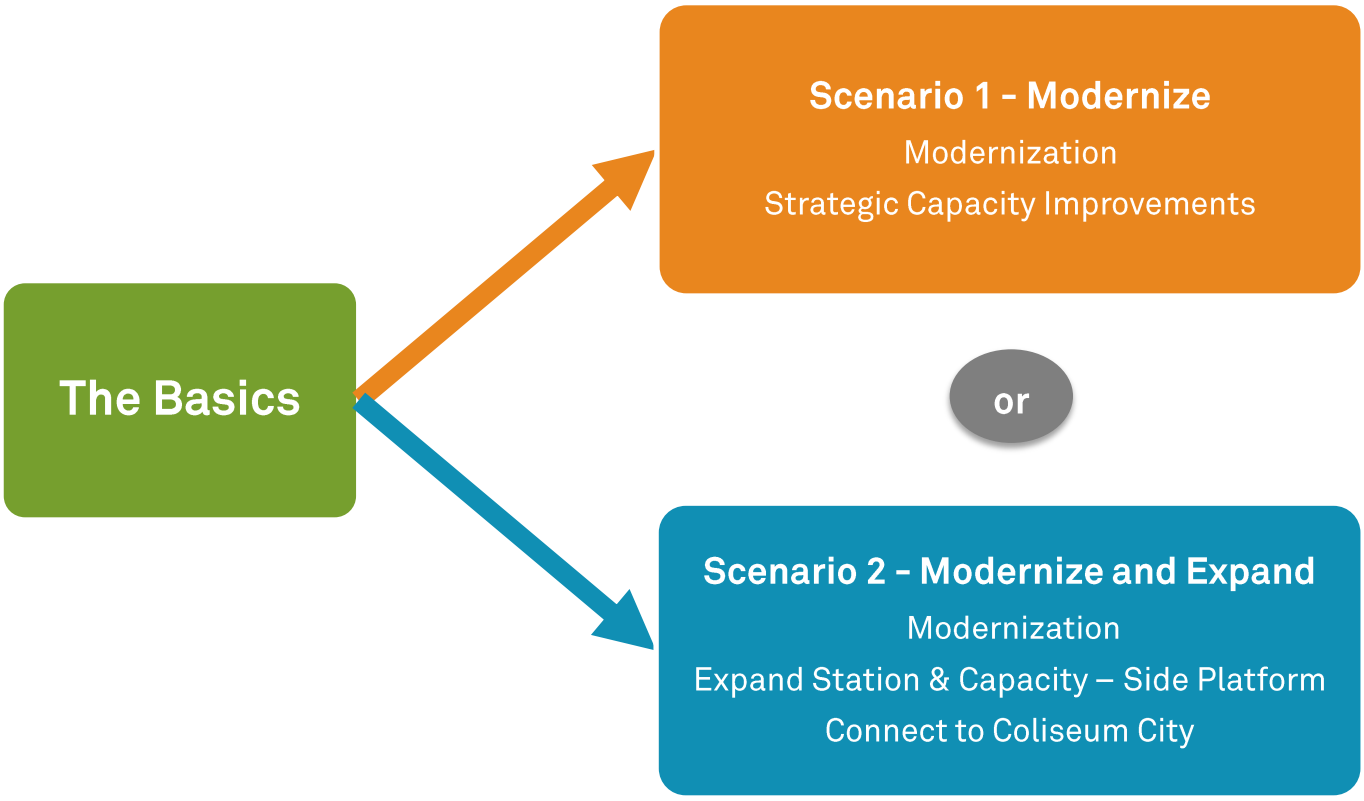


3.2 Framework for Station Modernization Scenarios

The Plan considers three station modernization scenarios. This framework allows BART to respond to development and financing realities, and allows more flexibility in making tradeoffs. The Plan identifies a baseline set of projects, packaged as "the Basics" that could either be implemented in the short term, or be packaged with Scenario 1 – "Modernize", or Scenario 2 – "Modernize and Expand".

- **The Basics** address short-term projects needed to modernize the station, regardless of which future scenario is pursued.
- **Scenario 1 – Modernize** includes a comprehensive package of improvements BART may consider if the Coliseum City Master Plan is not realized as currently envisioned, but events continue at Oakland Coliseum and/or Oracle Arena, or if funding/financing needs for Scenario 2 are not met.
- **Scenario 2 – Modernize and Expand** considers a package of improvements if the Coliseum City development comes to fruition and full funding is available. Key features include a new side platform, expanded concourse, and "High Line" connection.

Figure 25: Framework for Station Modernization Scenarios



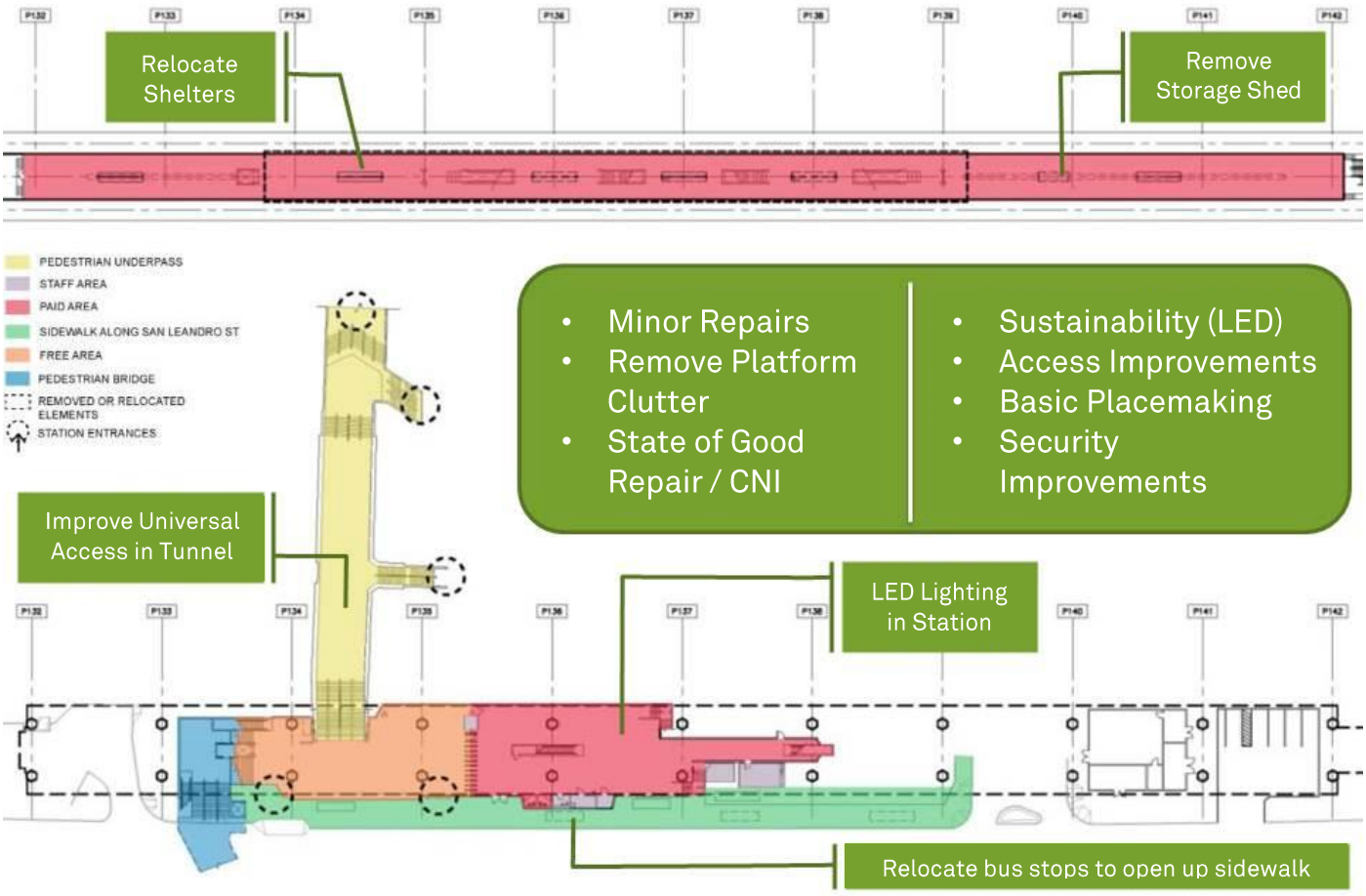
3.3 Basic Improvements

The Basics is a baseline set of improvements that could be implemented in the short term or together with either of the more complete modernization Scenarios 1 or 2. All of the basic improvements are consistent with both scenarios, and are included in both scenarios. The Basics include:

- Improvements to the station interior, state of good repair, and signage upgrades;
- Decluttering of the station, particularly on the platform;
- Basic placemaking at entrances and relocating bus shelters to open up the sidewalk along the west side of the station; and
- Improvement of universal access in the underground passage connecting to the east of the station.

Figure 26 provides an overview of the basic improvements and where they would be implemented in the station.

Figure 26: Basic Improvements



For the Basics, **Table 6** summarizes the key elements in each conceptual plan topic area and the rough order of magnitude cost to implement the package of improvements in each topic area. All of the elements sum to $13 million, with the most expensive elements being the new platform canopy and the new closed-circuit television and access control. As design proceeds beyond the conceptual stage, the numbers will be refined.

Table 6: The Basics – Cost Estimates

Description	Key Elements	Rough Order of Magnitude Cost
State of Good Repair	Train control antennae, urine shields, new trash cans, trash enclosure	$1 million
Circulation & Capacity	Relocate seating shelters and storage shed, add signage, new canopy between existing and OAK Shuttle circulation	$3 million
Safety & Security	Closed-circuit television, access control, fare evasion improvements	$3 million
Facility Upgrades	Pigeon mitigation, glass panels, storage, drainage, remove MyTransitPlus booth	$1 million
Sustainability	LED lighting plan, escalator energy savers, water efficient fixtures, landscaping	$2 million
Access Improvements	Relocate bus shelters, ADA improvements, sidewalk improvements	$1 million
Placemaking, Aesthetics, Amenities	Entrances, art, wayfinding, wall treatments	$1 million
Total		**$13 million**

Source: AECOM, 2014.

Notes:
These rough order of magnitude cost estimates were developed by utilizing conceptual estimating methods. This entails the development of conceptualized quantities based on the information provided in design concept drawings. In addition, historical pricing and lump sum cost assumptions were considered to estimate an approximation of costs for the scope of work provided.

Unit prices used in the estimates are for the most part current and represent cost for materials, labor, equipment, subcontract, general conditions, indirect, and contractor's overhead and profit. Also, soft costs allowances were applied to cover project administration, design engineering, construction management, insurance, legal fees, permits and other project fees.

Table 7 provides a comprehensive list of the basic improvements, including those that are part of the systemwide efforts and do not have station-specific cost estimates (Items 1.05-1.12 and 3.09).

