CONCORD STATION MODERNIZATION
CONCEPTUAL DESIGN
JANUARY 29, 2016

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1.0 SUMMARY

The purpose of this report is to document Final 15% Design process, analysis and recommendations. This report is the concluding presentation in the 15% design process for Concord Station as part of the BART Station Modernization Program. The document is a living document in the sense that these recommendations for Concord Station modernization will be further developed and tested to respond to

- Future developments in the BART programs and policies
- Further exploration of existing conditions at Concord Station precluded by the scope and budget for conceptual design
- Future modernization funding scenarios
- Developments in transportation systems and technologies as the design moves to more definitive levels

Station Modernization Goals and Vision

Long Term Holistic Vision

- Comprehensive assessment of Needs
- Transformative Improvements
- Showcase to leverage future funding opportunities

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

Conceptual Design Process

As owner of a large inventory of stations and station assets, BART must continuously decide when and what to renovate. To help answer this question, the Station Modernization program establishes "a snapshot" synthesis of station related information for targeted input and discussion by BART departments and stakeholders. For Concord Station this process has included analysis and technical memoranda establishing station condition, capacity, function, state of good repair, and comparing existing condition with BFS requirements.

Project proposals vetted by the Technical Advisory Committee and BART staff respond to the issues and opportunities identified. Preliminary technical confirmation has been preformed for desired improvements, such as placement of a new elevator in the fare paid zone, a new normal use stair and two new egress stairs, new entries and relocation of the station agent booth, new concourse enclosure system, improvement of platform and concourse sightlines have been recommended. Evaluation of systems however has been limited to visual inspection by the Mechanical-Electrical consultant. No system testing has been performed for 15% design.

Recommendations and associated cost are summarized in an example implementation scenario for full build-out. The implementation scenario has attempted to develop a preliminary construction logic. Funding scenarios remain to be determined and when they are clear, other implementation scenarios may be developed.

Technical Advisory Committee

The initial phase of the Concord Station Modernization Plan has included input from a Technical Advisory Committee internal and external to BART. The Technical Advisory Committee presentations included consideration of

- Universal and Pedestrian Access/Community connections
- Security
- Intermodal issues (bus, car, taxi, bicycle) and coordination with bus transit agencies
- Functional planning
- Aesthetics
- Coordination with City of Concord Downtown Specific Plan

Technical Advisory Committee meetings occurred in September 2014, March 2015, May 2015 and September 2015. BART distributed record copies of each of the presentations to committee members and solicited follow-up comments.

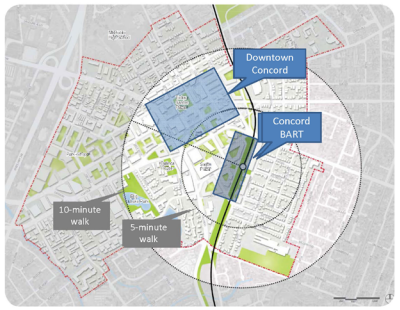
Public Outreach

- The project also included a public outreach event at Concord City Hall, online publication of proposals, and an online survey.
- English and Spanish versions of the April 2015 Public Outreach boards are available online at bart.gov/about/planning/contracosta/concord.

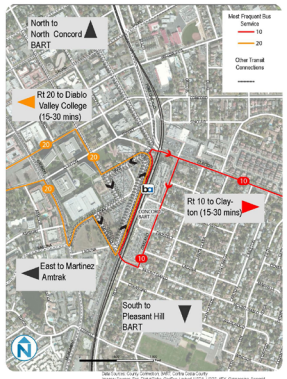
Concord Station Modernization

BART is working to invest resources into its existing stations to advance transit ridership, enhance the quality of life around its stations, and improve the customer and employee experience.The goal of this project is to create a station conceptual plan to a planning year of 2040. This long-term vision will provide a cohesive roadmap to modernize station access, function, safety, capacity, sustainability, and appearance. The project will identify early, short-term projects as well as longer-term and potentially larger-scale renovations. The following set of boards showcase preliminary ideas for improvement to the Concord BART station.

Concord BART Station Connections to Downtown Concord



Bus Transit Connections at Concord BART Station

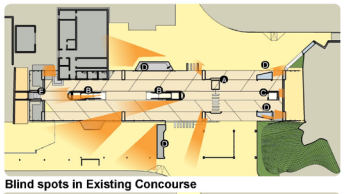


Issues & Opportunities

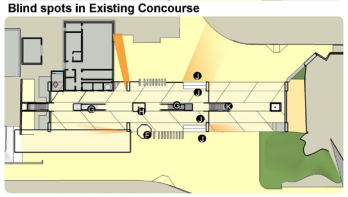
- Improve security/visibility
- Accommodate future growth and capacity needs within the BART system
- Improve station signage
- Enhance connections to Concord City streets
- Increase bicycle access and parking
- Renovations to station finishes and improvements to lighting at stairs, elevators, and escalators
- Upgrade public & employee restrooms
- Improve weather protection on platform
- Provide better seating and waiting areas at bus facility and within station
- Improve overall station cleanliness (reduce the need for pigeon control)
- Include opportunities for public art and create a sense of place

Make Transit Work

Sightlines/Security



Blind spots in Existing Concourse

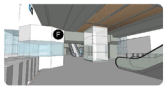


Proposed reduction in blind spots at Concourse Level

- Sightlines from the existing location of the Station Agent Booth are limited by structural and circulation elements which cause blind spots.
- A centrally located new Station Agent Booth at the west entry will have improved sightlines to fare gates, escalators, stairs, elevator and other areas such as the bus zone.

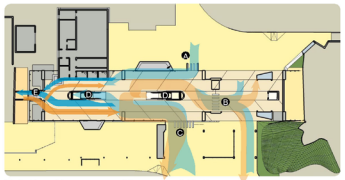
Blind spot areas for Station Agent

- A Existing Station Agent Booth
- B Existing escalator
- C Existing elevator
- D Existing ticketing structure
- E Existing stair
- F New Station Agent Booth
- G New escalator with transparent sides
- H New elevator with transparent shaft
- I New ticketing structure
- K New stair with transparent sides

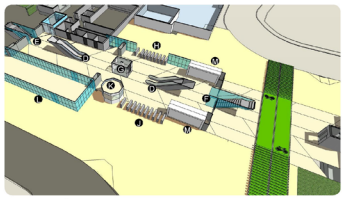


Proposed design improves sightlines to escalators, stairs and elevator from new Station Agent location.

Improved Station Gates and Circulation



Existing Concourse Movement Patterns



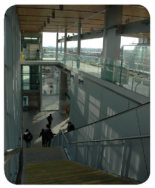
Improved Concourse - 2 central entry points with improved visibility of destinations and paths

Passenger movement through the station is complicated by conflicts between entries and exiting paths and queue areas. Proposed improvements include moving entry points to a more central location to reduce conflict; improving visibility of destinations; and moving queue zones out of the entry/exit paths.

Entry Flow

Exit Flow

- A Existing East Entry
- B Existing Central Entry
- C Existing West Entry
- D Escalator
- E Existing Stair
- F New Stair
- G New Elevator in fare paid zone
- H New expanded East Entry
- I New expanded West Entry
- K New Station Agent Booth
- L New Bike Station Entry
- M New Ticket Vending



Connect to the Community

Improve Pedestrian and Bicycle Connections

Shared pedestrian and bicycle space through plaza and station will improve east-west connections, and support use by nearby cyclists and pedestrians.

Real time bus arrival information makes transit predictable; more comfortable for passengers; and increases transit ridership.

Maps of local streets and destinations help with wayfinding. Maps also reinforce pedestrian and bike access to surrounding neighborhoods

- Concord BART is within walking distance of downtown, nearby parks, and residential neighborhoods
- Busy traffic conditions on adjacent streets create a barrier for pedestrians
- Pedestrian crossings and traffic calming could make it easier to walk and bike to the station

Proposed Improvements - Plaza, Pedestrian and Bicycle Access

Grant Street wide enough for bicycle facilities, connection to Downtown, Todos Santos Plaza

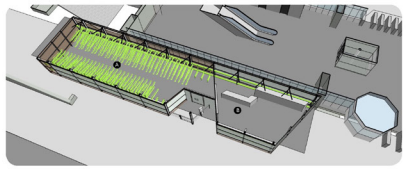
Very large bus loading area with unused space

Infrequent pedestrian crossings on Oakland Ave, reduces access to adjacent neighborhoods

High speed traffic on Oakland Ave, creates barrier for walking and biking

Bike Station

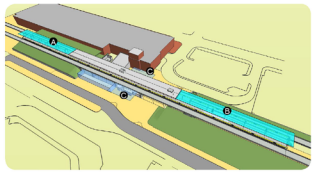
Concord's Bike station is currently in design and will be in construction in 2016. This secure facility will also include a retail area that will be staffed for portions of the day.



- A BART Bike Station will encourage and facilitate bike transit while reducing the number of bikes on trains. Planned bike storage has capacity for 120 standard and 8 oversized parking spaces.
- The Bike Station will include bike repair and maintenance functions.

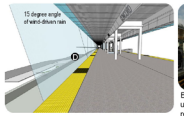
Safety, Comfort and Sustainability

Weather Protection



- A Extension of canopy at north end of platform
- B Extension of canopy at south end of platform
- C New entry canopy
- D Canopy width extension

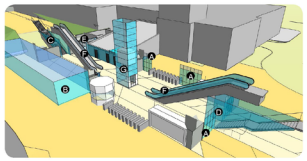
- Full canopy coverage of the platform will raise patron comfort; encourage full use of the platform length, reducing congestion near stairs and escalators; and improve safety in inclement weather
- New entry canopies will improve identification of entry points and provide improved shelter for intermodal transfers
- A slightly wider canopy will provide better wind-driven rain coverage at the critical platform edge, improving patron comfort and safety

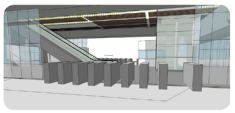


Extended canopy with flat underside to minimize pigeon roosting

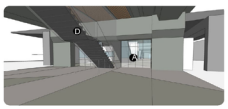
Glass canopy

Transparency: Visibility = Safety





Materials that increase transparency, such as glass, are being evaluated for each building element; balancing maintenance, cost, and functional criteria.



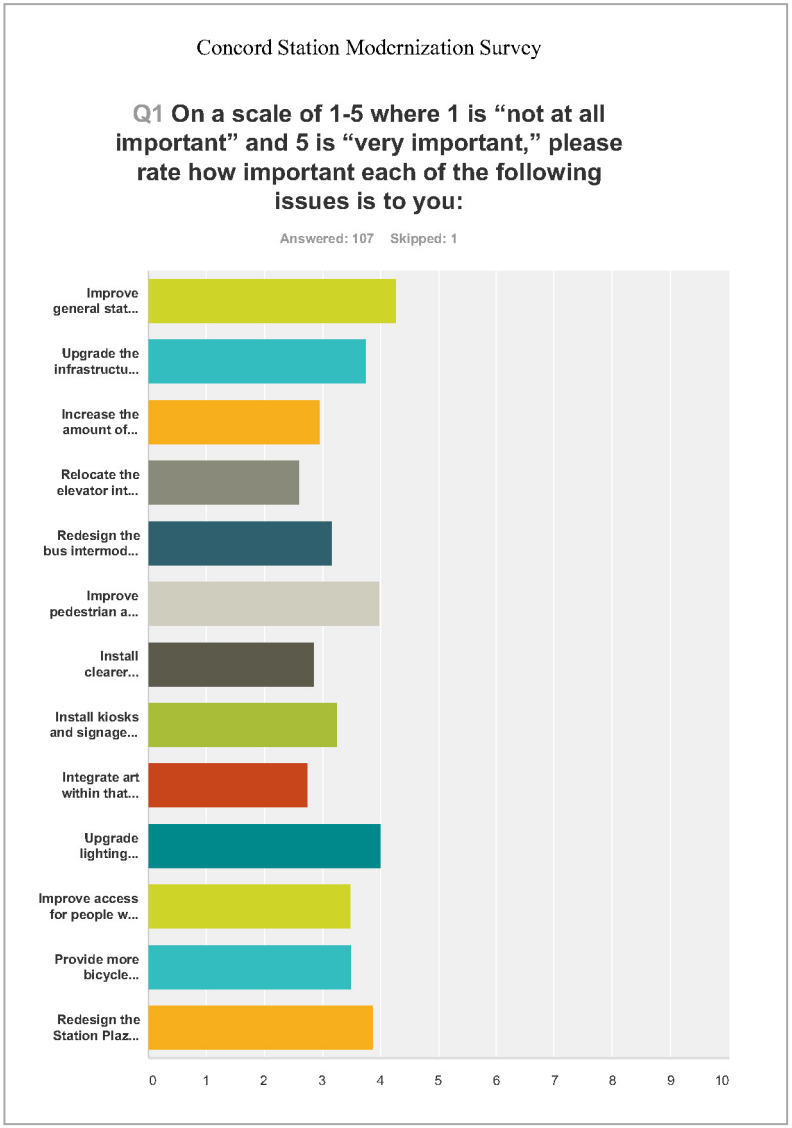
- A New more transparent station enclosure walls
- B New transparent bike station
- C New more transparent enclosure at existing stair
- D New stair with transparent enclosure
- E New staff room with more transparent wall at public area
- F More transparent escalator side walls
- G New elevator with transparent shaft and cab

Lighting and Ceiling Improvements

Improved light levels, lighting uniformity, and spectra at concourse and platform will improve patron comfort and safety. New L.E.D. lighting technolgies will improve the energy efficiency of the station. Reduced light spill into surrounding areas will improve perceptions of the station and improve lighting efficiency.