Table 7: Rough Order of Magnitude Estimates – Basic Scenario

Improvement		Conceptual Cost
1.00 State of Good Repair – Building and Systems Upgrade		
1.01	Station platform train control antennae	$168,000
1.02	Install urine shields on elevator return panels	$19,200
1.03	Install "big belly" trash cans; locate to avoid obstructing sightlines, elevator access, and/or walkways	$50,000
1.04	New trash enclosure	$480,000
1.05	Station uninterruptible power supply for train control system (in separate contract)	*
1.06	Phase 2 MS4 Compliance – EPA storm water permit requirements	*
1.07	Station fire alarm replacement	*
1.08	Replace single board computer in fare gates/TVM/AFM	*
1.09	Station AFC network switch replacement	*
1.10	Coin handling unit obsolescence	*
1.11	Fare gate LED lights for direction lamp	*
1.12	Public address system replacement: informational and emergency announcements plus added features for disabled (including automated verbal announcements for blind and improved hearability for all patrons). Ensure system can be heard at north and south ends of platform, particularly during peak crowding hours.	*
Subtotal		*$712,000*
2.00 Circulation and Safety		
2.01	Improve elevator access and signage	$84,000
2.02	Demolish existing and rebuild the two platform windscreen/seating units at the top of each stairway at the north end of the platform and include canopy/shelter	$288,000
2.03	Remove platform storage cabinet and repurpose existing break room for storage, replacing existing sink with countertop and replacing floor	$240,000
2.04	Improve escalator signage: include improved restrictions signage and CA2 Braille	$60,000
2.05	Provide stainless steel railings/banisters to prevent blockages and improve queuing at stairway and escalator landings	$24,000
2.06	Remove SLPA structure at south end of platform and provide OAK Shuttle canopy connection with LED lighting	$2,783,520
Subtotal		*$3,479,520*
3.00 Facility Upgrades		
3.01	Upgrade closed-circuit television cameras and security throughout the station (including pedestrian bridge and tunnel), expand coverage to the north and south ends of the platform, implement access control (swipe cards rather than brass key), and including data storage	$3,300,000
3.02	Complete pigeon mitigation, including removal of baffles	$50,000
3.03	Install glass panels in place of pigeon netting around concourse between wall and roof	$960,000
3.04	New staff break room (underway, no additional cost)	$0
3.05	Relocate utility and electrical boxes out of relocated bus stop between the station entrances, and from the concourse wall on the south side of the pedestrian underpass	$60,000
3.06	Install three 4x6x18" storage cabinets (or equivalent space) on the Platform 3 level	$54,000
3.07	Address drain that floods the pedestrian underpass	$60,000
3.08	Remove MyTransitPlus booth and relocate triangular transit information stand in place	$4,800
3.09	Lock and alarm swing gates and emergency exits; enable station agent control	*
Subtotal		*$4,488,800*

Improvement		Conceptual Cost
4.00 Sustainability		
4.01	Improve lighting design: incorporate new lighting fixtures, including removal of existing lighting and replacement with new LED lighting	$1,200,000
4.02	a Upgrade all fixtures to be water efficient	$60,000
	b Landscaping	$240,000
4.03	Modify existing escalators: install energy savers	$48,000
Subtotal		*$1,548,000*
5.00 Access Improvements		
5.10	East Side of Station Connection (Pedestrian Underpass) Improvements: If UP ROW becomes available, implement at-grade crossing and gateway entrance; if UP remains, install universally accessible ramps at far east entrance	See Scenarios 1 and 2 for cost estimates (not included in Basics cost total)
5.20	West Side of Station Improvements: a Relocate/consolidate shelters to limit entrance/exit obstructions, in coordination with AC Transit: ○ Build concrete pad in landscaping strip, move shelter off of sidewalk and on to pad ○ Move bus stop post over one shelter; remove shelter ○ Leave shelter in place, move bus stop post, add seating against station wall under shelter as part of entrance redesign ○ Move shelter to north side of main station entrance; remove pay phones and consolidate/relocate newspaper racks to accommodate relocated shelter ○ Reassign bus stop locations to improve operational efficiencies (reduce passenger loading/unloading time) – prioritize routes with high ridership, short headways, and magnitude of BART transfers b Widen sidewalk between OAK Shuttle structure and station agents' parking lot and standardize access driveway	$100,000 $960,000
5.40	ADA Improvements a Install cane detector where emergency telephone boxes, utility boxes, water fountains, fire alarms, stairwells, etc. protrude from walls b Bring all Braille signage into CA2 compliance c Replace non-compliant ADA signage with code-compliant signage and place at appropriate heights	$96,000 $84,000 $120,000
Subtotal		*$1,360,000*
6.00 Placemaking, Aesthetics, and Amenities		
6.01	Define entrances/exits, particularly main San Leandro Street entrance, with art and/or other gateway features	$120,000
6.02	Incorporate art and/or sports-related elements into station	$240,000
6.03	Address materials on walls, ceilings, floors, and railings	$60,000
6.04	Implement Wayfinding Improvement Project: design, fabricate and install illuminated wayfinding signs, transit information displays, station identification pylons, kiosks, and real-time displays	$305,072
6.05	Wayfinding Improvement Project Plus: provide additional wayfinding and destination signs in beyond the Phase 3 scope (ensure sufficient platform identification signage at stairways and escalators, and provide directional information for AC Transit, shuttle patrons and customers with bicycles)	$240,000
6.06	Replace wooden benches in central windscreen/seating unit that remains in place	$36,000
Subtotal		*$1,001,072*
Total		**$12,594,592**

Source: AECOM, 2014.
Note: *Denotes items that are part of systemwide efforts and do not have station-specific cost estimates.

3.4 Scenario 1 – Modernize

3.4.1 Overview

Scenario 1 – Modernize includes a comprehensive package of improvements BART may consider if the Coliseum City Master Plan is not realized as currently envisioned, but large events continue to occur in the area (at Oakland Coliseum, Oracle Arena, and/or a new facility). Key elements in Scenario 1 include:

- **Platform screen doors** to address safety issues associated with platform crowding following events, as described in **Section 2.3**. Platform screen doors have recently been implemented in the BART system on Platform 3 of Coliseum Station and at Oakland International Airport Station. Platform screen doors could be installed on Platform 1 & 2 of Coliseum Station as a pilot project to assess their feasibility at other stations served by standard BART trains.

- A **full platform canopy** that would encourage customers to spread out along the platform. In inclement weather, customers avoid the exposed outer ends of the platform, contributing to crowding in the center of the platform.

- **New staff areas/amenities** at concourse level to provide BART employees a more comfortable and functional workplace.

- A **north end paid area** would allow additional vertical circulation to be introduced at the north end of the platform, and enclose the platform elevator within a paid area, eliminating a perennial fare evasion problem.

- An **improved elevated pedestrian walkway** with a more aesthetic treatment than the existing chain link, real-time passenger information, and reconfigured access to the ground level concourse that better manages crowds.

- **Additional vertical circulation**: a **new elevator** within the existing paid area to expand vertical circulation capacity, especially to serve OAK Shuttle customers; a **relocated stairway** at the south end of an expanded concourse; and a **new stairway** connecting the new north end paid area with the platform.

- **Improved east-side station access if available:** If the UP ROW were acquired for trail use, a ground-level east-side entrance would represent a dramatic improvement for access between the station and the neighborhood to the east, as well as the parking lot.

Figure 27 provides an aerial view of Scenario 1, showing platform screen doors, new station walls and entrance, a full-length platform canopy, an improved pedestrian walkway and new stairway at the north end of the platform.

Figure 27: Scenario 1 Vision Rendering – Aerial View

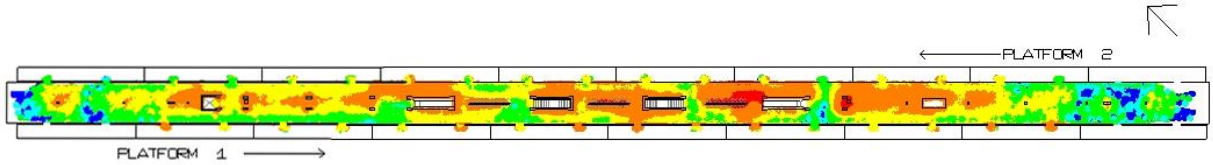
3.4.2 Capacity and Circulation

Working within the constraints of the existing platform, Scenario 1 changes the distribution of passengers on the platform to address areas of crowding as well as safety concerns during the post-game peak.

As introduced in **Section 1.5.2**, pedestrian flow modeling showed LOS E, an average of 5-10 square feet per person, over the peak 15 minutes following an event throughout the central core of vertical circulation elements. The most extreme crowding, LOS F (less than 5 square feet per person), is evident around the up escalator.

The density map shows that the north and south ends of the platform, where there is no concourse to platform vertical circulation or canopy cover, are underutilized even in the weekend post-event scenario, when the station sees its most intense use.

Figure 28: Weekend Post-Event Peak 15-Minute Density Map – Platform Level

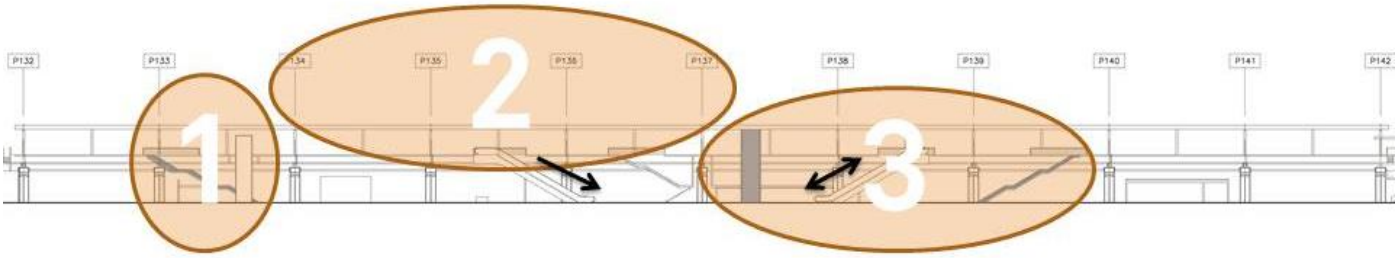


LOS	A	B	C	D	E	F
sq ft / person	> 35	> 25 and ≤ 35	> 15 and ≤ 25	> 10 and ≤ 15	> 5 and ≤ 10	< 5

As shown in **Figure 29**, three complementary improvements address circulation and relieve key points of crowding, drawing customers to the platform ends and distributing them more evenly along the platform. The elements are discrete, allowing implementation to occur separately or in combination:

1. North end paid area with new stairway
2. Extended canopy and platform screen doors
3. Additional elevator and relocated stairway

Figure 29: Scenario 1 Capacity/Circulation Phasing



In developing Scenario 1, both the distribution and capacity of vertical circulation were considered. However, given that Scenario 1 assumes the constraint of the existing platform (i.e., no new side platform), it is considered that additional vertical circulation should still perform a "metering function". Vertical circulation should not deliver customers to a crowded platform faster than the arrival of trains clears customers from the platform.

Given different train loads, the number of minutes required for a pair of vertical circulation elements to "process" a full train load was calculated, based on observed flow rates. These results are presented in **Table 8**, reflecting preliminary analysis at a conceptual design level. More detailed analysis would be required to ensure that fire/life safety requirements are met as the design proceeds beyond this planning stage.

Table 8: Conceptual Vertical Circulation Processing Times – Scenario 1

Train loading	Passengers per car (10-car train)	Minutes to Process Full Train Load by Pairs of Vertical Circulation	
		1 pair	2 pairs
500	50	4.2	2.1
1,000	100	8.0	4.2
2,000	200	17.0	8.0

Source: AECOM, 2014.

This analysis finds that takes about 17 minutes for the 2,000 passengers to fill a 10-car train at crush load (200 passengers per car) to reach the platform level given the single pair of vertical circulation elements available in existing conditions. This amount of delay is considered unacceptable and is reflected by excessive queuing on the concourse level at stairways and escalators in post-event conditions.

By providing an additional pair of vertical circulation elements in Scenario 1 (new north end stairway and additional elevator), the time to process post-event crowds (corresponding to crush load trains) is reduced to 8 minutes, which more closely aligns with post-event headways. While this would not completely eliminate post-event vertical circulation queuing, it strikes a balance between providing too little vertical circulation and too much. Additional vertical circulation elements would further decrease platform capacity, expanding the areas of LOS F crowding shown in **Figure 28** to a greater area of the platform.

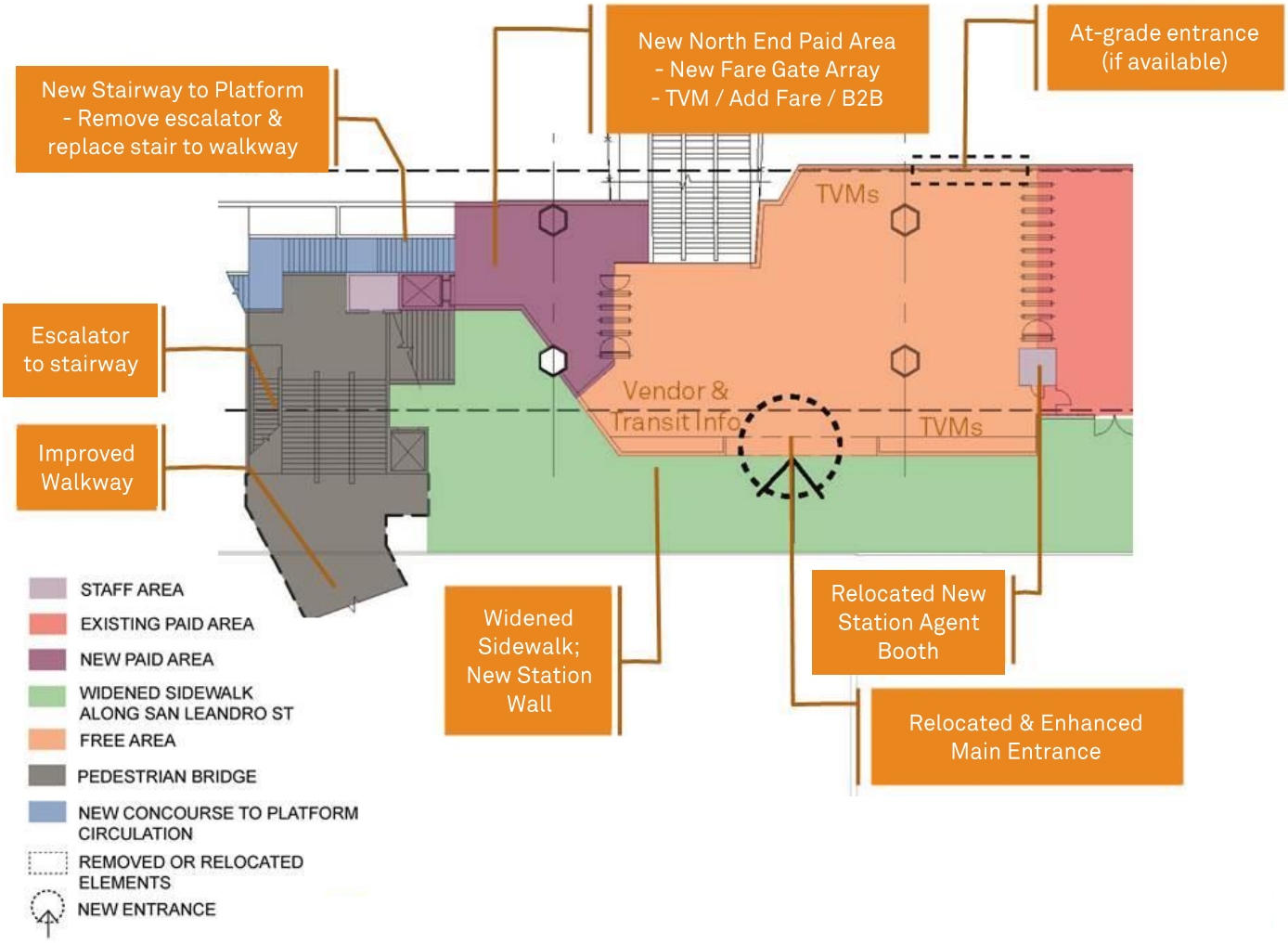
3.4.3 Planned Improvements

Figure 30 through **Figure 32** provide an overview of Scenario 1 improvements at the concourse level and where they would be implemented.

At the north end of the concourse, shown in **Figure 30**, the path for eventgoers to and from the elevated pedestrian walkway (gray) would be fundamentally changed. Post-event, rather than entering directly into the north end of the concourse, attendees would reach ground level at a widened sidewalk area along San Leandro Street (green), and enter the station at a relocated and enhanced entrance. Bollards that can accommodate temporary barrier elements along the sidewalk edge would channel crowds on event days.

This reconfiguration allows the north end of the concourse, where the elevated pedestrian walkway is accessed today, to be enclosed as a new paid area (purple), securing the platform elevator, and allowing a new stairway to the platform level to be implemented (blue). This new stairway would replace the existing single aisle stairway and escalator to the walkway at this location.

Figure 30: Scenario 1 Improvements – North End of Concourse



Improvements to the south end of the concourse, shown in **Figure 31**, would include a new elevator (blue), located roughly where the west stairway currently lands on the platform. This stairway would be removed and relocated (blue) to the south end of the expanded concourse (dark purple shows additional circulation area). Customers would thus have direct access to the underutilized platform end, avoiding the crowded areas in the middle of the platform. Note that if this improvement were implemented without the north end paid area, the north end elevator outside of the paid area could be decommissioned.

The up escalator (far end of red area, showing extent of existing concourse) would be variable in direction, running down in the post-event condition. This would meter pedestrian flow to the platform, which would be directed to the stairways or the new elevator.

The overall increase in concourse area allows new staff areas and amenities to be comfortably accommodated (light purple), yet still maintain convenient station agent parking, which would be formalized directly south of the expanded concourse.

Figure 31: Scenario 1 Improvements – South End of Concourse

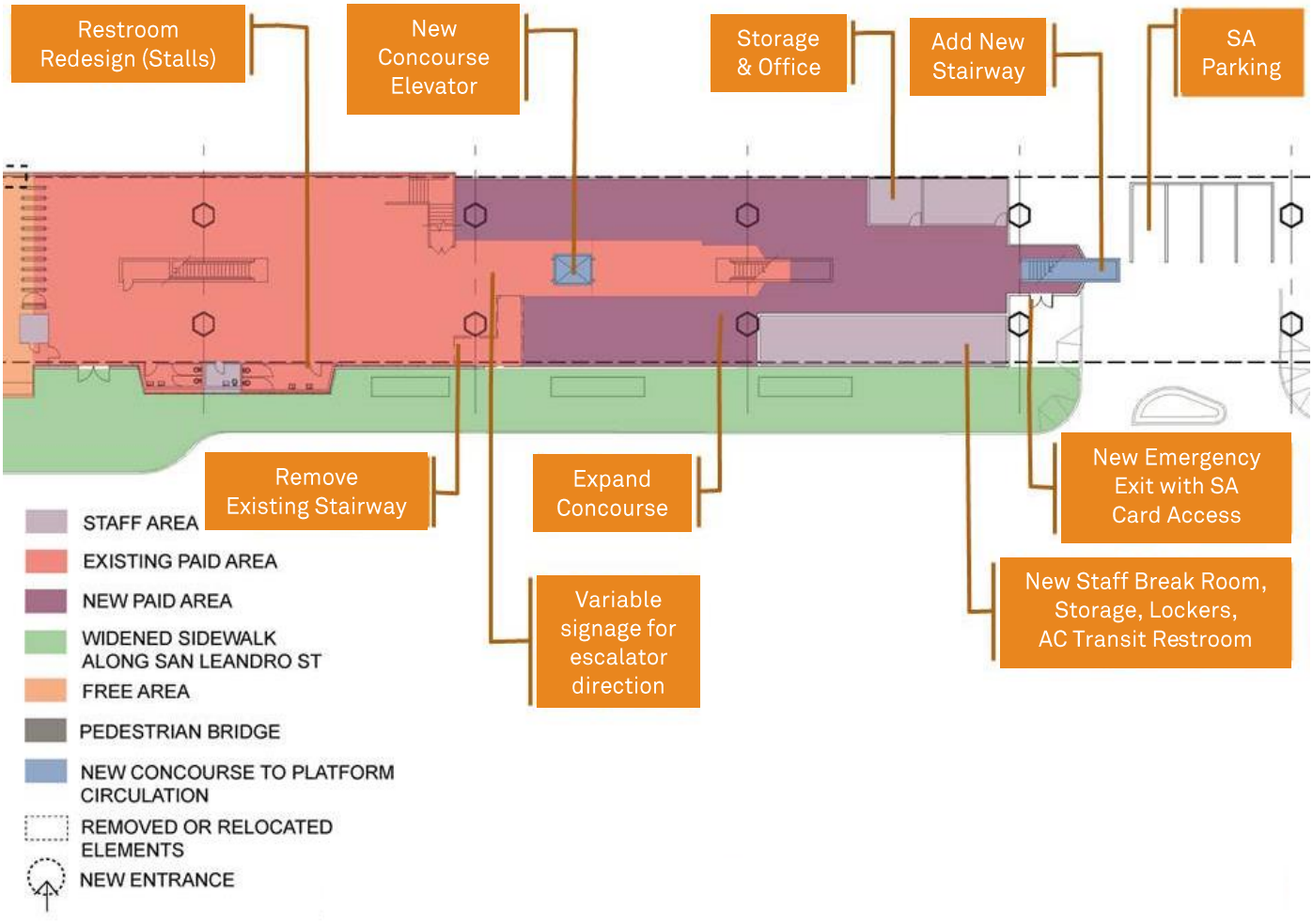


Figure 32 shows a vision rendering of the concourse level with Scenario 1 implemented. In this view, a new station agent booth is shown, located with a clear view of the new north end paid area. The new elevator and relocated stair are also shown within a more spacious paid area. Changeable signage would point the way to the up escalator during normal operations, and clearly direct post-event crowds to the stairways or elevator when the direction of that escalator is reversed.

Figure 32: Scenario 1 Vision Rendering – Concourse View

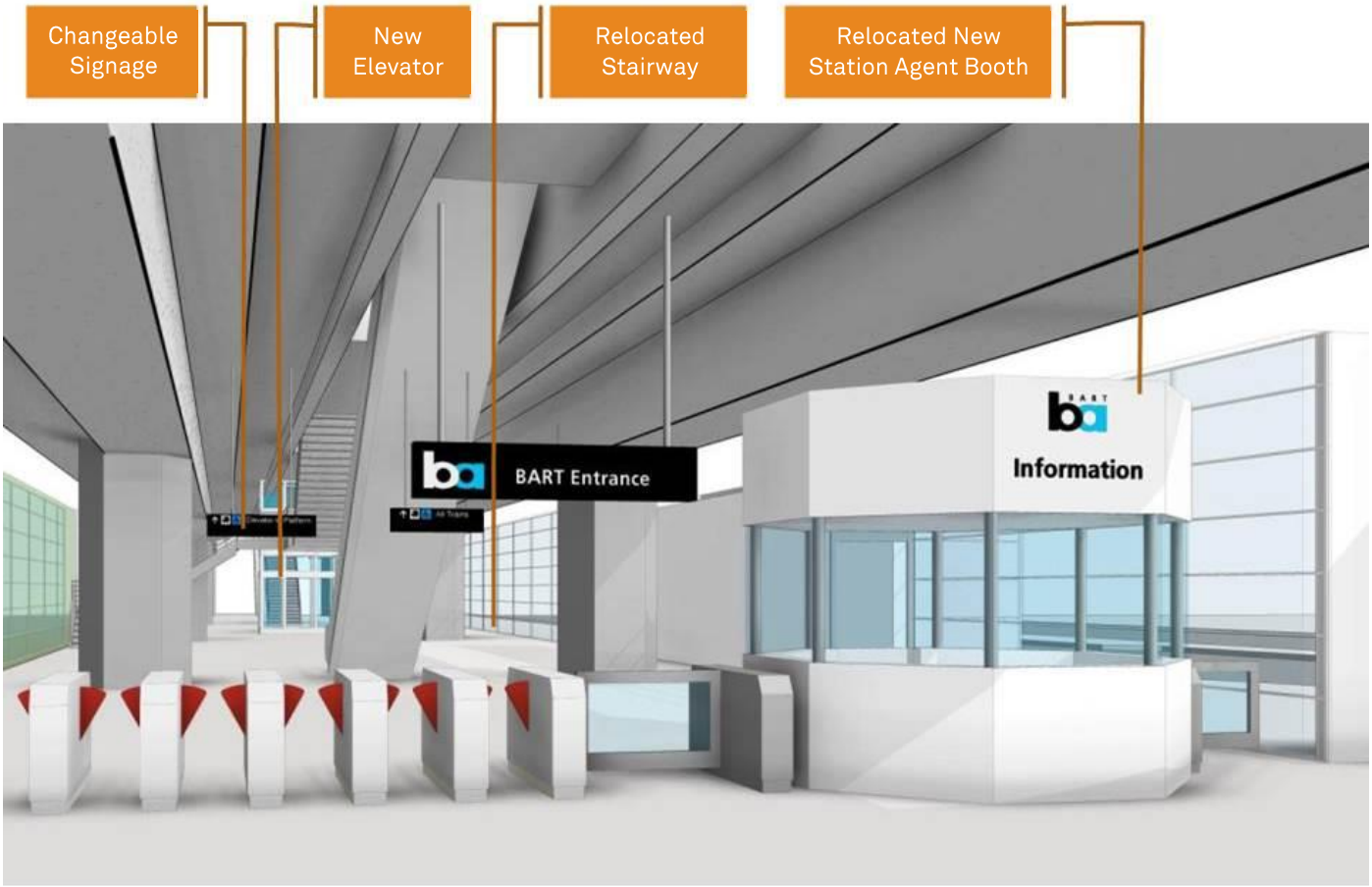


Figure 33 presents an improved platform level with a full platform canopy and platform screen doors, and shows the redistributed access at the platform level (blue) – a new north end stairway, removed stairway to accommodate a new elevator, and a new south end stairway.