- A Up-lighting and reflective canopy
- B Down-lighting to illuminate the platform edge
- C Concealed services conduit in station raceway
- D New acoustic ceiling at canopy

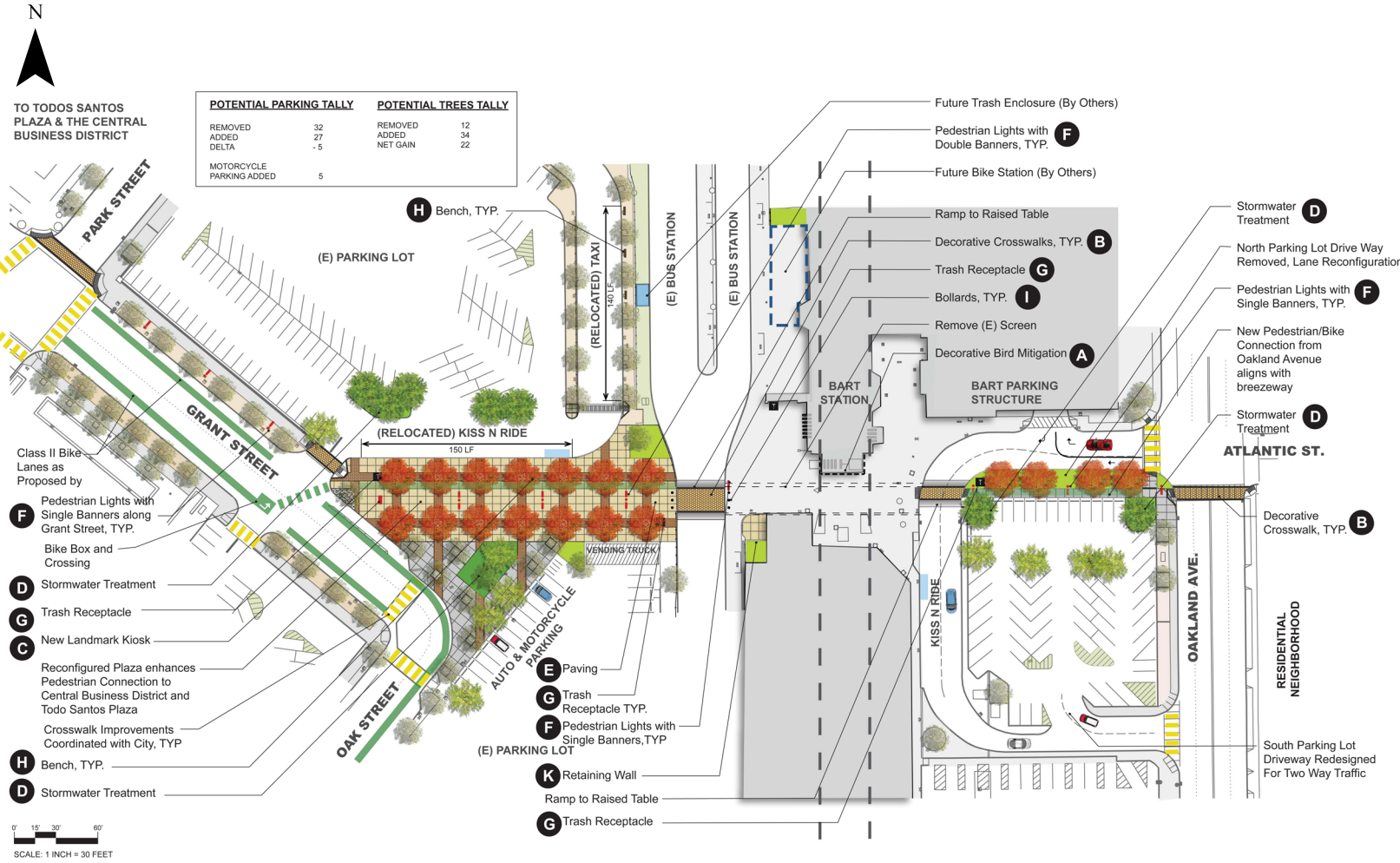
- The BART public survey at the April 2015 Outreach Meeting and online, included "Join the Discussion" questions shown on the board below.
- Survey participants rated the relative importance of potential improvements on a scale of 1 to 5. BART tabulated survey results in the bar chart, also below.



Coordination with Concurrent BART Projects at Concord Station

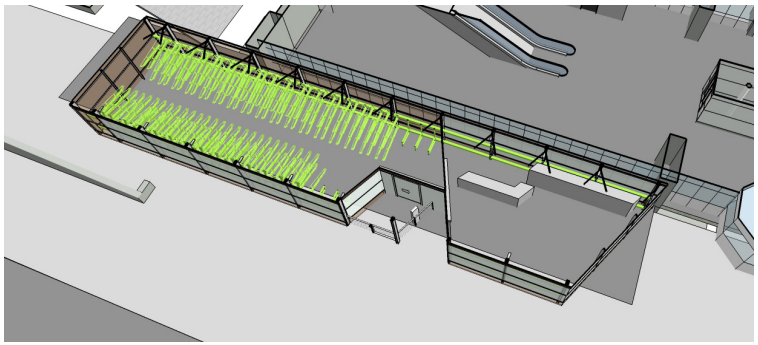
- BART Intermodal Improvements : Plaza Project

A new Station Plaza, in design concurrently with the development of 15% Design for Concord Station Modernization, will improve pedestrian and bicycle access, community east-west connections, and patron comfort and safety.



CONCORD BART IMPROVEMENTS
CONCORD, CA

- BART Prototype Bike Station
  - Intended to be designed as an adaptable prototype structure capable of implementation at several BART stations
  - Potential implementation at Concord
  - Implementation supports and is supported by
    - Current City of Concord Bicycle, Pedestrian and Safe Routes Project
    - The 2002 Concord Trails Master Plan
    - The 2009 Contra Costa Bicycle and Pedestrian Plan



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Deliverables and Presentations

The following documents and presentation preceded this report:

- Concord Station Modernization Kick-Off Meeting Presentation: Initial Findings, September 25, 2014
- Concord Station Stakeholders Update Presentation: Design Alternatives, March 3, 2015
- Concord Station Modernization Community Outreach Presentation, April 7, 2015
- Concord Station Existing Conditions and Constraints Technical Memo May 28, 2015 (Appendix 5)
- Concord Station Modernization 15% Design Stakeholders Update, September 2, 2015

Reference Documents

BART made the following documents available to design consultants as background information for development of 15% Final Design recommendations.

- Central Contra Costa Line Concord Station As-Built Drawings, October 1970
- BART Earthquake Safety Program Station Structure- C Line Concord Station Contract Record Drawings, February 12, 2013
- Concept Plan, BART Concord Plaza Improvements, March 26, 2014 (see below)

Planning documents of the City of Concord available at *http://ci.concord.ca.us/* have also been utilized.

- 2003 General Plan
- June 2014 Downtown Specific Plan
- Bicycle, Pedestrian, and Safe Routes Project

1.0 LAND USE CONTEXT

The Downtown Concord BART Station is located in the downtown area of the City of Concord, the largest city in Contra Costa County. The station is surrounded by several large surface parking lots and a large bus intermodal facility. The downtown area northwest of the station is mixed use, including residential, commercial, office, and the landmark Todos Santos Plaza. The neighborhoods immediately east, north and south, and beyond the downtown area to the west, include residential with a mix of single-family and multifamily housing, and more open park space.

Future Land Use

Plan Bay Area[1] has examined future land use and projected population changes for Bay Area communities from 2010 to 2040. Contra Costa County population growth from 2010 to 2040 is projected to be approximately 28%, which is consistent with the 30% average across the Bay Area. Because of existing development opportunities and potential for infill development, Concord will see a greater concentration of both housing and job growth than the average for Contra Costa County, accounting for 12 percent of the region's new homes and 11 percent of new jobs. Some of the short- to medium-term development in Concord will be located at the Concord Naval Weapons Station, which will redevelop the former military base and include housing and commercial land uses.

Concord has two Priority Development Areas (PDAs): (1) the Downtown Concord PDA, and (2) the North Concord PDA. Central Concord, especially close to the BART station, is an area identified for Medium housing growth (relative to the rest of the Bay Area). Plan Bay Area projects 38% growth in housing units across Concord, with 18,000 projected new housing units by 2040. Most of this growth will be concentrated with the Downtown area and the Concord Naval Weapons Station redevelopment. Concord ranks fifth in 2010-2040 Bay Area housing unit growth with nearly twice as many new units as planned in Livermore, Richmond or Mountain View. Two-thirds of the region's overall housing production is directed to the top 15 cities in order to concentrate housing growth in communities with high levels of transit service and strong employment growth.

Plan Bay area identifies Concord as medium strength for knowledge-sector job growth, and projects a 46 percent increase in jobs, with 21,810 new jobs by 2040 (compare to 15,000 to 20,000 new jobs in San Mateo, Hayward, Walnut Creek and Mountain View). These projections are based partially on the assumptions that some jobs are locally serving, and some will be located to match the distribution of regional housing growth. Even with substantial new housing development in Concord, there will be more commuters traveling to Concord in the future.

Transportation infrastructure will have to accommodate the housing and job growth, and Plan Bay Area identifies the following investments that will impact access to Concord BART Station:

- The East Contra Costa BART Extension is in construction and will expand BART access to central Contra Costa County from the east.
- One Bay Area Grant (OBAG) funding provides $45 million in funding to Contra Costa County (out of $320 million across all Bay Area counties), to support focused growth and use of existing transit systems in PDAs.
- There are no current plans for new regional transit or new highway system improvement investments in Concord, which maintains the importance of BART and multimodal access to the station.

1 http://files.mtc.ca.gov/pdf/Plan_Bay_Area_FINAL/Plan_Bay_Area.pdf

BART's Sustainable Communities Operations Analysis Study[1] (SCOA) responds to Plan Bay Area projections in relation to maintaining current service quality for future ridership. This report identifies Concord and North Concord Stations as a significant short-distance origin-destination pair with substantial increase in the total number of trips between these two stations by 2035. This is likely related to the residential population increase at the planned development of the Naval Weapons Station near the North Concord BART Station, which will increase trips to Downtown Concord for employment, shopping and recreation.

The projected job growth near the Downtown Concord Station will increase peak weekday ridership for commute trips both to and from Downtown Concord. The housing and population growth throughout the City of Concord will increase evening, weekend and holiday trips to Downtown Concord for access to Concord's urban and commercial core. Concord Station parking lots are currently at capacity by the end of the AM peak period; therefore, ridership increases across all time periods will require a mode shift for station access.

DOWNTOWN CONCORD SPECIFIC PLAN

1 http://www.bart.gov/sites/default/files/docs/BART%20SCOA%20Final%20Report%20June%202013.pdf

2.0 SERVICE PLANNING MODEL & STATION ACCESS

2.1 Current and Future Ridership

The BART ridership model projects short and long-term transit rider numbers, based on the following variables around each station: population, employment, cost, station characteristics, and transit service characteristics. The model establishes a baseline and predicts significant increases in daily users over the long-term, with projections for 2015, 2025 and 2040. BART Ridership Model numbers are summarized in the table below.

Model Year	Average Weekday Total Station Exits	Increase from Baseline	Increase from Previous Model Year
Baseline 2014	5,759	NA	NA
2015	5,854	2%	2%
2025	7,158	24%	22%
2040	8,558	49%	20%

Concord Station today has roughly 6,000 daily boardings, and the Average Daily ridership has hovered between 5,000 and 6,000 daily boardings (or exits) for the last sixteen years. It is used primarily for home origin trips (74%). The projected ridership growth for the next 10 years at Concord station is 21%, higher than other central C-line stations. As can be seen in Figure 1, entries at the station are generally very peak-oriented, although the peak periods are wider than at other stations in this corridor.

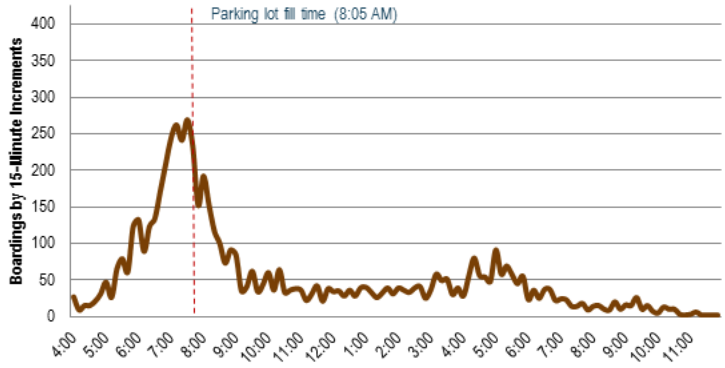


Figure 1 Concord Entries by Time of Day

BART forecasts a ridership increase of almost 50 percent by 2040.[1] If future boarding times are consistent with current entries, AM peak passengers will be constrained by station capacity. BART's SCOA report points out that limited parking may lead to earlier peaks to ensure access to parking space, unless parking is managed. The early parking lot fill time likely motivates passengers who drive to the station to plan for an even earlier arrival time, thus leading to a narrow AM peak for passenger boardings at this station. More multimodal access for Downtown Concord BART passengers would allow for a broader AM peak period, and is an important strategy to accommodate future passenger volumes.

1 Source: BART Planning 2013

2.2 Station Access

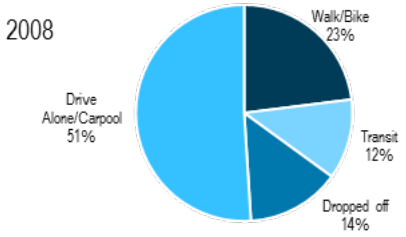
In March, 2014, BART produced its "Central C-Line First Mile/Last Mile Connections Plan: Corridor Access Pilot Program," which provided detailed analysis of existing conditions for Concord Station, as well as recommendations for access improvements. Much of this section is drawn from that report.

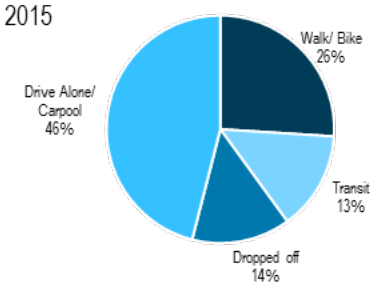
Station Access Mode Shares

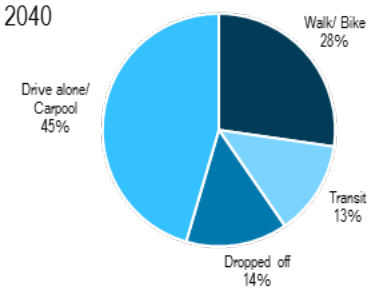
BART encourages diverse modes of access to the station, and has adopted a station access hierarchy to promote a vital station area that functions as an extension of the local and regional circulation network around the station area. BART's Access Guidelines prioritizes different modes of access in the following order

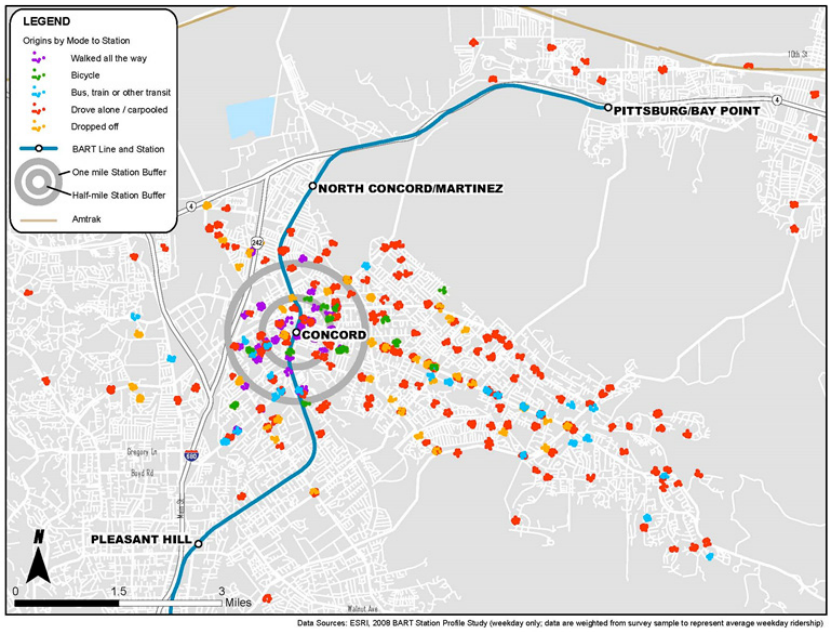
1. Pedestrian
2. Transit and Shuttles
3. Bicycles
4. Carpools, cabs and passenger drop-offs
5. Single-occupant vehicles

Charts on the right show the past, current, and forecast mode of access to Concord Station. Of the five stations in this corridor, Concord has the lowest rates of auto access in 2013: fewer than half of passengers drive alone or carpool, while one-quarter of passengers walk and 14% ride a bus. While the past five year period (2008-2013) saw modest increases in transit, walk, and bike access to the station, the mode share of arrivals at the station is not forecast to change over the next 10 years.