Figure 33: Scenario 1 Improvements – Platform

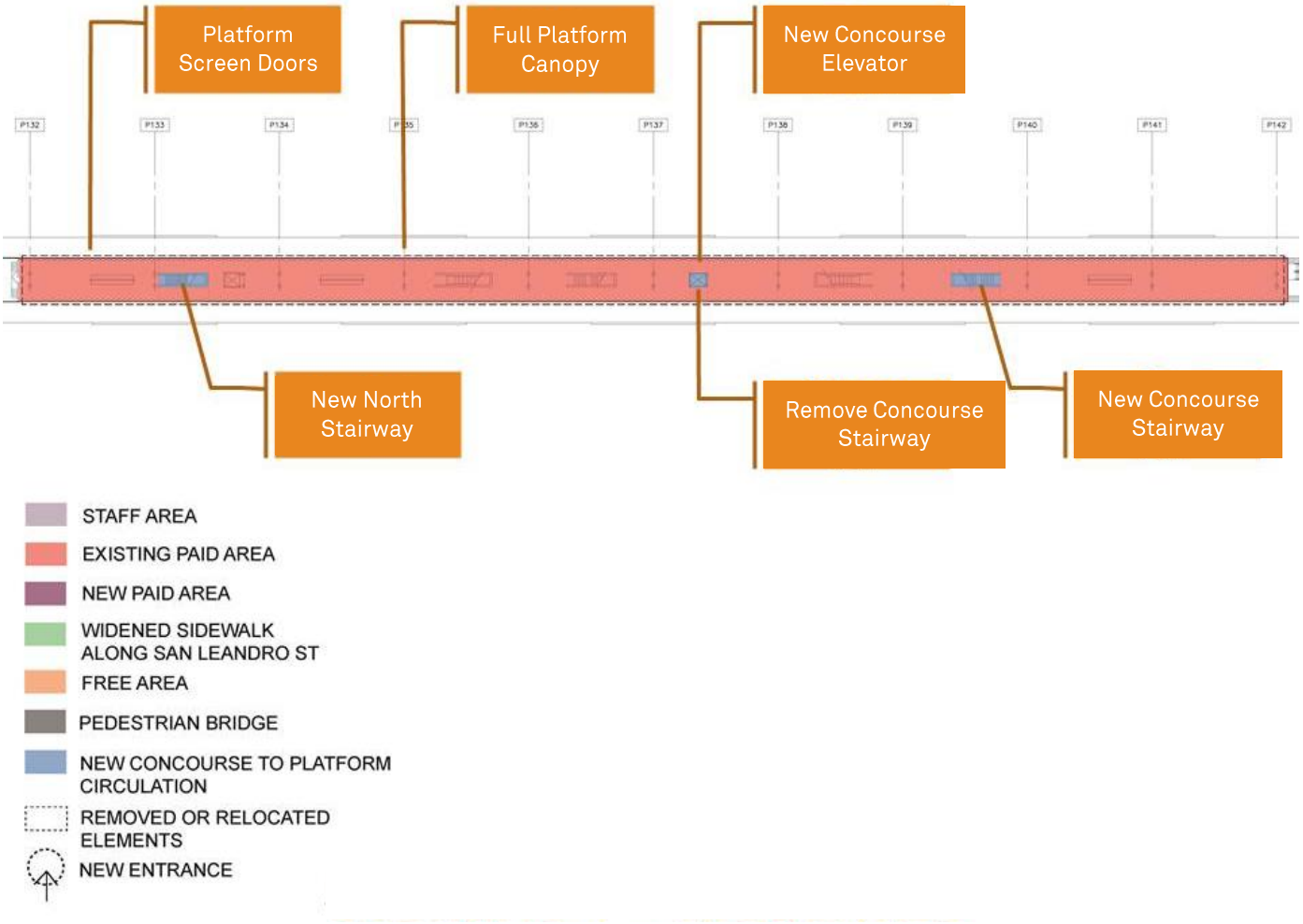
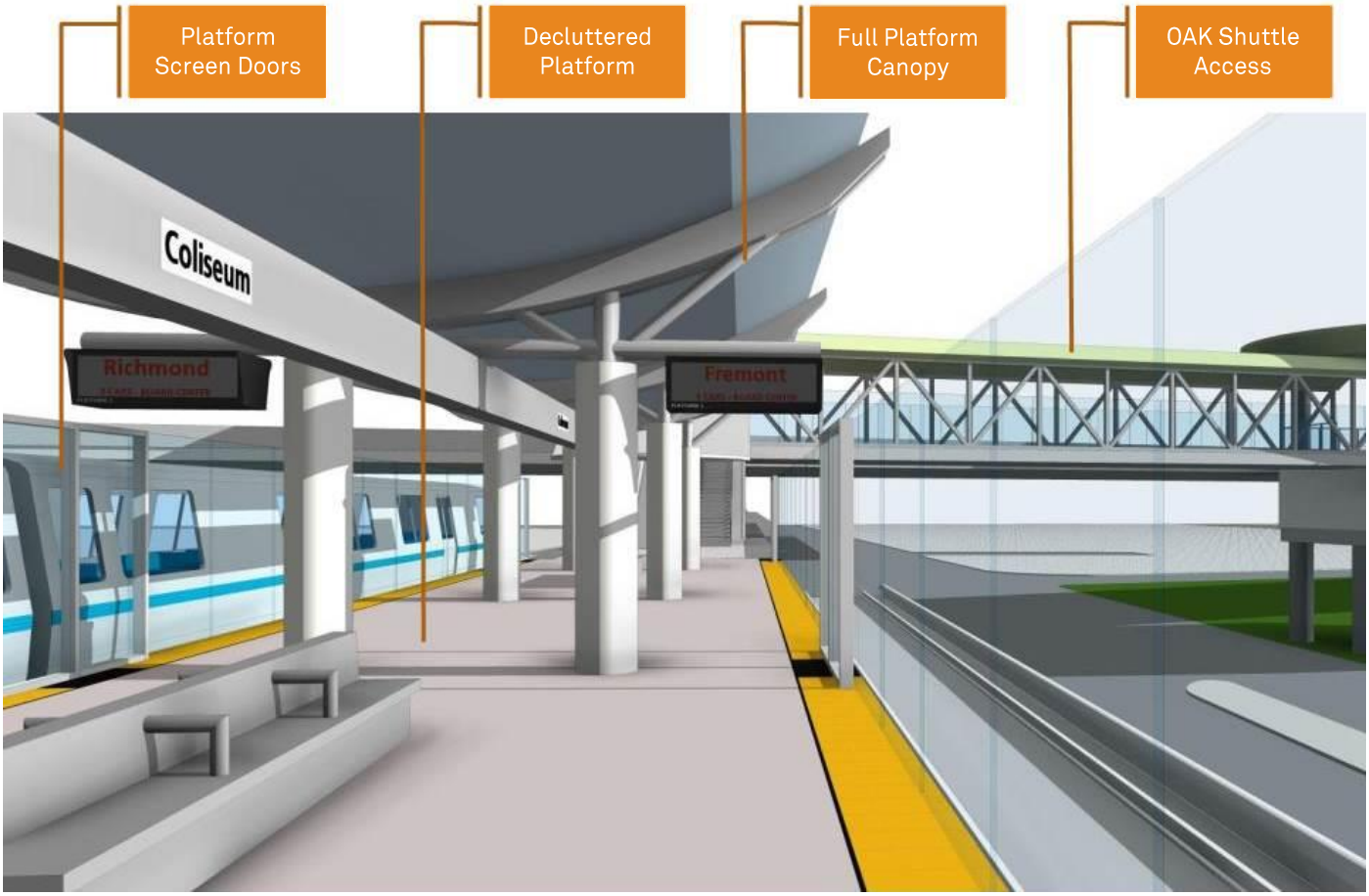


Figure 34 shows a vision rendering of the platform level with Scenario 1 implemented. In this view, windscreens and other elements have been removed to declutter the platform, screen doors provide safety and capacity benefits, and a canopy extends all the way to the OAK Shuttle access (Platform 3).

Figure 34: Scenario 1 Vision Rendering – Platform View



For Scenario 1, **Table 9** summarizes the key elements in each conceptual plan topic area and the rough order of magnitude cost to implement the package of improvements in each topic area. All of the elements sum to $42 million, with the most expensive elements being the full platform canopy and platform screen doors. As design proceeds beyond the conceptual stage, the numbers will be refined.

Table 10 provides a comprehensive list of the Scenario 1 improvements.

Table 9: Scenario 1 – Cost Estimates

Description	Key Elements	Rough Order of Magnitude Cost
Circulation and Capacity		
Platform Canopy	Full platform canopy with LED lighting, PA (building on Basics)	$17 million
Platform screen doors	Platform screen doors	$8 million
North end paid area	Add new platform / concourse stair, add fare gates	$5 million
Add elevator and relocate staircase	Add elevator, relocate stair, expand paid area	$4 million
Implement at-grade crossing (if available)	New station entrance, demolish existing underpass	$4 million
Subtotal		*$37 million*
Facility Upgrades	New emergency exit, new station agent booth, TVMs, restrooms, staff facilities	$3 million
Placemaking, Aesthetics, Access and Amentias	Pedestrian bridge improvements, relocated concession stand, main entry, bicycle improvements	$2 million
Total		**$42 million**

Source: AECOM, 2014.

Notes:
These rough order of magnitude cost estimates were developed by utilizing conceptual estimating methods. This entails the development of conceptualized quantities based on the information provided in design concept drawings. In addition, historical pricing and lump sum cost assumptions were considered to estimate an approximation of costs for the scope of work provided.

Unit prices used in the estimates are for the most part current and represent cost for materials, labor, equipment, subcontract, general conditions, indirect, and contractor's overhead and profit. Also, soft costs allowances were applied to cover project administration, design engineering, construction management, insurance, legal fees, permits and other project fees.

Table 10: Rough Order of Magnitude Estimates – Scenario 1

Improvement			Conceptual Cost
1.00 Circulation and Safety			
1.01		Pilot platform screen doors, including train control improvements	$8,100,000
1.02		Expand existing paid area, add changeable signage to indicate escalator directions, and provide architectural enhancements to interior wall	$2,400,000
1.03		Add new elevator	$1,320,000
1.04		Remove existing stair	$360,000
1.05		Add new stair	$720,000
1.06		Install new fare gates and create new paid area at north end of concourse	$960,000
1.07		Add new north stair with landings	$900,000
1.08		Remove existing escalator	$300,000
1.09		Install Add Fare and Bus-to-BART machines in new north paid area	$250,000
1.10		Add barrier/bollards at sidewalk edge	$180,000
1.11		Replace escalator with stairway	$960,000
1.12		Implement at-grade entrance	$600,000
1.13		Demolish existing pedestrian underpass structure	$3,600,000
1.14		Provide canopy at north end of platform with LED lighting (Phase 2a) a Remove SLPA structures b New canopy structure	$2,783,520
1.15		Provide new center platform canopy with LED lighting (Phase 2b) a Remove existing canopy b New canopy structure c Electrical and lighting	$13,912,560
Subtotal			*$37,346,080*
2.00 Facility Upgrades			
2.01		Add emergency exit with card/code access for station agents	$72,000
2.02		Install new station agent booth in new location	$960,000
2.03		Relocate existing ticket vending machines	$480,000
2.04		Relocate existing transit information display	$60,000
2.05		Relocate storage room and wet utility	$33,600
2.06		Relocate staff break room	$180,000
2.07		Remodel existing restrooms and adjacent rooms to accommodate staff and public restrooms with stalls	$780,000
2.08		New attached locker/storage room	$180,000
2.09		New AC transit restroom	$156,000
2.10		BART Police office and storage room	$288,000
Subtotal			*3,189,600*
3.00 Placemaking, Aesthetics, Access and Amenities			
3.01		Pedestrian Bridge Improvements: real-time information displays and wayfinding, upgrade PA system, and improve aesthetics	$840,000
3.02		Relocate concession stand	$100,000
3.03		Relocate main entry and enhance with placemaking elements	$600,000
Subtotal			*$1,540,000*
5.30 Bicycle Improvements			
5.30	a	Monitor bike rack usage and consider installing additional racks and/or bike lockers in pedestrian underpass or at south end of the concourse outside of the station	$6,000
	b	Improve bike-specific wayfinding signage to stations, to bicycle parking, to elevators, and to local destinations	$36,000
	c	Create station area map with recommended bike routes, integrated with existing/planned facilities	$12,000
Subtotal			$1,594,000
Total			**$42,129,680**

Source: AECOM, 2014.

3.5 Scenario 2 – Modernize and Expand

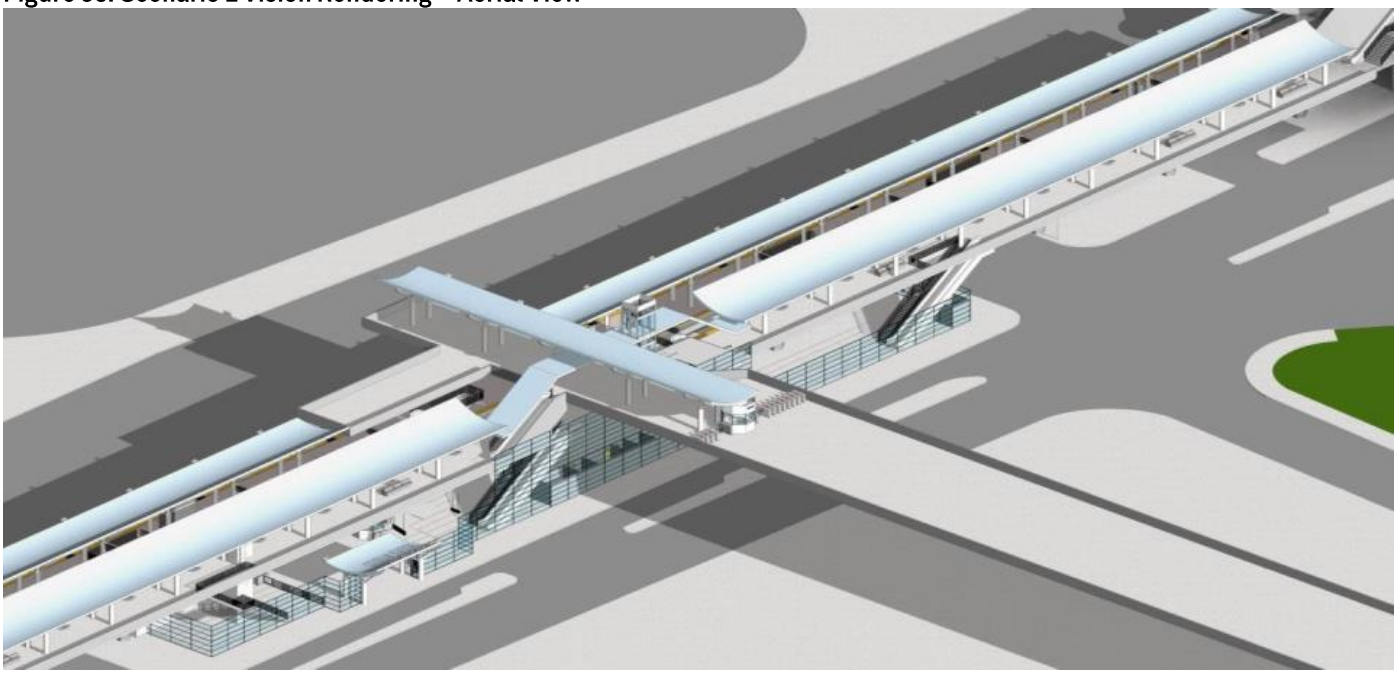
3.5.1 Overview

Scenario 2 – Modernize and Expand considers a package of improvements if the Coliseum City development comes to fruition. Key elements in Scenario 2 include:

- A **new side platform** to serve event ridership associated with Coliseum City and allow the station to accommodate future growth well into the future.
- An **upper concourse with station agent booth and fare gate array** connecting to the proposed Coliseum City "High Line", facilitating direct access to the station without having to "go down to go back up".
- **New vertical circulation** to access the upper concourse and the new side platform, as well as an **expanded concourse and new north paid area** to accommodate the new vertical circulation at ground level.
- **A full platform canopy on both the existing and new platform** that would encourage customers to spread out along the full platform length.
- **Realignment of San Leandro Street** to accommodate the new side platform (if on the west side), as well as an **improved San Leandro Street entrance**.
- **An at-grade east entrance** to the concourse, if a grade crossing of the UP ROW can be implemented or if the UP ROW is acquired for trail use.
- **New staff areas/amenities** at concourse level to provide BART employees a more comfortable workplace.

Figure 35 provides an aerial view of Scenario 2, showing a new side platform, full-length platform canopies, and an upper concourse with vertical circulation, station agent booth, and fare gate array.

Figure 35: Scenario 2 Vision Rendering – Aerial View



3.5.2 Capacity and Circulation

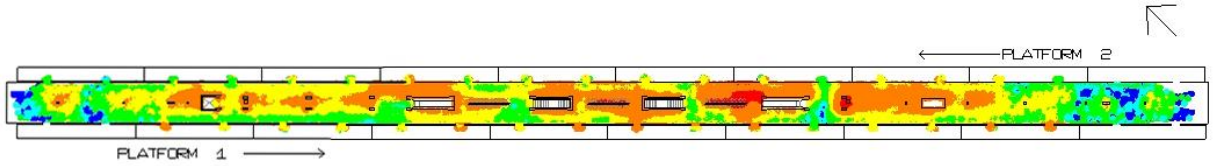
Scenario 2 addresses existing crowding concerns as well as future ridership growth by implementing a second platform. This platform would allow boarding on both sides of a southbound train, allowing BART maximum flexibility for future operations scenarios.

As introduced in **Section 1.5.2**, **Figure 36** shows pedestrian flow modeling of the existing platform in the post-event condition (at top) with areas of LOS E, an average of 5-10 square feet per person, throughout the central core of vertical circulation elements. The most extreme crowding, LOS F (less than 5 square feet per person), is evident around the up escalator.

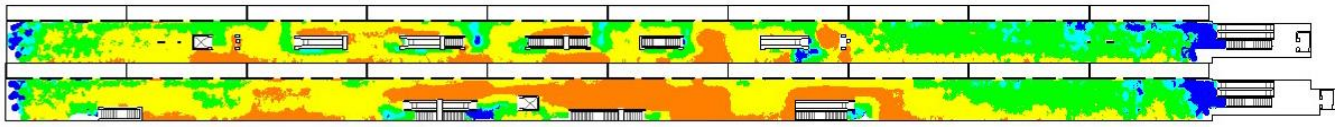
The corresponding density map for Scenario 2 (at bottom), shows that even with a 70 percent increase in post-event station entries by 2035, the existing and new platforms would provide an overall increased level of service. While areas of LOS E are still evident, they are limited to smaller areas, and no part of the platform provides LOS F.

Figure 36: Weekend Post-Event Peak 15-Minute Density Map – Existing Platform and Scenario 2 Comparison

Existing Platform – 2013 Ridership



Scenario 2 – 2035 Ridership



LOS	A	B	C	D	E	F
sq ft / person	> 35	> 25 and ≤ 35	> 15 and ≤ 25	> 10 and ≤ 15	> 5 and ≤ 10	< 5

In developing Scenario 2, vertical circulation needs were considered in addition to platform expansion. Given different train loads, the number of minutes required for a pair of vertical circulation elements (escalator and stairway) to "process" the train's full load was calculated, based on observed flow rates. These results are presented in **Table 11**, reflecting preliminary analysis at a conceptual design level. More detailed analysis would be required to ensure that fire/life safety and exiting requirements are met as the design proceeds beyond this planning stage.

If a 10-car train on which everyone is seated (about 50 passengers per car) were completely unloaded, it would take about 1 minute for the 500 passengers to move from platform to concourse level, given four pairs of vertical circulation. On the other extreme, if a 10-car train with a crush load (200 passengers per car) were completely unloaded, it would take 17 minutes for the 2,000 passengers to negotiate a single pair of vertical circulation to reach the concourse level.

To provide adequate vertical circulation, it is considered that in the 2035 pre-event peak hour, a train would arrive every five minutes. Thus, enough vertical circulation would be needed to process a full train load within five minutes. Assuming crush load trains, three pairs of vertical circulation would not be sufficient, as 5.6 minutes would be required to process all of the alighting passengers. With four pairs, the time is reduced to 4.2 minutes and the platform would be cleared before the next train arrives.

Table 11: Conceptual Vertical Circulation Processing Times – Scenario 2

Train loading	Passengers per car (10-car train)	Minutes to Process Full Train Load by Pairs of Vertical Circulation			
		1 pair	2 pairs	3 pairs	4 pairs
500	50	4.2	2.1	1.4	1.0
1,000	100	8.0	4.2	2.8	2.1
2,000	200	17.0	8.0	5.6	4.2

Source: AECOM, 2014.

Accordingly, Scenario 2 has been designed with four pairs of vertical circulation between the platform and concourse levels:

- the existing elements serving the existing platform;
- a new pair serving the existing platform from the High Line;
- a new pair serving the new side platform from the concourse level; and
- a new pair serving the new side platform from the High Line.

Figure 37 and **Figure 38** provide an overview of Scenario 2 improvements at the concourse level and where they would be implemented.

To accommodate a new side platform on the west side of the station, San Leandro Street would be shifted to the west and enhanced with streetscape improvements. Accordingly, the concourse would be expanded into the existing sidewalk frontage along San Leandro Street to accommodate the new vertical circulation elements accessing the side platform.

As in Scenario 1, Scenario 2 would also have a new north end paid area that would provide access to the existing platform and High Line via elevator, as well as to the new side platform via stairs.

Figure 37: Scenario 2 Improvements – Concourse Level

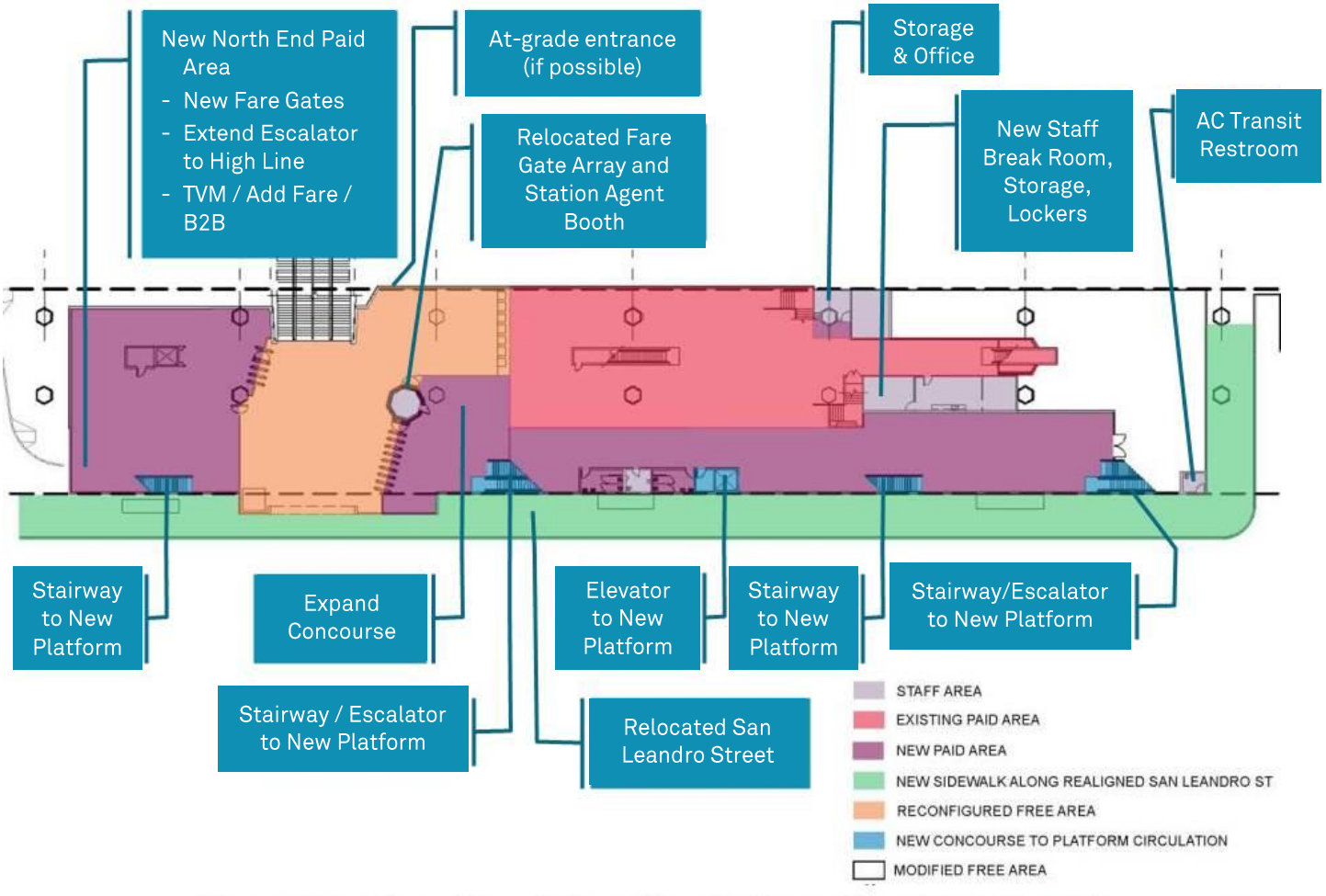


Figure 38 shows a vision rendering of the concourse level with Scenario 2 implemented. In this view, a new station agent booth is shown, located with a clear view of the new north end paid area. The concourse is widened, accommodating vertical circulation to the new side platform. In the foreground, a concept for an enhanced station entrance is presented, with the High Line overhead in the distance.