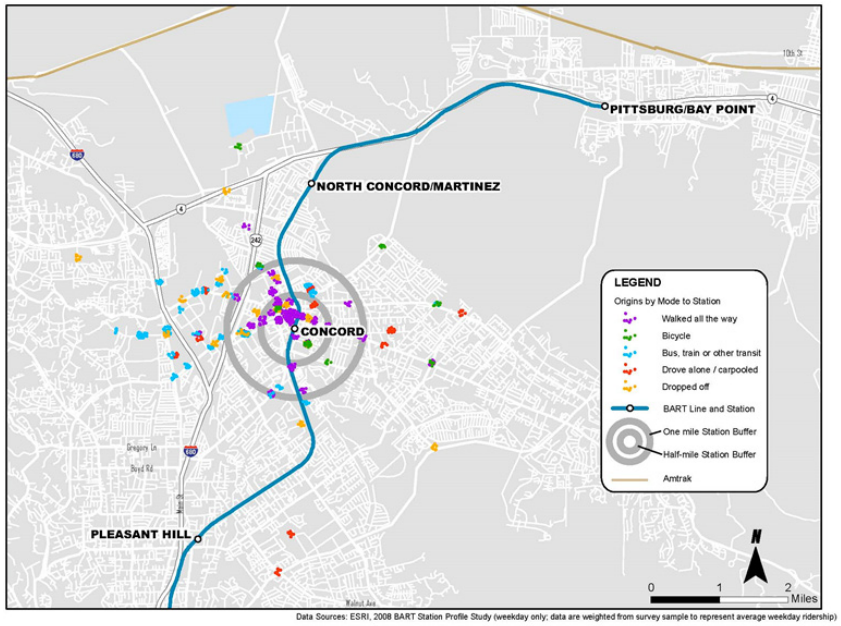








Home Origins



Non-home Origins

The maps on the left show home and non-home origins for passengers using Concord BART Station. As can be seen, home locations are clustered at points along the Clayton Road corridor, and within the one-mile station buffer. Many transit passengers arrive from the Monument Corridor and along Clayton Road. Non-home origins are also shown; these origin locations are highly concentrated within the one-mile station buffer, with transit riders coming from Diablo Valley College and west of the station on Concord Avenue.

The Home Origins map shows a significant number of vehicle trips (drove alone/ carpool and drop-off) within the one-mile buffer. These passengers choose to drive to the station despite the short distance of their trip, indicating potential deficiencies in access for alternative modes, as well as the potential for significant mode shift given modest improvements to walking, bicycling, transit, and parking management.

Bus Transit Access

Concord Station is well-connected to locations in Concord, Martinez, and Clayton with CCCTA services. The station is served by 14 routes; there is more weekend service at Concord station than other central C-line stations. Figure 5 shows which transit routes provide frequent service (30 minute or better in the peak period).

The table to the left shows 2008 and 2013 boardings for routes serving Concord station. It shows that there is consistent ridership along Clayton Road, the Monument Corridor, and at Diablo Valley College/Sun Valley Mall.

Route 20 provides service from Concord Station to Diablo Valley College, with 10-20 minute frequency in the midday period, and 30 minute frequency in the AM and PM peak periods and the off-peak period. It is one of just four routes in the system with frequencies under 30 minutes for some periods during the weekday. Another frequent service connecting to the Concord BART Station is Route 10, which operates from Concord along the Clayton Road corridor at 15 minutes in the PM peak, and 30 minutes in the AM peak and midday periods. Both of these services carry more than 25 passengers per service hour on weekdays, making them the most productive routes in the system after the Walnut Creek Free Ride Trolley. Route 11 provides service every 45 minutes between Pleasant Hill and Concord stations via Oak Grove Road. This service has relatively low ridership.

Stations Served	Route	Serves	Weekday Peak Periods Headways	Weekday Off-peak Periods Headways	Weekend Service Headways	Average Daily Ridership	Boardings per Revenue Hour
Concord	10	Concord BART to Clayton via Clayton Rd	15 (PM peak) – 30	30-60	--	1,004	25.6
Concord, Pleasant Hill	11	Concord BART to Pleasant Hill BART via Oak Grove and Treat	45	90	--	310	17.3
Concord, Pleasant Hill	14	Concord BART to Pleasant Hill BART via Monument Corridor, Del Rio, Bancroft	40	40	--	673	16.9
Concord, Walnut Creek, Pleasant Hill	15	Concord BART to Walnut Creek BART via Willow Pass, Concord High, Treat, Pleasant Hill BART, Civic	60	60	--	526	18.3
Concord	16	Amtrak, Contra Costa Regional Medical Center, Alhambra Ave., Gregory Lane, Monument Blvd., Concord BART	40	40	--	727	13.5
Concord	19	Amtrak, Pacheco Blvd., Concord BART	120	120	--	144	10.4
Concord	20	Diablo Valley College to Concord BART via Contra Costa, Willow Pass, Clayton	30; (10-20 in midday)	30	--	1,160	25.6
Concord	91x	Concord BART, Airport Plaza, Galaxy Way, Chevron, Clayton Rd.	30	--	--	42	11.5
Concord	260	Concord BART to Cal State East Bay via Cowell, Ygnacio Valley	40	varies	--		
Concord	310	Concord BART, Clayton Rd, Kirkier Pass	--	--	40		
Concord, Pleasant Hill, Walnut Creek	311	Concord BART to Walnut Creek BART via Willow Pass, Concord High, Treat, Pleasant Hill BART, Civic	--	--	80	181	12.2
Concord	314	Diablo Valley College to Concord BART via Contra Costa, Willow Pass, Clayton	--	--	40-80	888	22.2
Concord	315	Concord BART, Willow Pass, Landana, Clayton	--	--	80	64	9.5
Concord	320	Diablo Valley College to Concord BART via Diamond, Willow Pass, Clayton	--	--	45	163	13.4

CCCTA FY2011-12 Short Range Transit Plan

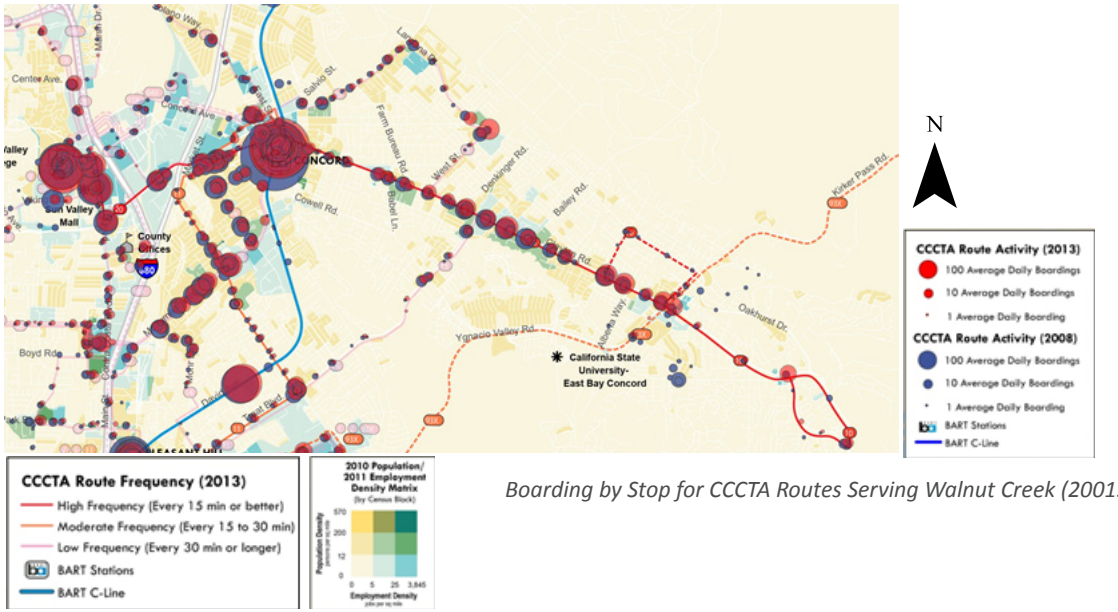
Routes 14 and 16 provide service in the Monument Boulevard corridor. Even combined, these routes have 40-minute frequency. However, productivity is reasonably strong, and there is boarding activity at stops all along the corridor.

The 2006 Monument Corridor Community Based Transportation Plan identified the need for a Monument Community Shuttle Bus. The shuttle launched in 2013 and now provides free service on-demand service targeting low-income, elderly and disabled passengers in the off-peak periods.

The 2006 BART Station Access Priorities identified several additional transit improvements for Concord station that have yet to be implemented at the station:

- Transit frequency improvements.
- Transit way-finding improvements with a transit stop diagram at the mezzanine and street levels of the station

Routes by Frequency for CCCTA Routes Serving Concord Station



Boarding by Stop for CCCTA Routes Serving Walnut Creek (20013 and 2008)

Busses access the station from the transit-only entrance at Mount Diablo Street and Laguna Street, and then proceed north through a drop-off and layover zone past the entrance to the paid area to a pickup area with two lanes of bus bays. Passengers access these bus bays from the main entrance to the paid area, and from the parking lot, with marked crosswalks located at the entrance to paid area, and at the intersection of the bus boarding lanes and Park Street.

Many routes travel around the station on peripheral streets to access the entrance on Mount Diablo Street at the south end and exit at Park Street at the north end. Bus route paths around the station are illustrated in the aerial photo on the right. Several routes loop around the station only to navigate between the route and the station exit and entrance. There may be opportunity to reduce distance traveled with two-way access to the bus bay and layover area.

Based on AM peak site observations and conversations with Central County Transit planners, most buses either lay over or wait at the drop off spots for up to 20 minutes, or pick up passengers and load and depart quickly from the bus bays. Buses queue at the layover area, but no more than three buses were observed at the bus bays at any one time. According to County Connection planning staff, nine of the eleven bus bays are designated drop off/ loading spaces, and more may be necessary with expanded service. However, current bus arrival and departure times are staggered throughout the peak periods with only minor overlap observed in the bus bay area.

Most passengers moving between the paid fare area and the bus bays cross north of the marked crosswalk at the shortest distance to the bus bays. Central County planners note that pedestrian/bus conflicts are a concern to bus drivers, and the existing crosswalk location only connects to the parking lots and plaza, and does not serve transit users.

Central County Transit identified bus access points and travel patterns on streets surrounding the Concord BART Station; these reflect the movements required to enter the station from Mount Diablo Street at the south end and exit to Park Street at the north end.

Pedestrian and Bicycle Access

The station currently has a large pedestrian plaza and bicycle lockers/parking, but is not a vibrant, pedestrian-scale environment. There is way-finding to and from the BART station provided by the City of Concord throughout the downtown area. Previous studies, such as the *Downtown Concord Specific Plan*[1] and the *Urban Land Institute's Downtown Concord Technical Assistance Panel*[2] report identified many of the same challenges to pedestrian and bicycle access that the consultant team observed during site visits:

- The streets immediately surrounding Concord BART station are vehicle-oriented, and many of the sidewalks are narrow without buffers from fast moving traffic.
- Many pedestrian crossings, including along minor streets, require pedestrians to push a button in order to get a walk signal.
- The parking lots and garage surrounding the station create a visual and physical barrier for pedestrians and bicyclists that is difficult to cross, and is reinforced with fences.
- Streets connecting to Downtown Concord are designed for regional access rather than local and downtown serving.
- There is a very long wait for the pedestrian signals along Grant between the BART station and Todos Santos Plaza; Clayton Road and Concord Boulevard are high speed one-way streets with aggressive traffic traveling in platoons.
- The station is surrounded by residential neighborhoods with more inviting pedestrian friendly streets near the station and Downtown, but with major gaps and boundaries; for example, the residential neighborhood to the east is hospitable to pedestrians until the Oakland Avenue boundary, where the sidewalk is narrow and crossings are marked only with yield-control crosswalks.
- Concord, like most of Central Contra Costa County, has one of the best regional bicycle trail networks in the US, including Iron Horse and Contra Costa Canal trails. None of these amenities, however, connect to downtown Concord or the BART station. The ULI report recommends bicycle improvements on several streets serving the BART station, including Grant, Port Chicago, Oak and Laguna, and recommends a path along the BART right-of-way.

Based on AM peak site observations, there are also several pedestrian and bicycle access challenges within the immediate station area:

- There are no marked bicycle facilities on adjacent streets.
- There are no stop-controlled crossings on Oakland Avenue between Clayton Road and Mount Diablo Street.
- Oakland Avenue is a four-lane, undivided road that carries fewer than 10,000 vehicles per day. It runs for only four blocks, and is significantly over-scaled for its function. As a result, traffic tends to operate fast, and in platoons.
- Southbound Oakland Avenue has a dedicated right turn lane for the garage and parking lot entrances, facilitating easy passing on the right.
- The north leg of the intersection of Oakland Avenue and the east parking lot and drop off entrance is not marked, and visibility is low at other legs.
- There are no formal bicycle connections to the station from the east side of the station – no on-road facilities, no connections through the parking lot and drop off zone, no way-finding to the existing secure bicycle lockers.

1 City of Concord, June 2014, www.ci.concord.ca.us/pdf/projects/downtownPlan/06042014.pdf
2 Urban Land Institute San Francisco, April 2014

Most pedestrian and bicycle activity was observed around the plaza on the west side of the station. Very few pedestrians arrived from the east side, which was more frequently used for passenger drop offs. A steady stream of pedestrians traveled north along the west edge of the station from the transit-only entrance on Mount Diablo Street, which connects to a large off-site parking lot that may have been the primary origin for these pedestrian trips.

There are several pedestrian and bicycle access initiatives currently underway in the City of Concord. The City's upcoming Bicycle, Pedestrian and Safe Routes to Transit Master Plan will develop a network, policies and programs that promote safe bicycle and pedestrian transportation throughout the city and focus on access to BART stations and transit hubs. These projects will also position the City to receive future funding to bicycle and pedestrian projects and roadway improvement, and will support the City's 2012 General Plan Amendment to incorporate Complete Streets policies into the Transportation Element of the General Plan to meet the needs of all users. The City of Concord also recently received grant funding for a corridor plan that will address streetscape design on Oak Street and Grant Street, which connect Concord BART to Downtown and Todos Santos Plaza, and are part of the "Green Frame" of Concord's Downtown Specific Plan.

BART is moving forward with plans for a plaza redesign and a bike station at Concord Station, concurrently with this station modernization plan effort. The plaza redesign aims to improve pedestrian connections to the Downtown area and to create a sense of place at the station. The proposed plaza design would also improve bicycle connections between Downtown and the station area, and could function as a shared use path between Grant Street and the station entrance. The proposed plaza is much wider than a typical shared use path, and would accommodate a substantial increase in pedestrian and bicycle volumes. Similar designs for shared pedestrian and bicycle space have been successfully used in other urban settings, such as in front of the San Francisco Ferry Building.