Figure 38: Scenario 2 Vision Rendering – Concourse View

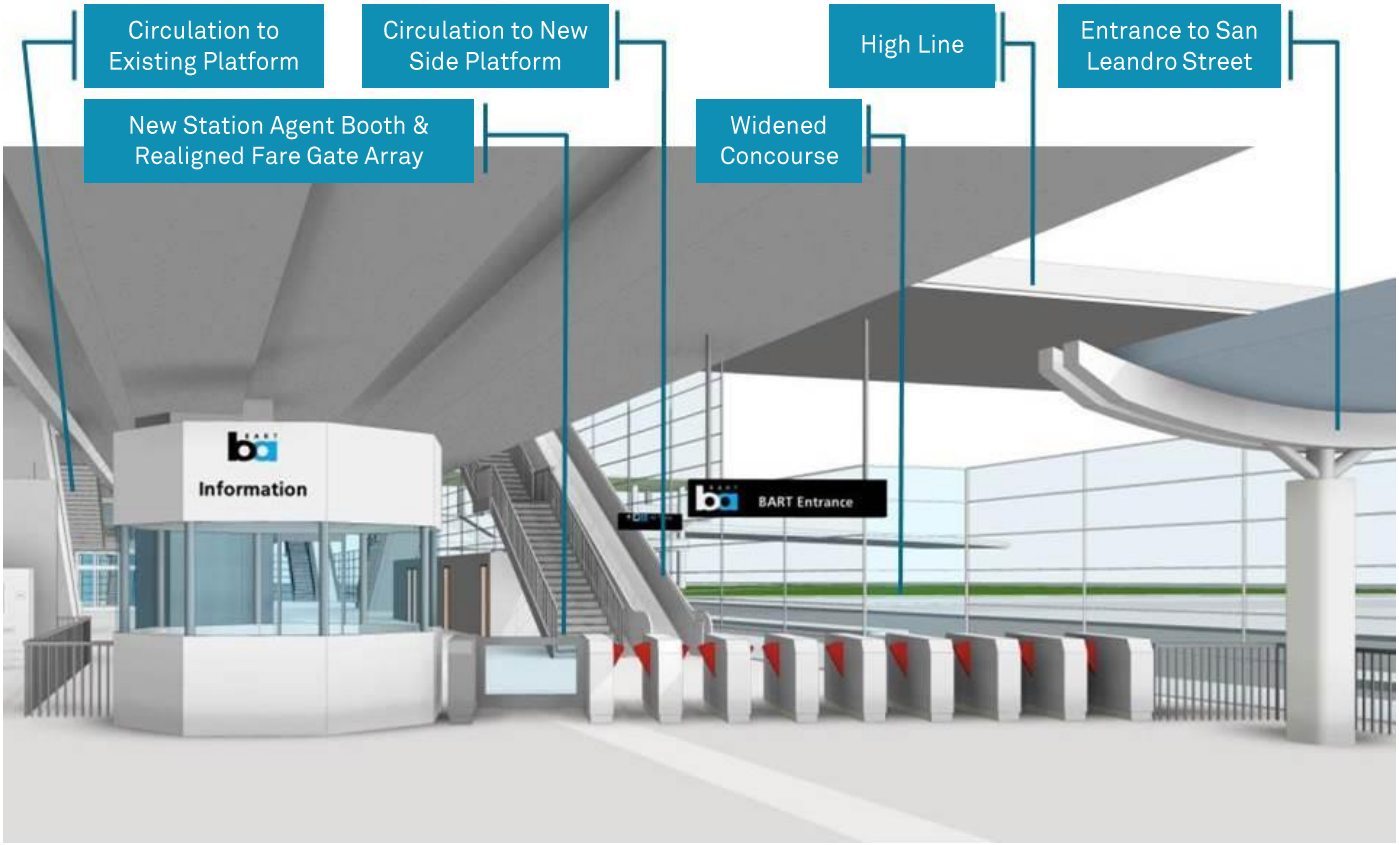


Figure 39 shows the existing platform level (red) and new side platform (purple), with new vertical circulation from the existing platform to the High Line (yellow), and new vertical circulation serving the new side platform from the concourse and High Line levels (blue).

The new side platform could also be implemented on the east side of the station, which would allow for the addition of a third track in the long term. However, this option is dependent on the acquisition of the UP ROW adjacent to the east side of the concourse for regional trail use. The opportunity to acquire and repurpose the UP ROW remains uncertain at this time.

Figure 39: Scenario 2 Improvements – Platform Level

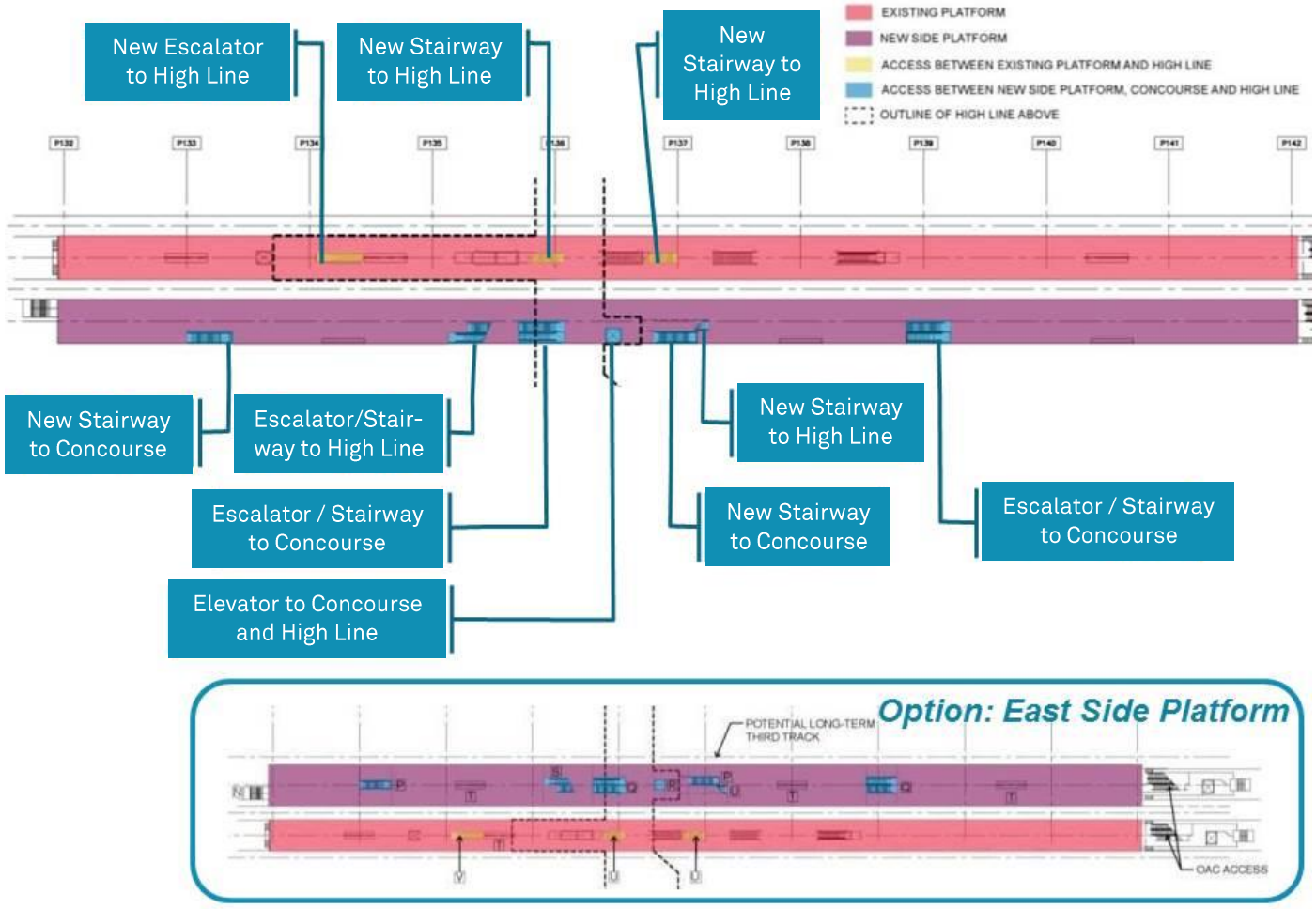


Figure 40 shows a vision rendering of the platform level with Scenario 2 implemented. In this view, windscreens and other elements have been removed to declutter the existing platform, and a canopy extends all the way to the OAK Shuttle access. The new side platform, with its own OAK Shuttle access, appears on the right.

Figure 40: Scenario 2 Vision Rendering – Platform View

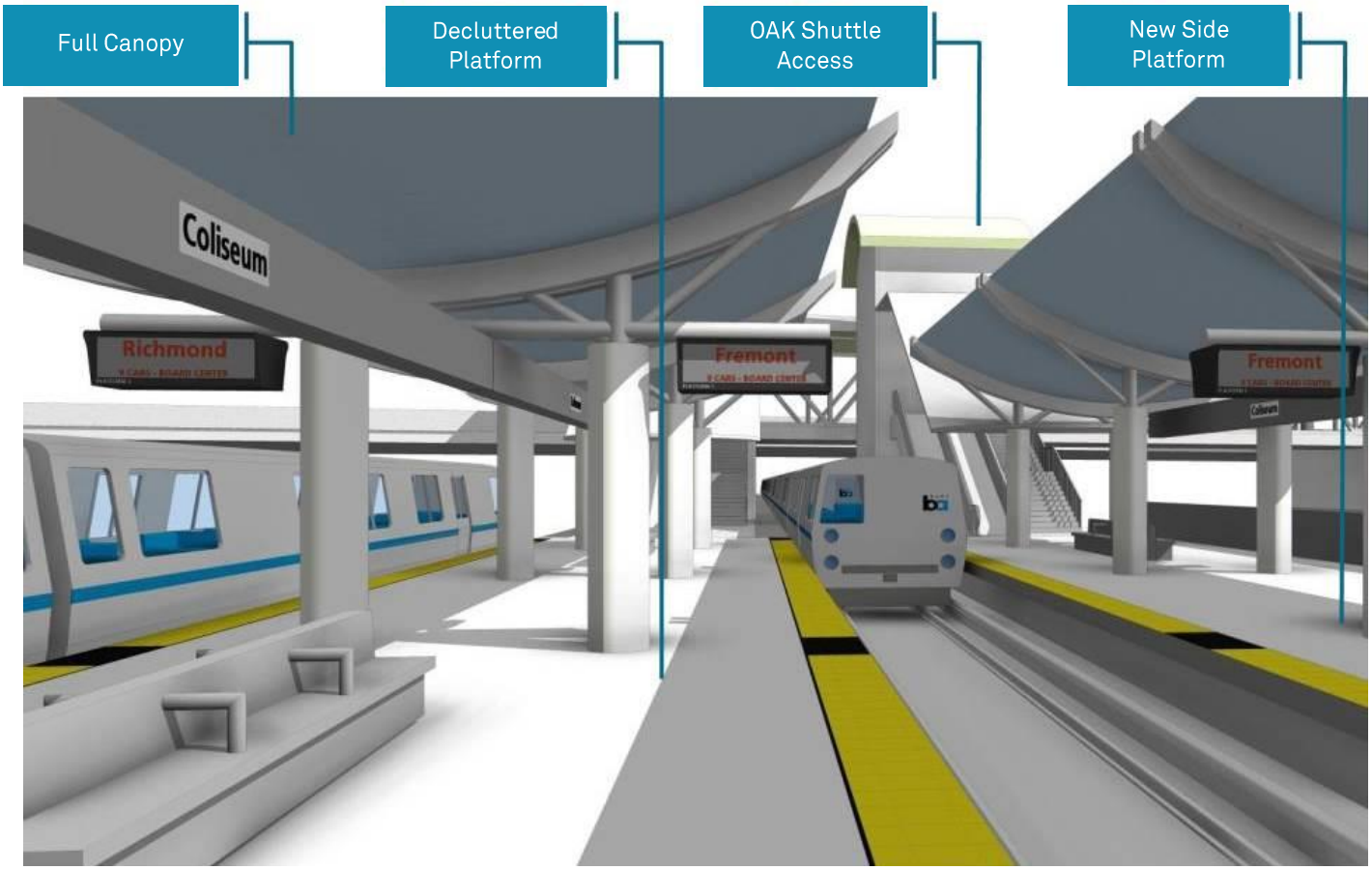


Figure 41 shows the new upper concourse at High Line level that would be implemented in conjunction with Scenario 2. To evenly distribute passengers, the upper concourse is situated at the center of the platforms. A new station agent booth with fare gate array would be located at the High Line interface (on the west side of San Leandro Street), and the upper concourse would provide access to vertical circulation to both the existing and side platforms. The upper concourse would extend above the existing platform to reach the location of the existing elevator, and could potentially connect to new development on the east side of the station. Note that the new fare gate array located on the High Line on west side of San Leandro Street will require that the new development/parking garage include a parking space and elevator access to enable cash collection. These costs are not included as part of this estimate as they are to be included in the design of the transit hub.

Figure 41: Scenario 2 Improvements – High Line Level

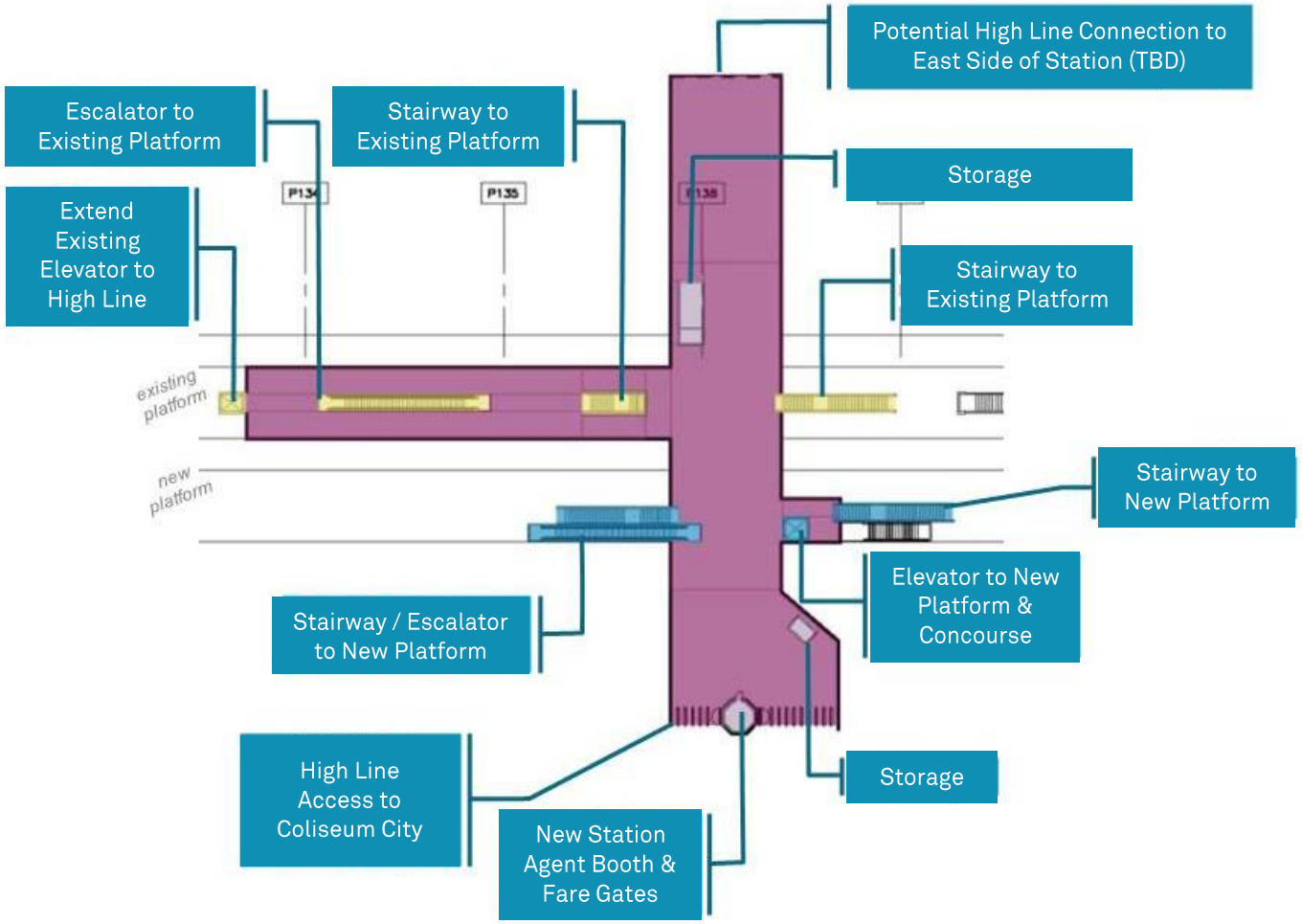
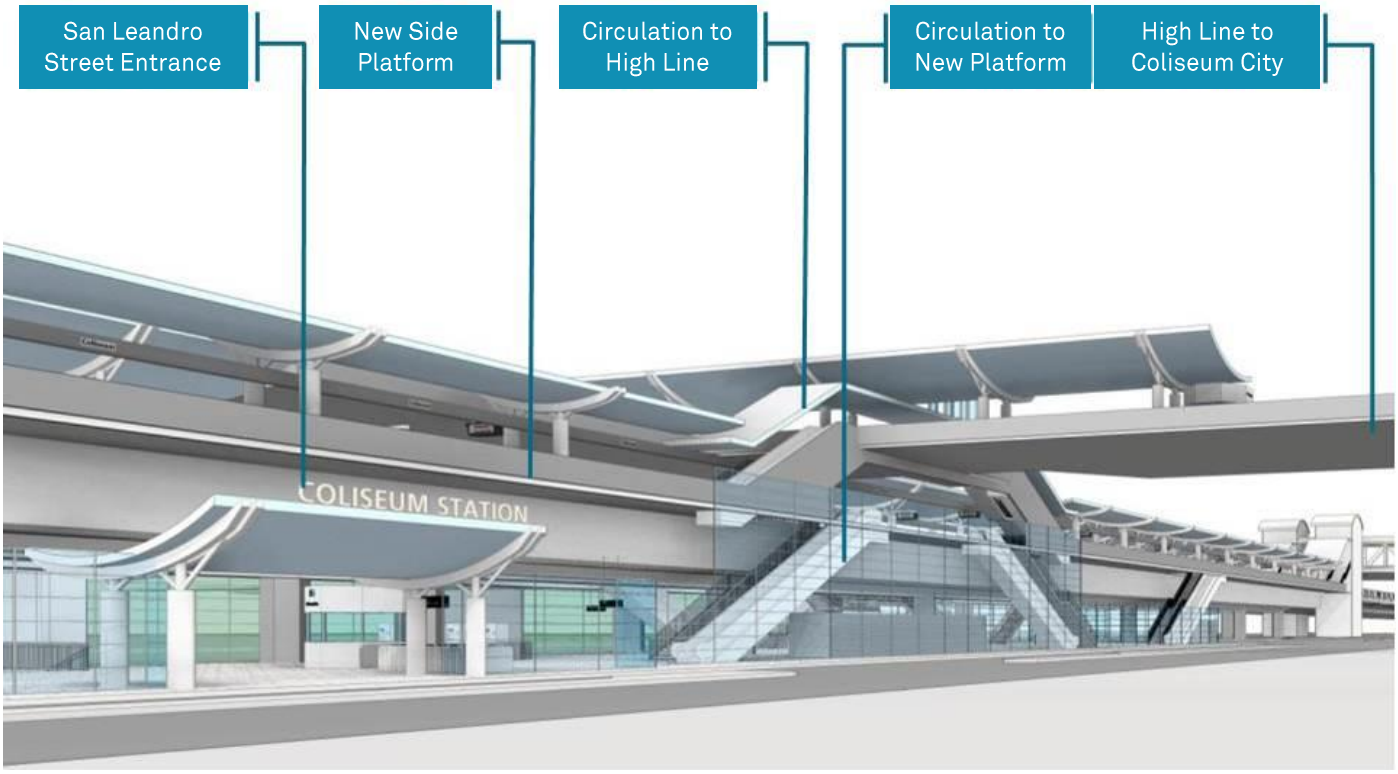


Figure 42 shows a vision rendering of the station along San Leandro Street in Scenario 2, with the new side platform situated on the west side of the station. In this view, the vertical circulation between ground level, the new side platform, and the High Line level is clearly articulated. Canopies cover all platform and upper concourse areas, and their consistent design is reflected in an enhanced station entrance. Note that the design is conceptual and will evolve to meet BART design and functional objectives (i.e. canopies will not be concave).

Figure 42: Scenario 2 Vision Rendering – Platform View



For Scenario 2, **Table 12** summarizes the key elements in each conceptual plan topic area and the rough order of magnitude cost to implement the package of improvements in each topic area. The overall costs for this scenario total $118 million; as design proceeds beyond the conceptual stage, the numbers will be refined. Most of the costs relate to circulation and capacity, which in this case includes the bulk of the facility upgrades and placemaking amenities. As a result, the costs for these elements not included in circulation and capacity are low.

For a new side platform on the east side of the station, the costs would amount to about $8 million more, as they would include a wider platform, larger canopies, and center vertical circulation to accommodate a long-term third track.

Table 13 provides a comprehensive list of the Scenario 2 improvements.

Table 12: Modernize and Expand – Cost Estimates

Description	Key Elements	Rough Order of Magnitude Cost
Circulation and Capacity		
New side platform	New platform with canopy, lighting, solar panels, etc.	$31 million
Upper concourse / High Line	Upper concourse with canopy, lighting, fare gate array, TV monitors, real-time information, etc.	$31 million
New vertical circulation	Nine stairways, six escalators, two elevators	$20 million
Existing platform and new full canopy	Excludes upper concourse area	$16 million
Other	Create north concourse paid area, realign San Leandro Street, property acquisition, solar panels, at-grade entrance if available, relocate fare gates, TV monitors, etc.	$14 million
Subtotal		*$111 million*
Facility Upgrades	Expand paid area, new emergency exit, new station agent booth, TVMs, restrooms, staff facilities	$6 million
Placemaking, Aesthetics, Access and Amenities	Relocated concession stand, main entry, bicycle improvements	$1 million
Total		**$118 million**

Source: AECOM, 2014.

Notes:
These rough order of magnitude cost estimates were developed by utilizing conceptual estimating methods. This entails the development of conceptualized quantities based on the information provided in design concept drawings. In addition, historical pricing and lump sum cost assumptions were considered to estimate an approximation of costs for the scope of work provided.

Unit prices used in the estimates are for the most part current and represent cost for materials, labor, equipment, subcontract, general conditions, indirect, and contractor's overhead and profit. Also, soft costs allowances were applied to cover project administration, design engineering, construction management, insurance, legal fees, permits and other project fees.

Table 13: Rough Order of Magnitude Estimates – Scenario 2

Improvement		Conceptual Cost
1.00 Circulation and Capacity		
1.01	2A: Add new side platform (west side): structural concrete (piers and slab), warning strip, emergency stairs, architectural finishes, canopy with solar panels, windscreens and benches, signage and wayfinding, electrical and lighting, and PA system	
	a Structural concrete (piers and slab)	$13,608,000
	b Warning strip	$134,400
	c Emergency stairs	$120,000
	d Architectural finishes	$3,326,400
	e Canopy	$5,832,000
	f Solar panels	$2,937,600
	g Windscreens and benches	$216,000
	h Signage and wayfinding	$720,000
	i Electrical and lighting	$3,024,000
	j PA system	$604,800
	1.01 Subtotal	*$30,523,200*
1.02	2B: Add new side platform (east side): elements as in 1.01 above	
	a Structural concrete (piers and slab)	$19,845,000
	b Warning strip	$134,400
	c Emergency stairs	$120,000
	d Architectural finishes	$4,851,000
	e Canopy	$8,505,000
	f Solar panels	$3,213,000
	g Windscreens and benches	$216,000
	h Signage and wayfinding	$720,000
	i Electrical and lighting	$3,307,500
	j PA system	$882,000
	1.02 Subtotal	*$41,793,900*
1.03	Add upper concourse / High Line including new fare gate array, ticket vending machines, transit information, real-time information display signs, public address system, lighting and canopy with solar panels	
	a Structural concrete (piers and slab)	$10,530,000
	b Architectural finishes	$3,432,000
	c New fare gate array	$1,200,000
	d Ticket vending machines	$720,000
	e Transit Information	$120,000
	f Real-time information display sign	$240,000
	g Canopy	$5,265,000
	h Solar panels	$2,652,000
	i Signage and wayfinding	$720,000
	j Electrical and lighting	$2,340,000
	K PA system	$468,000
	L Extend existing elevator to High Line (most likely total replacement of elevator)	$2,880,000
	1.03 Subtotal	*$30,567,000*
1.04	Explore potential for High Line connection to east side of station (requires fare gate array, vertical circulation)	$240,000
1.05	Install new stairways, escalators, and elevator	$20,190,000
	a Install new stairways	$4,050,000
	b Install new escalators	$13,500,000
	c Install new elevators	$2,640,000
	1.05 Subtotal	$20,190,000
1.06	Relocate/remove windscreens/seating on existing platform to make way for High Line circulation	$72,000
1.07	Remove existing platform canopy and install new canopy that conforms to High Line, extending to north end to cover relocated seating and to OAK Shuttle access at south end; should complement canopy on new side platform	
	a Remove existing canopy	$4,395,600