Example shared use path along the Embarcadero in San Francisco, where the San Francisco Bay Trail connects to the Ferry Building and ferry terminals

"Kiss & Ride" Access

The passenger pick-up/ drop-off zones are located adjacent to the parking lots closest to the paid fare area on either side of the station. On the west side the kiss & ride is accessed from Grant Street, and on the east side it is accessed from Oakland Ave. These areas are used steadily throughout the AM peak period, though no more than four vehicles were observed at any time, with no queuing. These areas are considered as part of the ongoing pedestrian plaza redesign efforts mentioned above.

This area currently functions adequately for vehicle passengers and does not interfere with transit access. However, it does not improve the pedestrian access and vehicles entering the parking areas. Drop-off zones may conflict with pedestrians entering the station area from surrounding streets.

Parking Access

There are 2,345 car parking spaces at Concord: 19 for monthly permit users, and 2,318 daily use spaces that cost $1.50 per day, as of June 4, 2013. The parking lot did not fill to capacity in 2008, but in February 2013 the parking lot fill time was 8:30 AM[1]. There is a significant amount of free parking around Concord Station, in surface lots and on-street spaces.

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1 Based on data provided by BART Customer Access Dept (R Franklin) in 2013.

3.0 CAPACITY, VERTICAL CIRCULATION & EGRESS

The station capacity and vertical circulation assessment identifies capacity needs related to future ridership projections and building design requirements.

BART's Sustainable Communities Operations Analysis (SCOA) identifies three station capacity categories, all of which impact the others: fare gate, vertical, and platform capacity. SCOA states that if vertical capacity (elevators, escalators, and stairs) is increased it will impact platform capacity; for example, expansion of vertical capacity with an additional stairway will reduce platform space and further constrain platform capacity, and will also reduce the metering effect of constrained vertical capacity, increasing the rate of accessing the platform. However, it is important to note that these recommendations are based on service plans, rather than station needs, and additional stairway access at Concord Station may also redistribute waiting passengers across the platform, increasing the utility of existing platform space, despite the reduction in total platform area. At Concord Station, where passengers access the platform primarily from the up escalator at the center of the platform, the area around the escalator landing is very congested, and the area on the far ends of the platform away from the escalator access is under used.

BART and the Santa Clara Valley Transportation Authority (VTA) have partnered to examine future needs and capacity impacts on BART stations related to BART service expansion south of the Fremont station to new stations in Milpitas, San Jose and Santa Clara. The Silicon Valley Rapid Transit (SVRT) C*ore Stations Modifications Study*[1] discusses high level capacity analysis for stations across the BART system based on emergency egress safety requirements defined in the California Building Code (CBC). Concord station was built before 1989 and used the California Public Utilities Commission (CPUC) building safety code; any upgrade to the station will trigger application of the CBC, which was adopted by BART as part of the BART Facilities Standards (BFS). The CBC code requires platform evacuation in four minutes, and station exit (to "reach point of safety") in six minutes; the platform exiting occupant load is equal to the maximum train load, which is 2,000 passengers for BART trains.

The SVRT report recommends that aerial stations with small concourses like Concord Station can address exit and access constraints with expansion of the concourse to accommodate new fare gates. The SVRT analysis notes that Concord may benefit from two new emergency stairways and approximately 1,000 square feet of additional platform capacity.

1 Nelson\Nygaard, October 2010

3.1 Station Capacity

- Current average daily volume is around 5000
- The projected average for 2040 is 8,000
- BFS required Design Capacity is LOS C[1]

- **Platform Design Capacity**
  - LOS C/D : Observed AM peak loading suggests that train departure intervals result in queues that extend across the full platform width, blocking circulation along the length of the platform to preferred queues
  - LOS C requires 5-7 square feet per person. Existing platform net area[2] is 13, 350 square feet. The implied capacity for the existing platform at LOS C is 1,907-2,670 persons. (Maximum 10 car train capacity is 2,000 persons)

1 BFS 2.2.2 Level of Service Description: LOS C- Some restrictions in walking speed and ability to pass others. LOS D-Restricted and reduced walking speed for most pedestrians.

2 Net area for this purpose is platform area less tactile edges, columns, escalator and stair enclosures, elevator, TM, trash enclosure, and wind screen area.

- **Vertical Circulation: Elevator Capacity: BFS Non-Compliance**
  - Existing hydraulic elevator measured descent travel time over 22'-10" is 36 seconds or 38 fpm.
  - BFS Standard Specifications for hydraulic elevators is 100 fpm with maximum 5% speed variation under any loading*
  - The existing elevator car inside dimensions are 67"x56"
    - BFS requires 80"x63"*
    - ADA compliance is satisfied for an existing elevator
  - It is not adequately sized to accommodate an average bicycle without lifting
  - Cannot therefore easily accommodate a wheel chair and bicycle simultaneously
  - Cannot accommodate a 24"x 84" stretcher*
- **Vertical Circulation: Escalator Design Capacity**
  - AM peak observations also found platform crowding with cross circulation at escalators
    - Stair guard structure and the elevator result in restrictions in walking speed and ability to pass others (Los C)
  - Escalator travel distance at Concord is 46 feet. Observed escalator travel time per passenger was 35 seconds or 79 feet per minute (fpm)
  - Assuming maximum speed of 90 fpm, existing escalator nominal Egress Capacity is 67.5 persons per minute or 4050 passengers per hour
    - BFS Design Capacity for Escalators is also 67.5 passengers per minute
  - Escalators are assumed to be bi-directional as required by BFS
  - Measured existing escalator step width is 39.5 inches (tread width)

AM Peak Crowding at Escalator

- **Vertical Circulation: Public Stair Design Capacity**
  - The existing stair at Concord is two-way. BFS requirement at two-way stairs is 8.5 passengers per minute per foot (LOS C).
  - The existing clear stair width is 5'0." BFS minimum stair width is 5'6" *
  - Existing stair travel distance is 46 feet. Total rise is 22 feet 10 inches
  - Measured climbing time was 28 seconds[1]
  - Measured descent was 26 seconds
  - The clear width of the existing stair permits 2 people to rise or descend on a single tread simultaneously
  - There are 40 treads in the existing stair
  - The calculated maximum capacity of the existing stair is 202 passengers per minute or 4.4 passengers per minute per foot[2]
  - Capacity does not conform to BFS Design Capacity for two-way stairs*
  - Width does not conform to BFS requirement for 3 exit lanes at 22 inches each *

*** BFS Non-compliance**

1 1.4-1.6 feet per second, about 1/3 flat surface normal walking speed
2 Assume 2 persons on each of the 40 treads and 6 additional persons at each of 2 landings

- **Vertical Circulation: Platform Access/stairs to track bed**

  (Gated stairs with warning signs at the platform ends, emergency access from track to platform)

  - As-built structural drawings indicate structural width of 3'6"
  - BFS requirement is 2'10" minimum
  - SVRT analysis found that Concord may benefit from two new emergency stairways

Platform Access Stair at North End of Platform

- **Open Concourse Design Capacity**
  - The BFS requirement is 11.5 square feet per person, LOS B
  - Net area of the existing concourse fare paid zone is 5,260 square feet
  - The LOS B based capacity of the existing concourse is 457 persons

AM Peak Concourse at Up Escalator

3.2 Emergency Egress Requirements and Performance

- For Concord Station, built in 1972, egress capacity is governed by CPUC-NFPA 130 (1989), CPUC Criteria with NFPA 130 Methodology
- BART/SVRT Core Stations Modifications Study found that modernization will trigger compliance with the California Building Code methodology
- • BART tested egress compliance in 2013 and found a maximum capacity of 1680 patrons will satisfy 6 minute and 8 minute tests

BFS Egress Criteria	Concord Station Current Status
There shall be sufficient means of exit to evacuate the station occupant load from the station platforms in four minutes or less.	Not Compliant
The station shall be designed to permit evacuation from the most remote point on the platform to a point of safety in six minutes or less	Compliant
Stations shall have at least two exits placed a distance apart equal to not less than one half the length of the maximum overall diagonal dimension of the station	Not Compliant

- **Egress Load Calculations**

Estimation Method	Assumptions	Passenger Load
California Building Code (CBC)	Full capacity train in peak direction track, 25% capacity in non-peak direction, 12 minutes of waiting	2,953
California Public Utilities Commission (CPUC) - BART's Current	Based on system ridership projections	1,172
Alternative Load Calculations (Nelson Nygaard)	Peak ridership projections for AM Peak Passengers at end of line stations	1,004

- The CBC calculation is based on both inbound and outbound trains arriving at the station at during peek ridership. This assumption, while potentially applicable for the Market Street San Francisco stations, is highly unlikely at Concord now or in the future. Therefor it is recommended the CBC figures be viewed as not applicable to the Concord Station.
- CPUC figures are comparable to the alternative loading calculations and are recommended to be used as the baseline for the exit lane requirements.

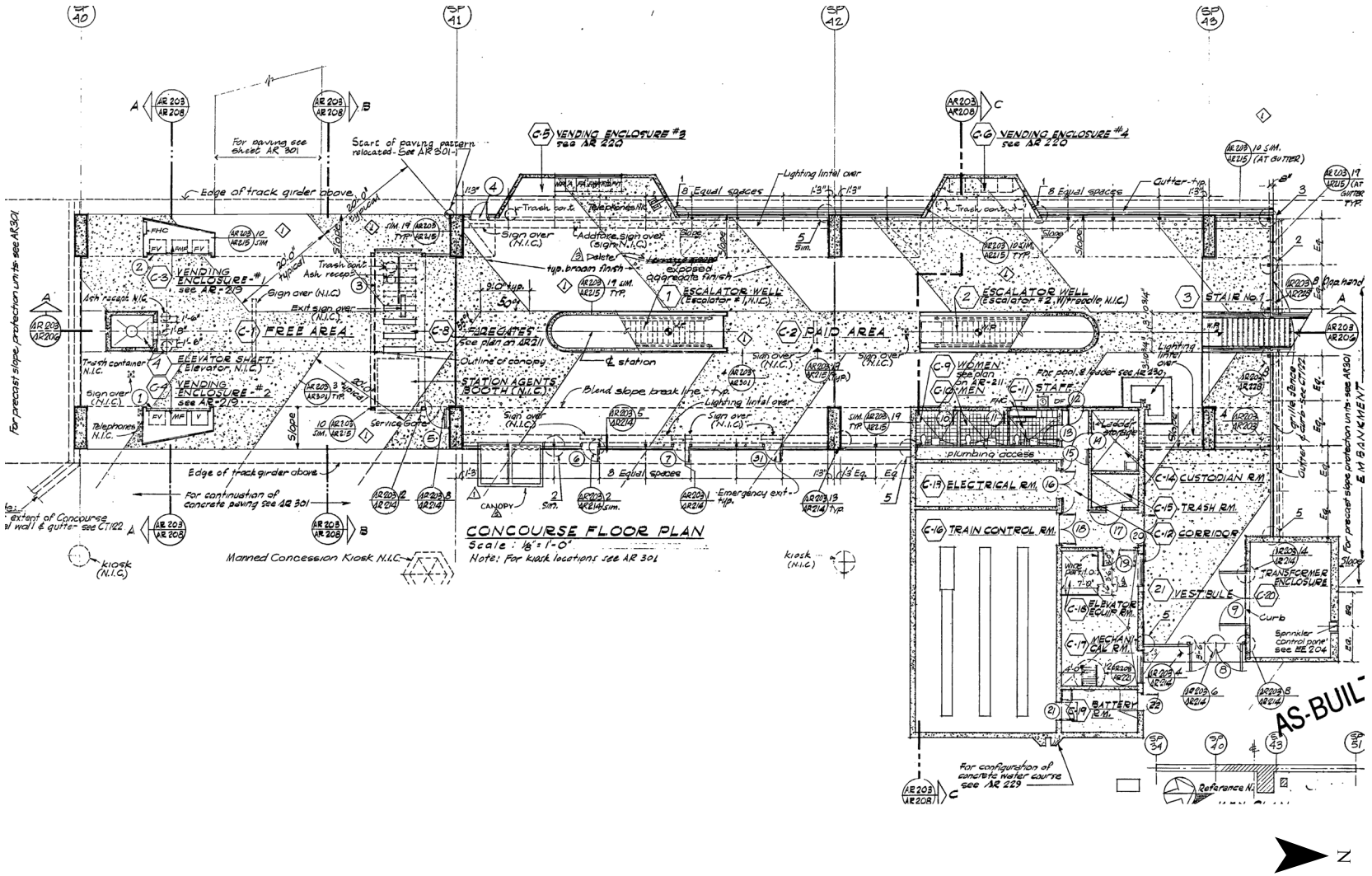
- **Emergency Exit Scenarios and Exit Lanes**

  - Assumes all passengers will exit from the platform to a point of safety at the nearest stair, fare gate
  - Current California Building Code requirements
    - 4 minutes for last passenger to clear platform and exit stairs
    - 6 minutes for last passenger to reach point of safety
  - Calculations are based on estimate 2040 ridership
  - Stairs from platform to concourse present primary constraint/opportunity

AM Peak Passenger Load Scenario	Passenger Load	Exit Time (min)	Required PPM Capacity	PPM/ Lane	Required Total Stair Lanes
CBC	2,953	4	738	40	18.4
CPUC	1,172	4	293	40	7.3
Alt Volume	1,004	4	251	40	6.3

Egress Scenario Comparison

4.0 FUNCTIONAL PLAN ASSESSMENT, STATION ACCESS AND CIRCULATION

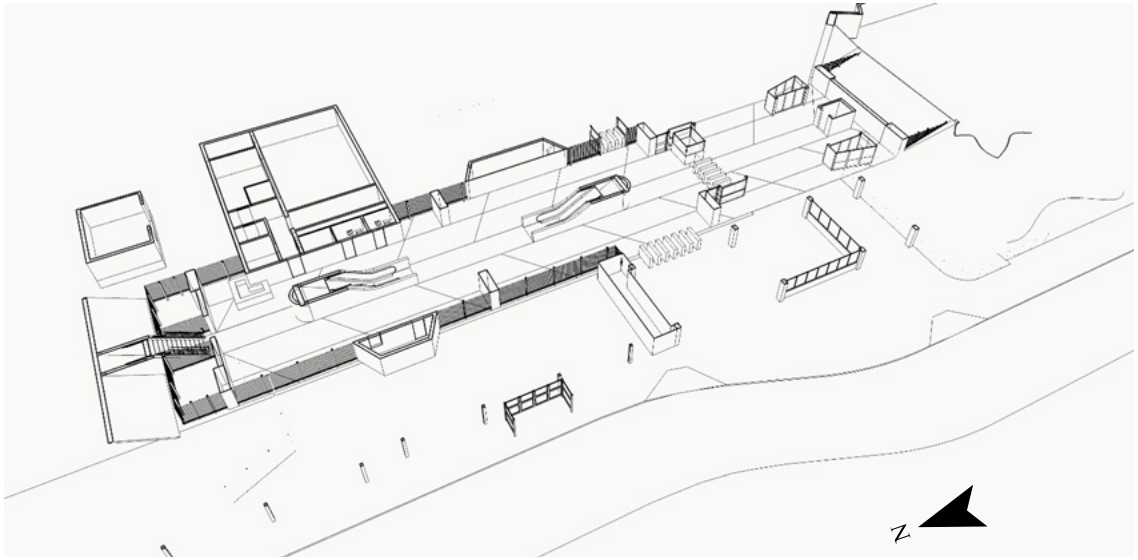


The functional planning assessment is based on observations by the VIA team members and BART personnel from station site tours, as-built drawing review, and focused on-site observation and analysis of passenger movement and platform use patterns as well as 2-dimensional plan analysis, the assessment considered the existing station in 3-dimensions, both from the point of view of a first time station user and a commuter or regular daily user. While the assessment findings are spatially interrelated, the discussion below is organized according to the major functional zones of the station.

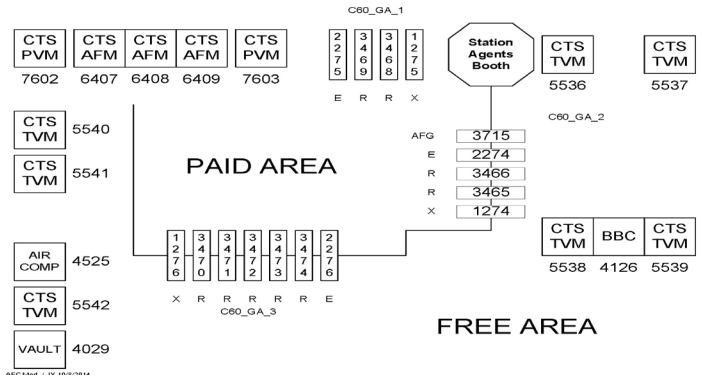
4.1 Station Ticket Vending and Fare Gates

The free- standing structures that house the system information, trip-planning information and the ticket vending machines are centrally located on the primary access path from the ease and west. However the orientation of the fare vending machines away from and at right angles to the path of travel to fare gates, and the deep alcoves they form adjacent to the elevator, result in the following functional issues:

- The location and orientation of the TVMs and information panels leads passengers in the opposite direction to the direct path of travel to the fare gates, contributing to inefficient flow and way-finding disorientation
- The deep alcoves constrain sight lines to the station entrance
- The dead end alcoves impact patron safety and are difficult to monitor and supervise
- The existing TVMs and information panels are remote from the most active fare gate array on the west side of the station
- The location of the elevator outside of the fare paid area creates a fare evasion problem and separates persons with disabilities and other elevator users from the primary passenger circulation paths in the concourse.



Existing Concourse Layout



BART Concord Station Fare Gate entry and exit data for July to November 2014 are represented in the two charts on the right.

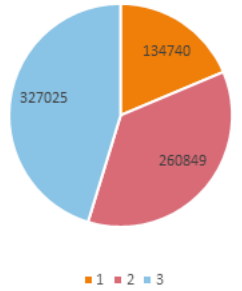
- Array 1 is on the East side of the station near the parking garage and also serving the Kiss & Ride and surface parking on that side of the station.
- Array 2 is located on the longitudinal axis of the station at the south end of the fare paid zone.
- Array 3 is on the West and serves bus and taxi intermodal transfers as well as pedestrian traffic from downtown Concord.

It is not clear how much of the evident preference for arrays 2 and 3 is a result of directional demand and how much is a result of the specific configuration, number of gates, or other factors such as weather protection. As might be expected the array on the more active side of the station has the largest portion of entries and exits.

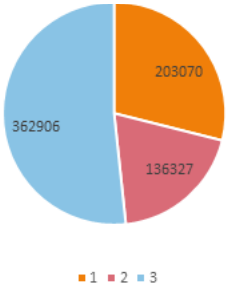
The weekend distribution may be understood to reflect reduced use of the parking garage and surface lots. For weekend entries the shift in balance between arrays 2 and 3 may also suggest increased traffic from residential neighborhoods versus Concord central business district. Weekend exits again favor the West array, perhaps reflecting Concord as a destination to some extent in the downtown area.

The existing configuration of fare gate arrays contributes to some functional disadvantages:

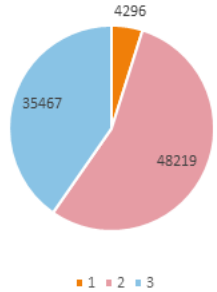
- Three entrances are difficult to monitor simultaneously from the station agent's booth
- Converging and overlapping fare gate queue zones are directly in line with the escalator walls result in poor sightlines and potential congestion in the station entry/exit zone
- Counter-flow traffic contributes to passenger movement conflicts
- The elevator is dissociated from the rest of the vertical circulation elements and is outside of the fair paid zone



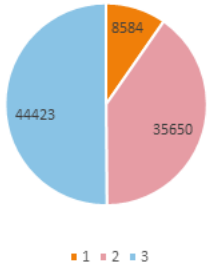
Fare Gate Entries per Array. All Days



Fare Gate Exits per Array. All Days



Fare Gate Entries per Array. Weekend



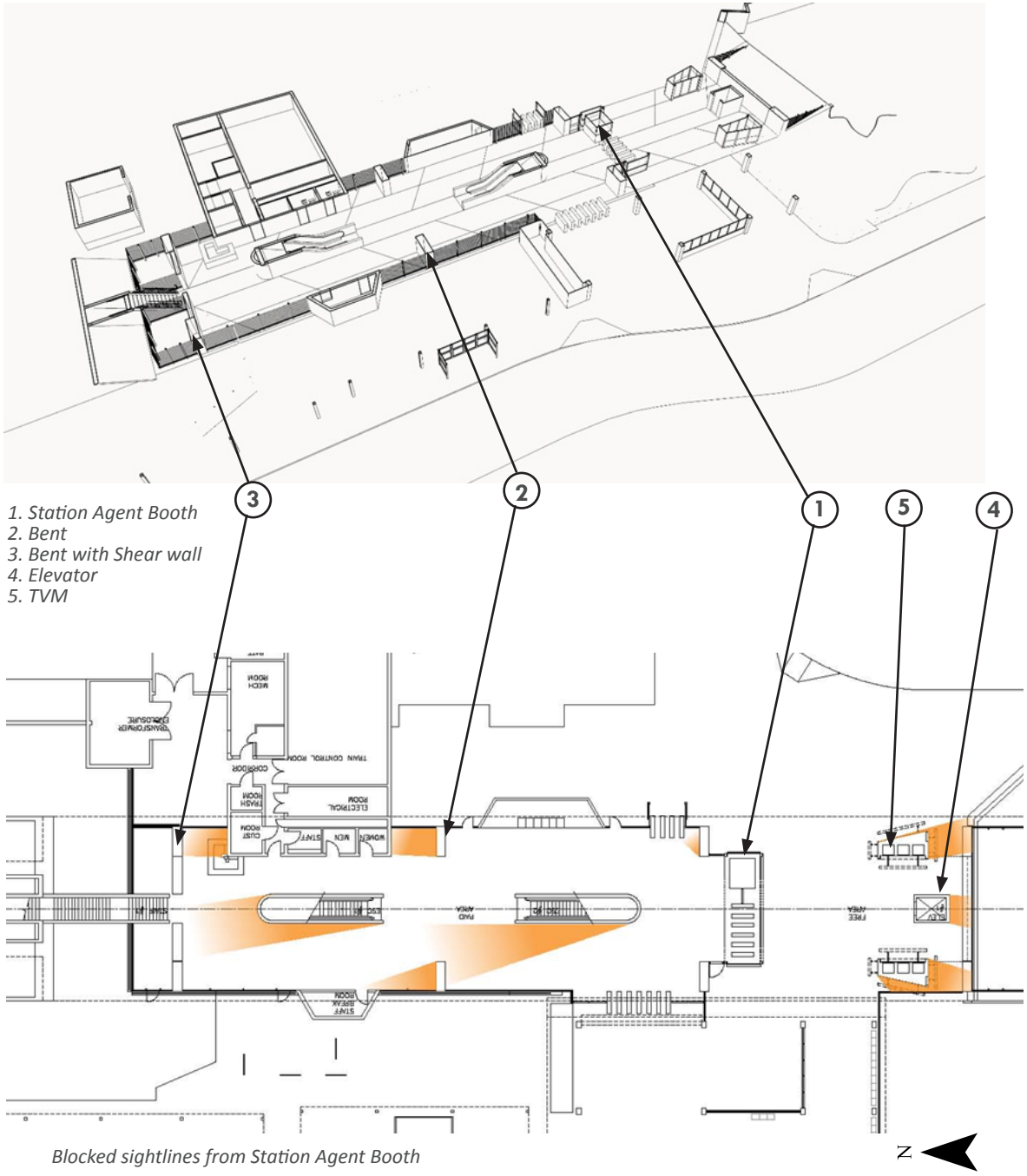
Fare Gate Exits per Array. Weekend

4.2 Concourse Circulation and Sightlines

The existing location of the station agent's booth with respect to vertical circulation elements and the recently seismically upgraded guide-way bents result in circulation and sightline issues:

- The station agent booth location does not allow visual supervision of all primary circulation areas of the concourse. Sightlines to many of the circulation spaces are limited or fully obstructed
- Non-structural massive concrete escalator enclosure structures obstruct passenger sightlines and also reduce the available circulation width on the east and west circulation paths
- Stair visibility is limited by shear walls that were added at the base of the stairs at the north end of the concourse, in the recent seismic upgrade

Non-structural concrete escalator surround and bent beyond

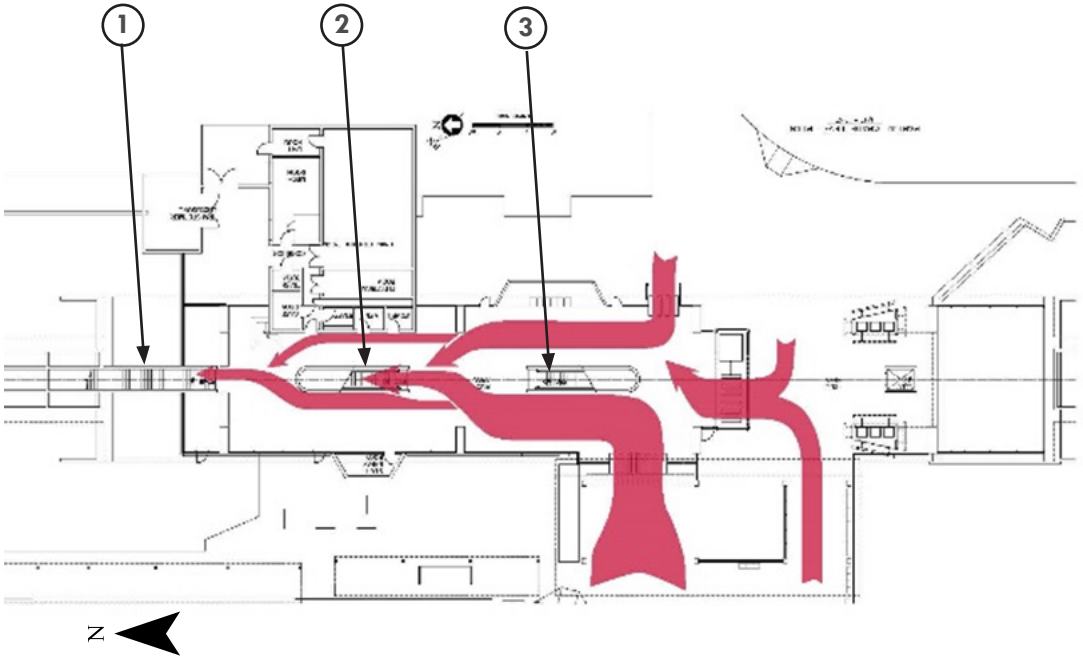


1. Station Agent Booth
2. Bent
3. Bent with Shear wall
4. Elevator
5. TVM

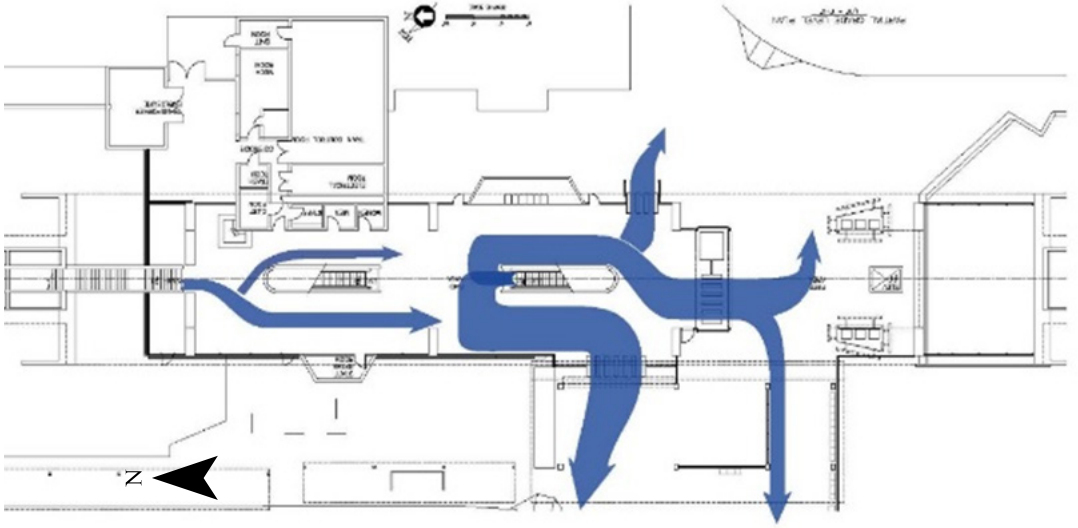
Blocked sightlines from Station Agent Booth

Counter-flow turning movements at the base of the down escalator conflict with incoming passenger flow toward the up- escalator or stairs.