Improvement		Conceptual Cost
	b Remove SLPA structures	$960,000
	c New canopy structure (not including High Line)	$7,344,000
	d Electrical and lighting	$3,240,000
	1.07 Subtotal	*$2,400,000*
1.08	Incorporate solar panels	$2,400,000
1.09	Realign San Leandro Street and construct civilwork along San Leandro Street	$4,600,000
1.10	Conform to new trail facility and construct civilwork in current UP right-of-way (east side platform only)	$1,200,000
1.11	Demolish Existing Pedestrian Underpass (if east side platform is built or UP ROW becomes available)	$3,600,000
1.12	Implement at-grade entrance	$600,000
1.13	Relocate existing and add new fare gates to incorporate north end of station (including vertical circulation and elevator) into paid area; install new station agent booth, floor finish, and electrical and lighting upgrades	$1,440,000
1.14	Install Add Fare and Bus-to-BART machines to new north paid area	$600,000
1.15	Remove and demolish north side vertical circulation and access to pedestrian bridge	$840,000
Circulation and Capacity Subtotal A (West Side Platform)		*$111,611,800*
Circulation and Capacity Subtotal B (East Side Platform)		*$119,482,500*
2.00 Facility Upgrades		
2.01	Relocate ticket vending machines on concourse level	$480,000
2.02	Relocate transit information on concourse level	$60,000
2.03	Restrooms under side platform (cost additional to 2.04b in Scenario 2A – West Side Platform only)	$180,000
2.04	Move restrooms to interior to reduce impact to sidewalk and provide adequate queuing space to reduce impacts to concourse circulation during periods of peak demand; design restrooms with stalls	$780,000
2.05	Install a restroom at the south end of the station with access from outside for AC Transit driver use	$156,000
2.06	Increase paid area to south end of station and formalize station wall., add emergency exits with card/code access for station agents	$3,120,000
2.07	Build BART Police Department office	$240,000
2.08	Build a new storage room adjacent to stairway on the east side of the south escalator access (min. 5' x 8')	$33,600
2.09	Build a new attached locker/staff room (10' x 19')	$182,400
2.10	Expand storage area in the location of existing break room, and install wet utility	$180,000
2.11	Incorporate 10' x 16' foot storage room on upper concourse / High Line: o Floor sink - dirty water drain o Hot and cold water taps per current janitorial room designs o Double doors to allow access for a riding scrubber o Eye wash station o Ability to store cleaning solutions and other items	$172,800
2.12	Incorporate 5' x 8' supply room on upper concourse / High Line located near proposed station agent booth / fare gate array	$24,000
Facility Upgrades Subtotal A (West Side Platform)		*$5,608,800*
Facility Upgrades Subtotal B (East Side Platform)		*$5,428,800*
3.00 Placemaking, Aesthetics, Access, and Amenities		
3.01	Relocate concession stand on concourse level	$100,000
3.02	Relocate main entry on concourse level and enhance with placemaking elements	$600,000
3.03	Bicycle improvements	
	a Monitor bike rack usage and consider installing additional racks and/or bike lockers in pedestrian underpass or at south end of the concourse, outside of the station	$6,000
	b Improve bike-specific wayfinding signage to stations, to bicycle parking, to elevators, and to local destinations	$36,000
	c Create station area map with recommended bike routes, integrated with existing/planned facilities	$12,000
	3.03 Subtotal	*$54,000*
Placemaking, Aesthetics, Access, and Amenities Subtotal		*$754,000*
Total A (West Side Platform)		**$117,974,600**
Total B (East Side Platform)		**$125,665,300**

Source: AECOM, 2014.

3.6 Scenario Selection

Moving beyond the Basics, three factors would weigh into the decision to move forward with Scenario 1 or with Scenario 2: cost; level of service benefit; and the timing, tradeoffs, and unknowns of development within the station area.

3.6.1 Cost Comparison

As noted in the previous sections, the initial rough order of magnitude cost estimates are subject to refinement as design proceeds beyond concept. **Figure 43** provides a graphical comparison of the costs of each scenario.

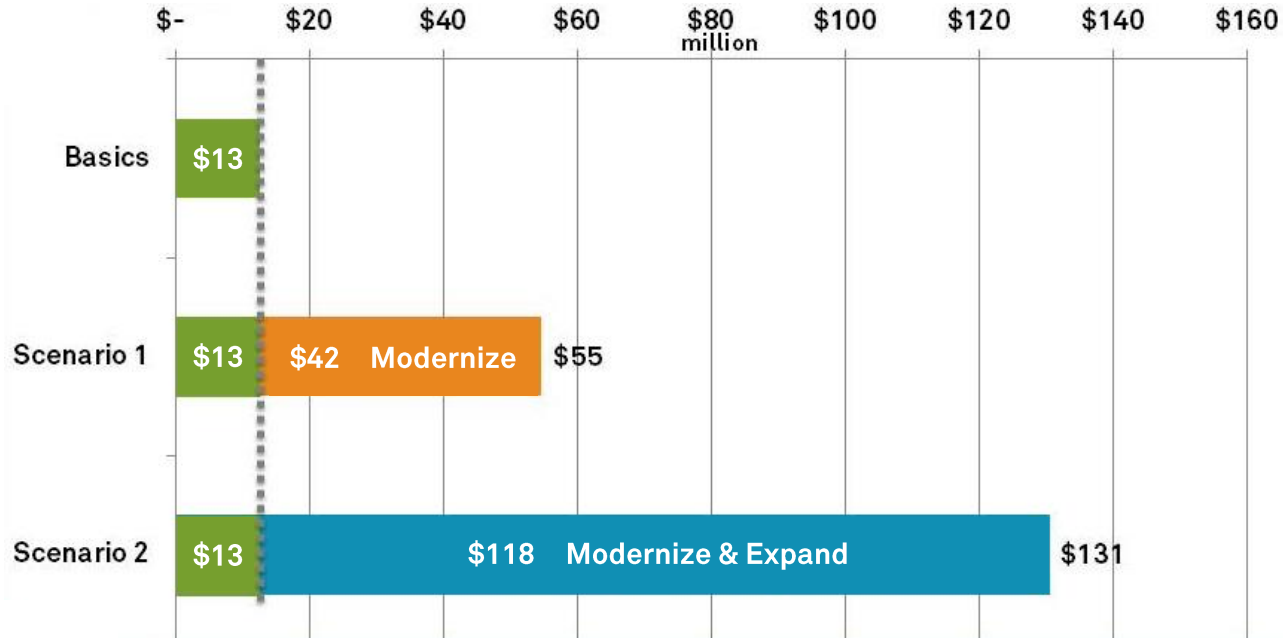
- The improvements included in the **Basics** sum to $13 million, with the most expensive elements being the new platform canopy and the new closed-circuit television and access control. These projects would either be implemented in the short term or packaged with Scenario 1 or 2.

- Implementation of **Scenario 1** would add another $42 million in costs to modernize the station, for a total of $55 million. The largest investments would be in a full platform canopy and screen doors.

- Implementation of **Scenario 2** would add $118 million to modernize and expand the station, for a total of roughly $130 million. The largest investments include a new side platform and upper concourse, with new vertical circulation elements connecting them with each other and the concourse.

Each scenario includes a comprehensive list of all identified improvements for the station that needs to prioritized. The cost estimates only include improvements to the station and do not include any Transit Hub improvements as introduced in **Section 3.1**. As a comparison, the Coliseum City Master Plan estimates total costs of $55 million for transit improvements (including $26 million in hard costs specifically for BART).

Figure 43: Rough Order of Magnitude Cost Estimate Comparison



Source: AECOM, 2014.
Note: Costs reflect station-only improvements, not including parking or intermodal; improvements to be prioritized for each scenario.

3.6.2 Level of Service Comparison

Aside from cost, another way to compare Scenarios 1 and 2 is to consider the improvement in level of service that each would provide. **Table 14** presents level of service in terms of average square feet per platform occupant during the peak 15 minutes prior to or after an event. For this comparison, additional platform space available through the implementation of platform screen doors in Scenario 1 is not included.

With an average of 1,518 riders on the platform, the peak 15 minutes following a weekday event in 2035 represents the most crowded condition, providing an average of just under 9 square feet per person (LOS E) under Scenario 1, and just over 18 square feet (LOS C) in Scenario 2. Intuitively, adding an additional platform effectively doubles the amount of space available for each rider. Scenario 1 – Modernize performs in the range of LOS D and E, while Scenario 2 – Modernize and Expand offers a level of service a letter grade or two higher.

As trains are operated more frequently, the "platform population" is reduced more often, having the effect of providing more space per platform occupant. It is calculated that level of service would improve by roughly one letter grade for each additional train operated during the peak 15 minutes. Thus, much of the LOS improvement in Scenario 2 could be achieved in Scenario 1 by reducing headways from 5 to 4 minutes. Four-minute headways are possible under existing conditions, and future capacity improvements could further reduce headways to 3.5 minutes.

Table 14: Scenarios 1 and 2 – Platform Level of Service

2035 Event Scenario	Time of Peak Occupancy (as modeled)	Peak Platform Occupancy	Scenario 1: Modernize		Scenario 2: Modernize & Expand	
			sq. ft. / person	LOS (average)	sq. ft. / person	LOS (average)
Weekday Pre-Event	5:43 pm	1,145	11.8	**D**	24.0	**C**
Weekday Post-Event	9:52 pm	1,518	8.9	**E**	18.1	**C**
Weekend Pre-Event	12:07 pm	952	14.1	**D**	28.9	**B**
Weekend Post-Event	4:13 pm	1,480	9.1	**E**	18.6	**C**

Source: AECOM, 2014.

LOS	A	B	C	D	E	F
sq ft / person	> 35	> 25 and ≤ 35	> 15 and ≤ 25	> 10 and ≤ 15	> 5 and ≤ 10	< 5

3.6.3 Timing, Tradeoffs and Unknowns

Finally, selection of a scenario requires consideration of timing, tradeoffs and unknowns related to outside efforts in the station area. In particular, two opportunities in the station area would have considerable implications on the future of Coliseum Station: the acquisition of the UP ROW and its conversion to trail use, and the Coliseum City mixed-use development.

UP ROW

Abandonment of the UP ROW could occur in the mid- to long-term, and is a prerequisite for an east side ground-level station entrance and east side platform. BART is dependent in part on ACTC's timing and priorities for pursuing acquisition of the UP ROW. The east side platform allows greater long-term flexibility to BART and avoids impacts to San Leandro Street. Alternatively, the side platform could be built on the west side of the station (as shown in this report), though it would require a realignment of San Leandro Street that could potentially involve complex engineering and property acquisition.

Coliseum City

With respect to timing, components of Coliseum City such as a new NFL stadium could be implemented in the near term while full build-out of Coliseum City would take at least 20 years.

The High Line is an essential component of the Coliseum City development's access and circulation concept. However, the High Line could divert pedestrian traffic from street level and isolate Coliseum City from the surrounding community. Ensuring that ground level access is facilitated will require Transit Hub improvements, the funding for which are unknown.

Coliseum City and BART both agree that a strong connection between the development and the station are desirable, but the nature and funding of the High Line and Transit Hub will require further analysis to move beyond this conceptual stage.

Overall, the likelihood, timing, and feasibility of both UP ROW access and Coliseum City development remain uncertain at the time of this Plan's development.

The timing, tradeoffs and unknowns associated with the UP ROW and Coliseum City are summarized in **Table 15**.

Table 15: UP ROW and Coliseum City – Timing, Tradeoffs and Unknowns

	Union Pacific Right of Way	Coliseum City
Timing	• 5-10 years	• 3-5 years (stadium) • 20 years (full build-out)
Tradeoffs	• Allows east side at-grade access (short term solution: new lifts for existing underground passageway) • Allows east side platform (opportunity for future third track)	• Upper concourse essential • New side platform requires improved circulation • Ensure ground level access with Transit Hub
Unknowns	• Will UP and Coliseum City timing align for an east side platform? • How soon will ACTC be able to purchase the UP ROW (Measure BB funding availability)?	• Feasibility, BART funding, likelihood unknown

Source: BART, 2015.

3.6.4 Next Steps

Despite the uncertainties faced by Coliseum Station modernization as described in the previous section, the effort can move forward with the following next steps:

- **Engage with the community** to ensure station modernization and its relationship to new development minimize impacts and reap benefits for the station's existing users and neighbors;

- **Prioritize improvements** within each scenario, and as scenarios are carried forward, to take advantage of funding sources and exploit synergies between projects; and

- **Identify key improvements** that align with funding opportunities and timelines of demonstrated investment need to advance into preliminary engineering.