- The orientation of the down -escalator requires passengers to make 180 change of direction at the concourse level, resulting in potential conflicts with incoming passengers and way-finding disorientation
- Right hand circulation paths that minimize counter-flow conflicts are not optimized in the existing layout
- Potential flow conflict points may reach critical congestion at peak times as ridership increases
- Given Concord Station location at near end of line, flow tends to be in one dominant direction at peak load



AM Patron Flow and Relative Volume

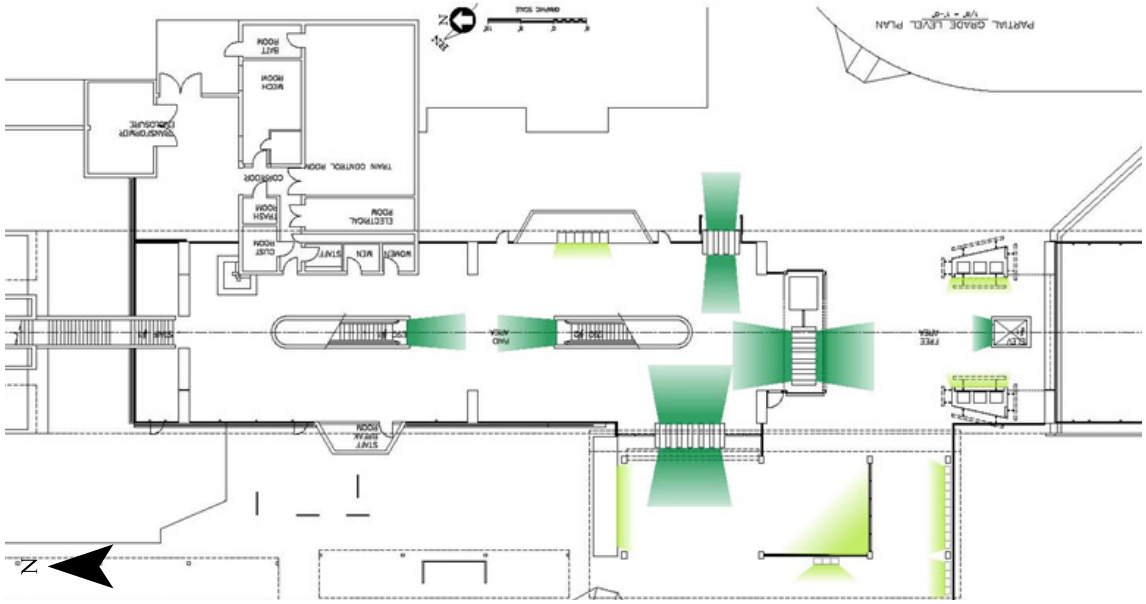


PM Patron Flow and Relative Volume

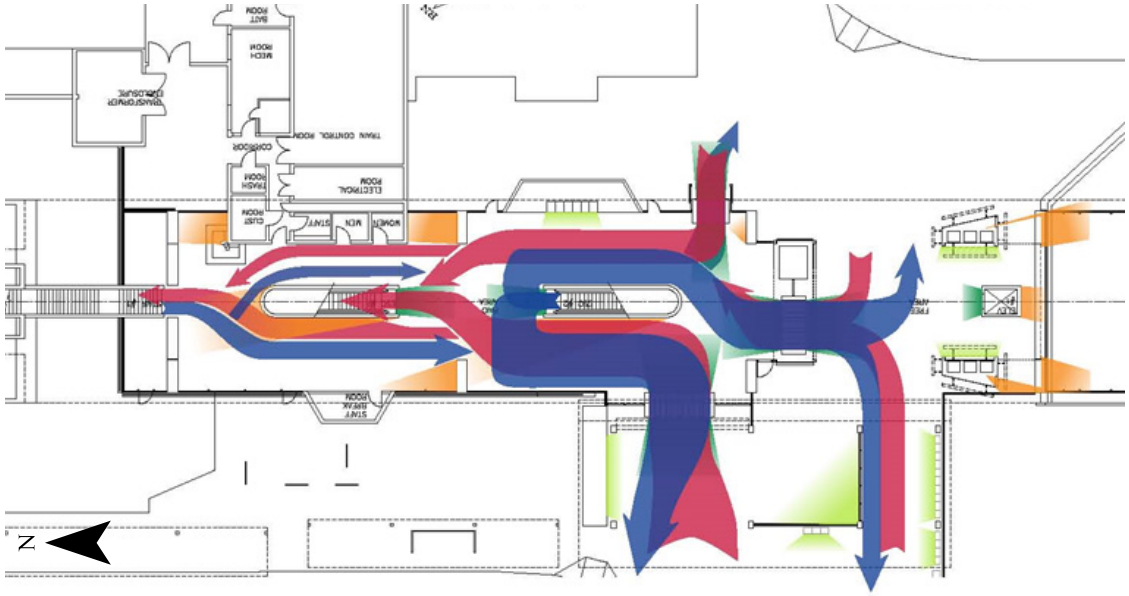
1. Public Stair
2. Escalator typically in up mode
*3. Escalator typically in down mode**

It is not confirmed that the existing escalators are have reversible direction capability. At every observed time they were in their typical directional mode.

- Queue and surge distance between bottom of down escalator and bottom of up escalator is 36 feet combined and conforms to BFS provisional minimum 15 foot escalator queue for each instance but compresses the additional Run-off from BFS 10 feet to 3 feet
- Queue space at center fare gates is 25 feet (to escalator enclosure) and conforms to BFS 15 foot minimum queue plus 10 foot Run-off per BFS
- Queue space at the Northwest fare gates is 18 feet to escalator and conforms to BFS for minimum fare gate queue but
  - Does not allow for BFS 10 foot Run-off on axis
  - Intermodal ticket vending machines at side of escalator conflict with the BFS Run-off
- Queue space at the Southeast entrance from the parking garage also conforms to the BFS provisional dimension but additional Run-off either conflicts with the queue space at the central axis or requires a 90 degree turn along the side or the escalator

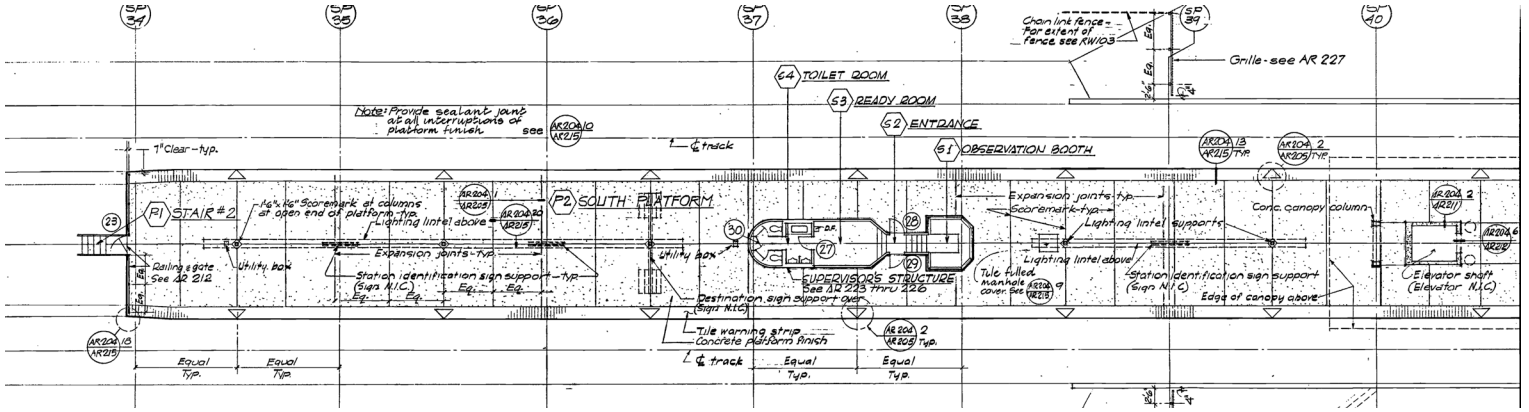


Queue Zones

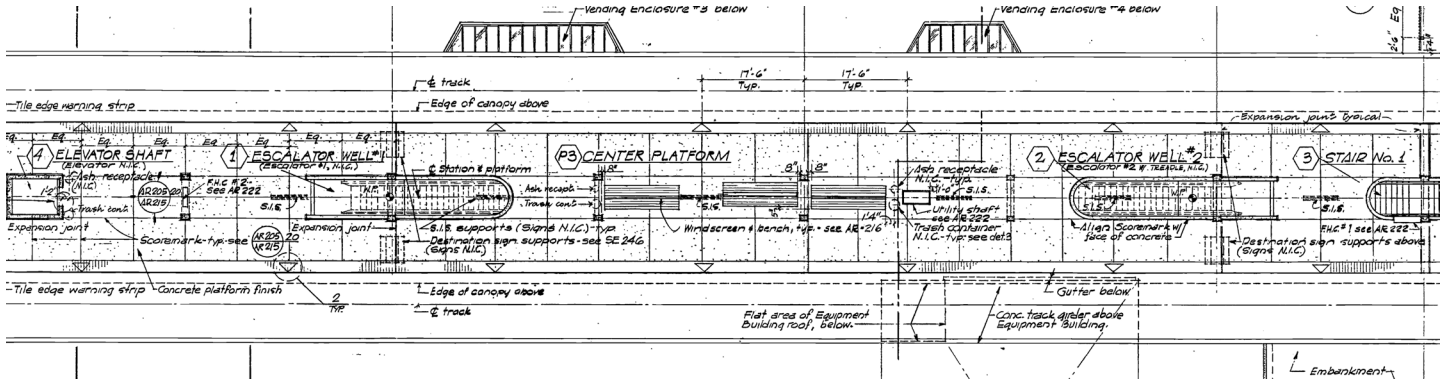


Overlaid Sightline, Queue Zone and Circulation Conflicts

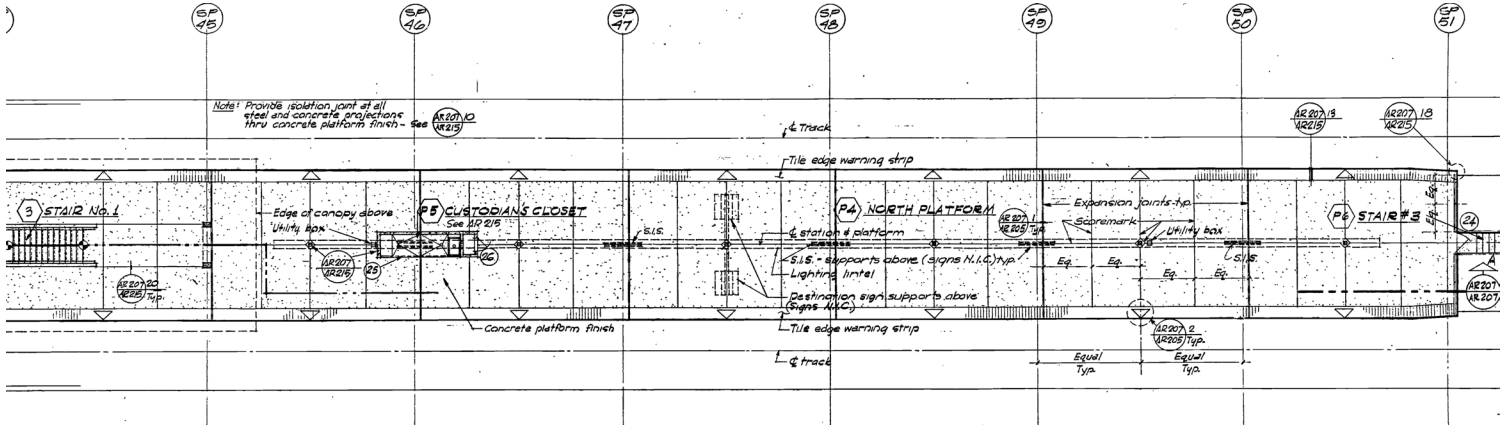
4.3 Platform Circulation and Sightlines



South Platform



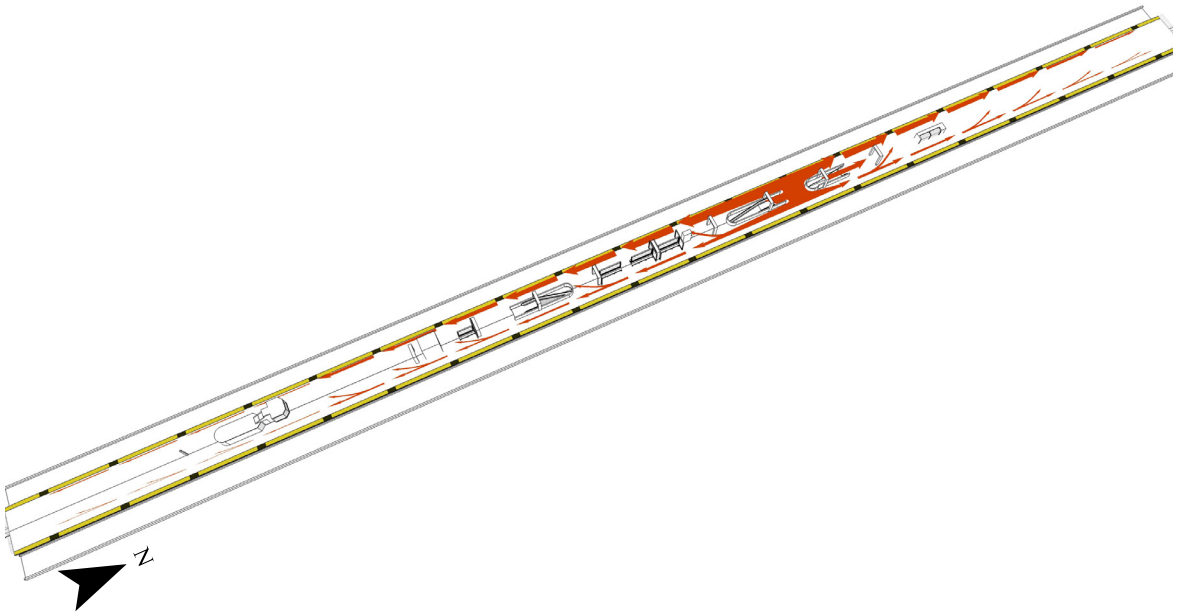
Center Platform



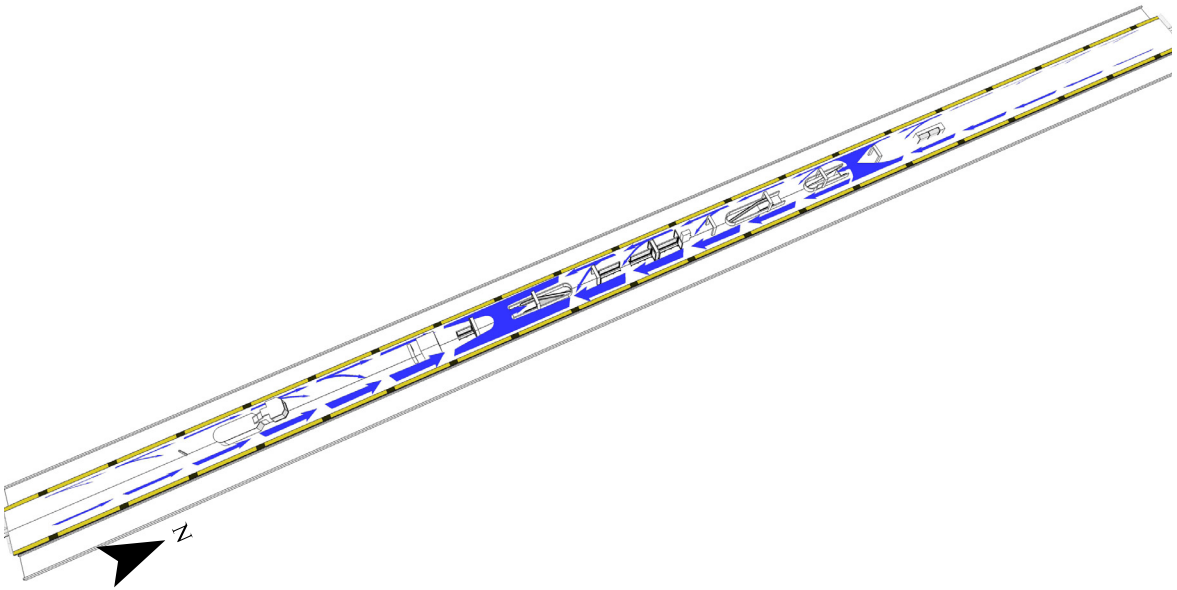
North Platform

N

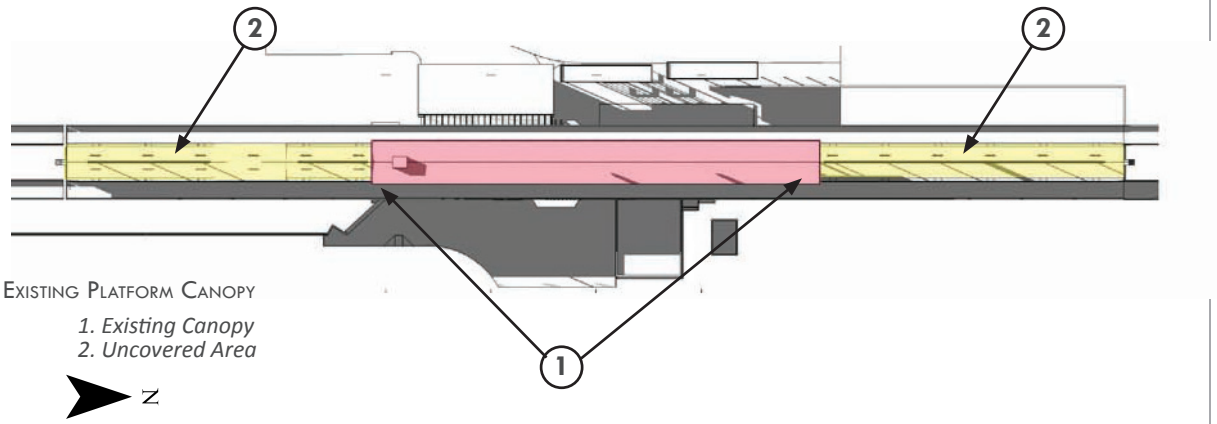
- Observed escalator direction is not modified at AM and PM peaks
- North escalator is always operated in the up direction
- South escalator is always operated in the down direction
- The single public stair is located north of the up escalator
- AM peak crowding occurs at center-north platform
- PM peak crowding occurs at center-south platform
- Public stair is remote from entrances resulting in limited use
- Escalators conform to the minimum ADA clear width of 32 inches but they do not conform to BFS minimum width



AM Peak Concentration at Center-North Platform



PM Peak Concentration at Center-South Platform

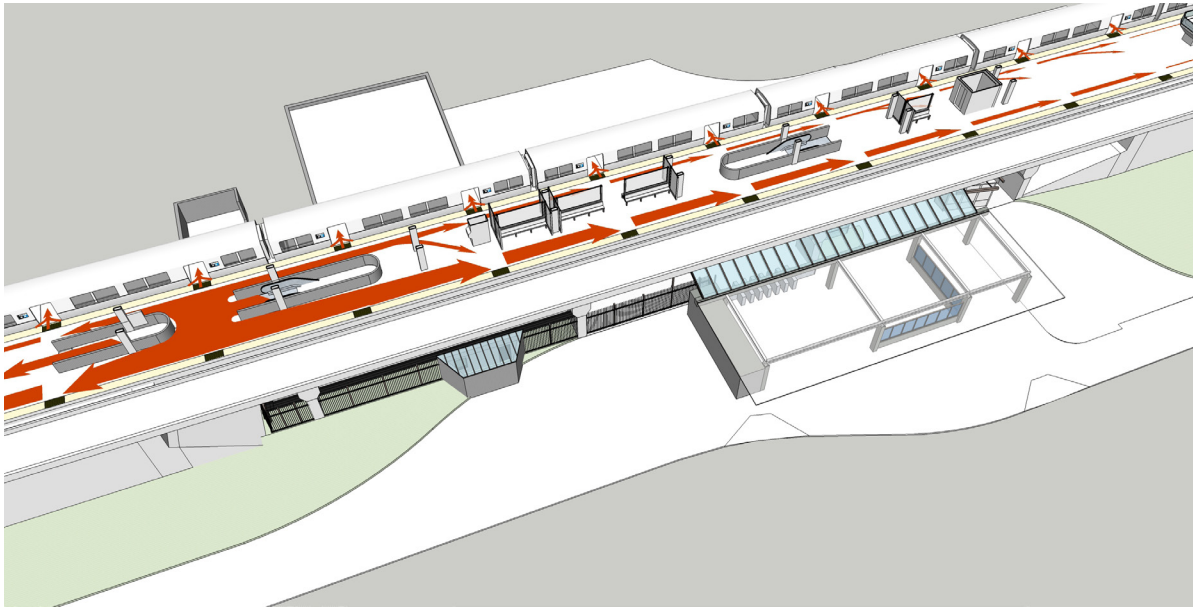


EXISTING PLATFORM CANOPY

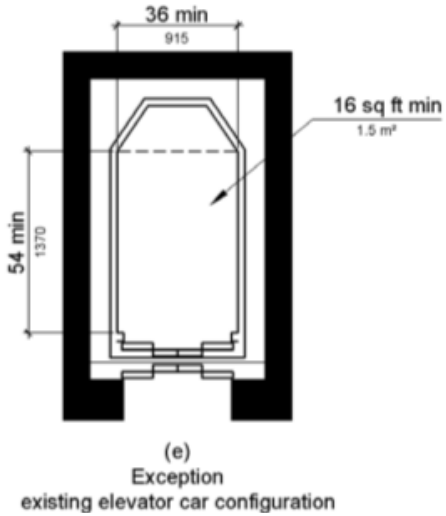
1. Existing Canopy
2. Uncovered Area

N

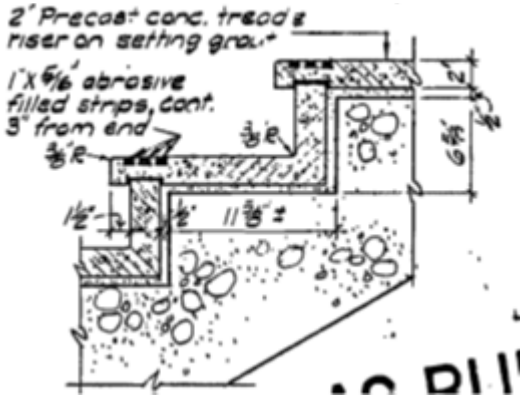
- Canopy coverage is limited to the middle third of the platform, concentrating use in the areas also occupied by vertical circulation and seating
- The TM structure, currently not in use, blocks visual access to the south end of the platform
- Concrete guards at escalators and stair tend to limit visibility
- The concrete elevator shaft limits visibility to the south end of the platform



- Concentration of vertical circulation elements at center platform combined with expression in massive concrete constrains patron movement on a narrow platform
- As the existing elevator is outside of the fare paid zone its' contribution to efficient circulation is limited
- The elevator is undersized compared to current BFS, further limiting its' contribution to movement of patrons as well as its' emergency use for stretcher transportation
- (The elevator does meet ADA minimum dimensions for an existing elevator but it would have to conform fully to ADA size if station modifications affect the principal function of the station)
- The current location of the station elevator is not in compliance with ADA requirement to coincide with general circulation path
- The existing stair tread-riser design does not meet current ADA requirements, limiting use by some patrons

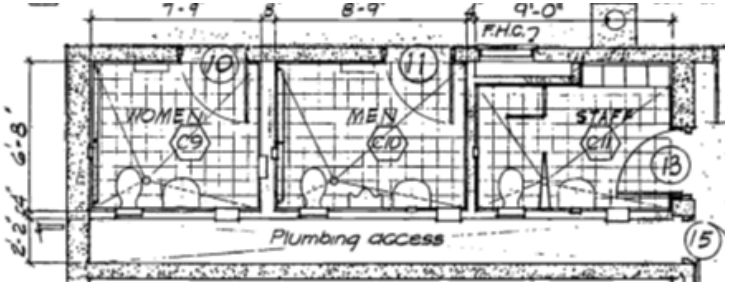


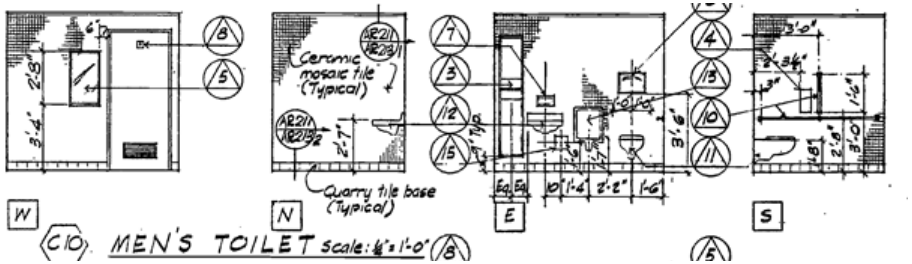
(e)
Exception
existing elevator car configuration



4.4 Public Restrooms

- Modernization alterations to Concord Station will invoke Title III, 2010 ADA updates to toilet rooms





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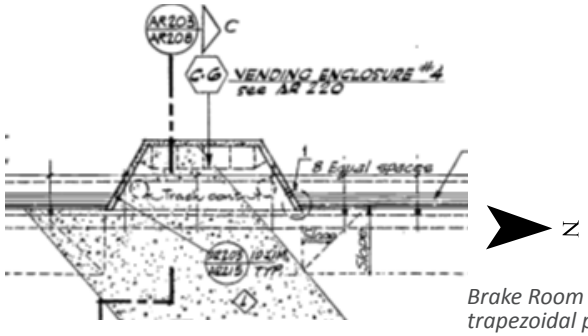
4.5 Staff Break Room

- The break room is a converted TVM space
- It is undersized per BFS and ADA standards
- The location of the existing break room is in conflict with the planned location of the bicycle station
- Break room should have adjacency to an emergency supply storage room
- Greater transparency of the break room could supplement station agent surveillance functions



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Brake Room Interior depth maximum dimension is 6'-4" in the trapezoidal plan

5.0 SPACE PLANNING: WAYFINDING AND ADVERTISING

5.1 Way-finding Signage Issues

A comprehensive review and update of Concord Station functional signage occurred in 2014 (Appendix 4) Functional signage types and locations are gnerally subject to system-wide implementation. It was not clear what the status of the 2014 update plan was at the time of this memo.

At the time of the Existing Conditions Memo (May 2015) it appeared that in general location, scale, design and content of sign types was inconsistent and ad hoc within the station and inconsistent with Basic Purposes of signage as stated in BFS. There was no clear hierarchy of sign types. Presentation of way-finding information was primarily visual, possibly not meeting current ADA requirements for vision impaired way-finding. At Concord the BFS principle that way-finding should be an "integral" part of the architecture and site design had not been applied in the original design. Patron Groups that are listed in BFS but not addressed well by way-finding at Concord Station include Mobility-impaired, Visually-impaired, Hearing-impaired, Cognitive-impaired, Elderly, Very Young, First Time patron, Non-English speakers, Literacy Impaired.

- **Station Entry**
  - Station identification signage is secondary in scale and location to advertising signage
  - Station ID signage is obscure compared to the Milbrae example in BFS
  - Advertising signage locations are ad hoc and inconsistent with station architecture
- **Concourse Level**
  - Way-finding signage and advertising signage compete for attention at the concourse level contrary to BFS principle "to efficiently and safely guide and direct the public…"
  - Signage with unnecessary or out of date policy statements clutter the visual field
  - Advertising signage conflicts with and defeats existing station enclosure transparency
  - BFS Community destination signage is absent
  - The design of the facility and location of fare gates is not consistent with the BFS principle that facility design and way-finding devices shall encourage right-hand traffic

Non-structural, Over-sized Concrete Escalator Cladding

Advertising Panels mounted on Station Enclosure system

- **Platform**
  - Real time Variable Message signage and information appears to be adequate
  - Real time audio may not meet ADA requirements due to poor acoustic environment and obsolete or improperly placed speakers
  - Egress signage appears to be code compliant
  - Tactile way-finding at top of stairs and escalators does not meet ADA requirements
  - Emergency exit/plan is provided
- **Hierarchy of Sign Types**
  - Overhead signs: the BFS principle that they are reserved for essential patron information is not implemented consistently
  - BFS concourse level real time and variable message signs are not implemented at Concord
  - Safety and Security signage may need an update to comply with updated code
  - Tactile signs require a comprehensive and specific review

Prominent Poorly Placed Overhead Advertising Conflict at Critical Decision Point

5.2 Advertising Signage

- Advertising strategy appears an ad hoc appropriation of available surfaces
- Advertising is not coordinated/ integrated with either station architecture or way-finding signage.
- Direct conflicts between Advertising and Way-finding are observed
- Direct conflicts between Advertising signage and CPTED transparency is observed
  - Opaque advertising panels are attached to the otherwise enclosure grille blocking daylight and limiting transparency

Confusing adjacency of Advertising and Regulatory Sign Types

1. West enclosure fence facing plaza and bus loop, Station interior

2. West enclosure fence from exterior plaza and bus loop

3. South entry fare gate array and station agent booth

- CPTED: Locations on the primary enclosure ensure that the ability of patrons to see into the station or to orient themselves with respect to the site from the inside of the station is limited (photos 1 and 2)
- Inconsistent mounting heights even in arrays of identical sign units add to the visual confusion at Concord Station (photos 1 and 2)

- Overhead locations contravene the BFS principle that reserves that space for information "essential to guide patron to their destination" as well as BFS decision point signage principles (photo 3)

4. SP 42 facing north escalator

- The scale of the non-conforming overhead sign type also obscures essential patron wayfinding signage in direct adjacencies (photo4)


5. South escalator enclosure from west entry

- There is no clear hierarchy of signage in either scale or location, revenue signage appropriates primacy in scale and location (photo 5)

6. SP 42 bent column

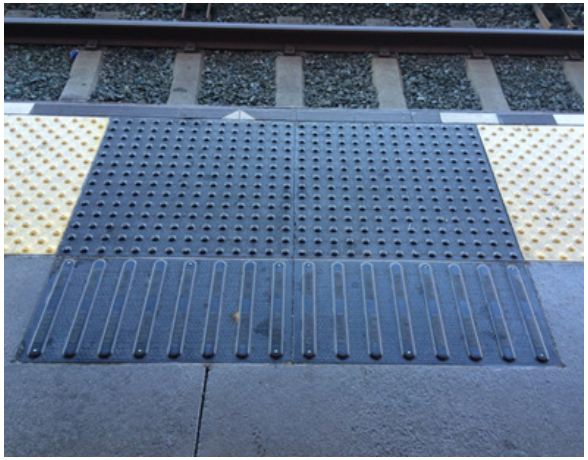
- Conduit for backlit signage is routed in an ad hoc expedient manner (photo 6)
- Every revenue sign type and locations for identical revenue sign types have inconsistent mounting heights (photo 6)
- Backlit revenue sign types project from the wall creating potential bird perches and the problem is solved in an ad hoc manner, introducing yet another material type (photo 6)

- **ADA/ Universal Access Signage and Wayfinding**

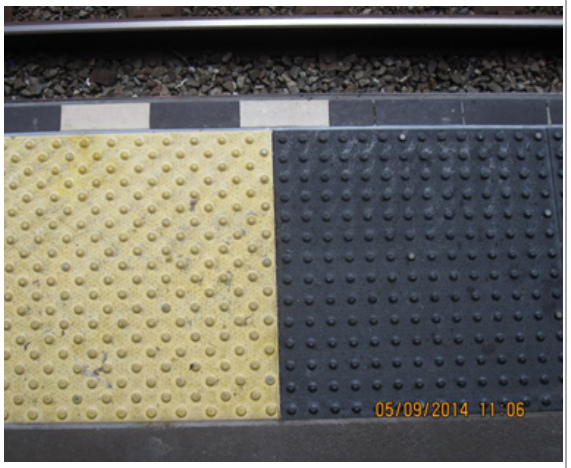
Concord Station, constructed in 1970, predates the first iteration of ADA, the Americans with The Americans with Disabilities Act (1990). Previous and current versions of ADA Accessibility Guidelines may have been implemented in the existing Concord station either due to alterations such as the 2013 seismic upgrades or as a matter of BART system-wide conformance. Certain aspects of the existing station such as the elevator reflect allowed exceptions for existing components. Alterations proposed for station modernization may result in the need to update particular functional spaces that are related to the primary function of the station, such as the toilet rooms.

- Detectable Warning at the platform edge may need to be brought in to conformance with CBC if platform changes are made
- Distinct directional color at door locations is provided but does not conform to CBC but directional pattern is only provided at center platform
- Exception may have been approved by the State Architect as required
- ADA tactile signs were not evaluated for this memo, are assumed to conform to BART system-wide standards and programs
- Public address systems at Concord exist and the same or equivalent information appears to be provided in visual format
- Aural equivalence was not tested for this memo
- Continuous tactile path is not provided but it is not required
- Top of stair tactile warning is not provided

No top of stair tactile warning



The four enter platform door locations include directional tactile information panels



Typical Door Location at Concord is by pattern and color

6.0 STATE OF GOOD REPAIR

6.1 Station Architecture

Materials and finishes review

- The primary architectural material at Concourse level is unpainted shutter form-board cast-in-place concrete.
- Raw concrete is inherently difficult to maintain and tends to gather and store dust, soils and stains easily
- Raw concrete conflicts with BFS materials criteria for ease of maintenance and resistance to vandalism, i.e. that all surfaces exposed to the public be finished in such a manner that the results of graffiti can be readily removed with normal maintenance techniques
- As a specific type of concrete wall finish shutter forming conflicts with BFS requirements for smooth textures
- The secondary structural material is painted steel, generally in good condition although re-painting requires field application of coatings, usually resulting in less durable finish performance
- Platform canopy is painted steel decking, durable and apparently in good condition except at expansion joints
- The dominant third level finish material for hardware doors and handrails is painted steel which is in each instance not the preferred option industry wide and in BFS as painted finishes in contact areas tend to be high maintenance and require maintenance that interferes with station operations
- Handrails do not conform to BFS requirement for stainless steel or galvanized steel
- Stainless steel fare gates and ticket vending areas are in good condition
- Painted wood at platform benches requires continuous maintenance
- The unfinished wood soffit at concourse level appears to be in good condition but conflicts with the BFS allowable materials for ceilings
- Sealed concrete floor finish at platform level is potentially hazardous when wet and produces night glare
- Sealed concrete floors are easily maintained.
- Platform floor finish may conflict with current BFS requirement for a static coefficient of friction not less than 0.6
- Concrete floor at Concourse level with alternating 20' wide bands of exposed aggregate and broom finish appears sound.
- The Concourse decorative floor banding and finish type complicate revisions to station component locations over time
- Stair tread/riser concrete is worn and surface, non-integral, nosing strips are discontinuous

- Ad hoc additional materials, for example for bird exclusion, are present and tend to be placed expediently without integration in station architecture.
- These added materials conflict with BFS requirements for durability, good appearance and resistance to vandalism. (BFS Architectural materials criteria)

6.2 Station Lighting

- Concourse interior characterized by hot spots and glare
- Existing fixtures are directed at spaces rather than surfaces resulting in inefficient performance
- Vertical circulation elements are poorly illuminated or lenses have become discolored, resulting in poor illumination levels
- Platform lighting employs both metal halide and fluorescent lamps resulting in mixed spectra, glare and hotspots
- Lamp and luminaire types are out of date in terms of efficiency and maintenance costs
- Platform lighting is exposed luminaire or lens down-lighting, resulting in light spill and glare
- Re-lamping appears to be consistent and current

6.3 Maintenance

- BART has implemented new trash receptacles system wide and they have been implemented at Concord
- Trash removal appears to be regular
- The trash storage structure at the platform obstructs movement and sightlines
- Major maintenance effort has been directed at bird exclusion from architectural elements and systems
- Cleaning and maintenance at station toilets not reviewed for this memo

Structural, mechanical and electrical review scope at 15% was limited to one visit to make a visual assessment. Testing of systems was not scoped for 15% design.

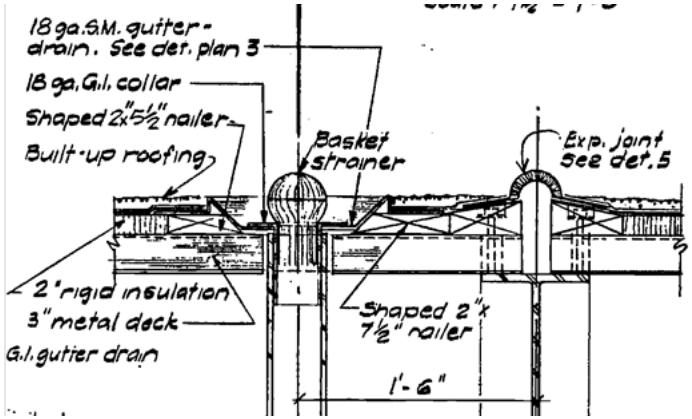
6.4 Station Structural

- Station specific seismic upgrade in 2013. (Contract 15PQ-110 DMJM Harris-AECOM)
- Vibration Limitations not tested
- Loads and Forces: BFS Roof and Floor Live Load requirements are assumed to be met in existing design
- Wind Load: assumed compliance with CBC wind loading per Occupancy Category IV and Exposure C. Testing not performed
- Equipment Loads: assume existing design meets requirements. Confirm equipment loads if platform or grade level floors are modified

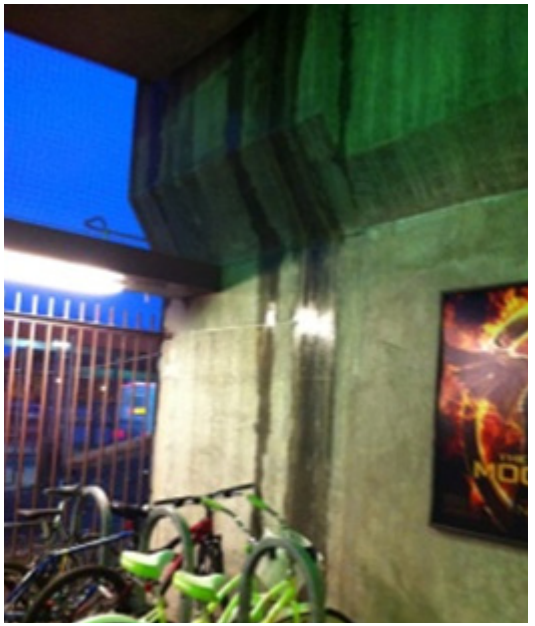
6.5 Station Mechanical

- HVAC
  - Noise performance not tested
  - Power requirements not tested
  - HVAC temperature control, pressure and air exchange for enclosed spaces not tested
- Fire Protection
  - Existing system is reported to be out of date
- Mechanical Seismic Requirements
  - Assume 2013 seismic upgrade included required upgrades to mechanical
- Plumbing
  - Assume existing fixtures and equipment may not meet current BFS water efficiency requirements
- Rainwater
  - The systems are assumed to be properly supported
  - Existing system does not meet BFS requirement for piping systems designed and arranged for neat appearance

- The original integral artwork water feature at the ancillary building which utilized water run-off from the roof has been disconnected and partially removed
- This drainage revision along with the original design of the roofing may have contributed to observed water intrusion in ancillary spaces
- BART reports that the source of water intrusion in the ancillary room is conduit
- Canopy rainwater leader transitions are exposed at the underside of the canopy and then integrated in canopy columns
- Water intrusion was observed at platform, over stairs, over escalators and at concourse levels
- Observed locations of water intrusion at platform level correspond to canopy expansion joint locations
- Low profile curbs at platform canopy expansion joints may be inadequate to prevent water intrusion into joints
- Overflow scuppers do not appear to have been incorporated into the original design.
- The original canopy rain water design incorporates a centerline longitudinal gutter that traverses expansion joints, with drains at column locations



Proximity of roof drains and expansion joints may account for water intrusion at platform and concourse levels



6.6 Station Electrical

- Power
  - Electrical panels were updated in 2009 and adequate spare circuit breakers for
  - Replacement scheduled:
    - UPS for emergency lighting
    - Panel boards
    - Fire alarm system
- Conduit management
  - Risers: architecturally articulated and enclosed from the ancillary rooms to the platform
  - Distribution conduit is not accommodated in a systematic or integral way resulting in ad hoc surface mounting of conduit for added or modified fixtures and services

6.7 Station Communications (BFS Electronics)

- Access Control System
  - Assumed to conform to BFS or that other projects will update
  - Assumed camera monitoring of access conforms to BFS
- BARTnet (WAN)
  - Assumed to conform to BFS
- CCTV: CCTV (CAB 100)
  - Assumed to conform to BFS or that other projects will bring into conformance
- Display Systems
  - BART Destination Sign System is deployed at the platform level
  - System-wide compatibility assumed
  - Compliance of system-wide DSS with ADA requirements is assumed
  - The BFS required number of DSS per platform side (4) is provided
  - DSS interface with Concord PA system is assumed
  - Spacing of DSS at platform appears to conform to BFS
  - Software is assumed to conform with DSS

- PA System
  - Existing Public Address system is out of date (speaker type)
  - Functionality of speakers at the platform level is compromised by reverberation caused by the particular combination of materials in the floor and ceiling planes
  - Confirm power from UPS per BFS
  - Confirm whether speakers are IP addressable per BFS
  - Confirm BFS conformance of switches
  - Assume existing system may not conform to applicable ADA provisions
  - Assume BFS acoustical modeling has not been performed and non-conformance to ANSI S3.2 as required by current BFS
  - Confirm integration with Fire Alarm system
  - Confirm visual display of PA announcements as required by BFS
  - Confirm volume control in staff rooms per BFS requirements
  - Speaker distribution appears to conform to BFS 15-20 foot centers at platform
- Automatic Fare Collection System
  - Assumed conformance to BFS
  - BART concerns on fare evasion/ fare gate design
- Automated Train Control (ATC)
  - Assumed to conform to requirements and that Train Control Room is adequate
- Integrated Computer System
  - Assumed to conform to current BFS
- Telephone System
  - Assumed to conform to system-wide requirements (BFS)

7.0 DESIGN CONCEPT SUMMARY

7.1 Intermodal Improvements: Bus Loop

- BART does not necessarily accommodate bus facility improvement needs but does have a clear interest
  - Intermodal efficiency improves patron experience
  - Supports ridership and system revenue
  - Supports overall sustainability of transportation systems
- County Connection's current level of service does not utilize all of the existing bus bays
- A more efficient configuration can benefit bus and BART patrons
- BART can accommodate more bus bays if service expands
- The existing bus loop is located directly between the station and downtown Concord, straddling the principal bicycle and pedestrian access paths
- Further analysis of bus operations that would support or direct specific proposals includes
  - bus schedules
  - layover needs
  - boarding data

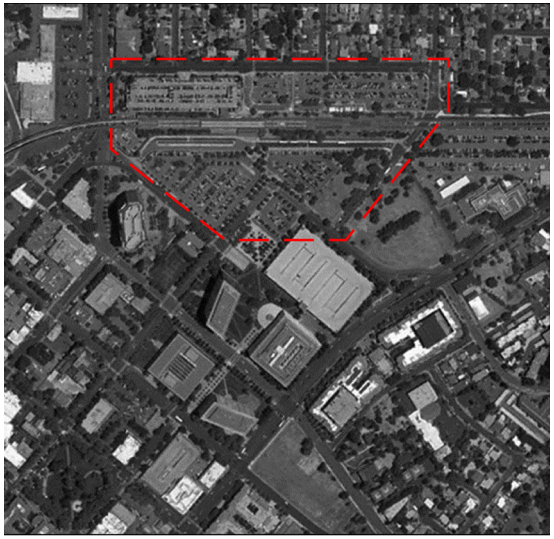
Opportunities:

- Consolidate bus activity
- Focus on BART passengers
- Create a transit hub
- Maintain future capacity

Concepts:

- Phased improvements
- Improve weather protection
- Increase transparency
- Capitalize on plaza and station updates
- Connect to streets

- **Existing Bus Loop**



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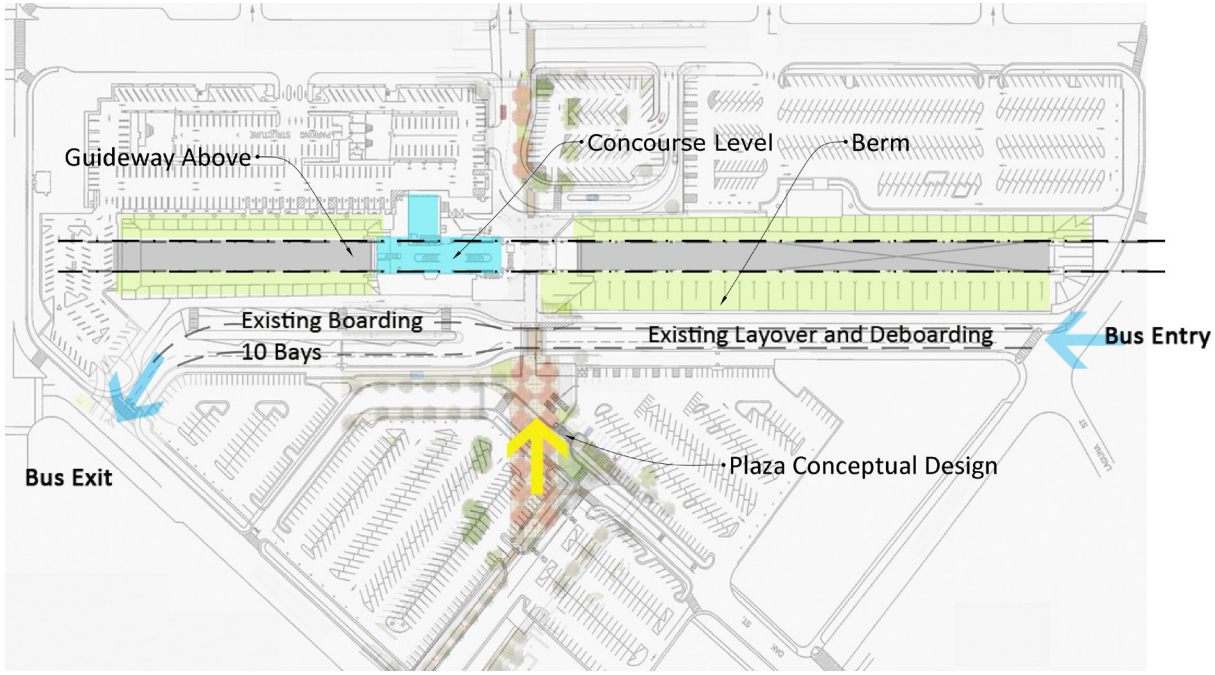
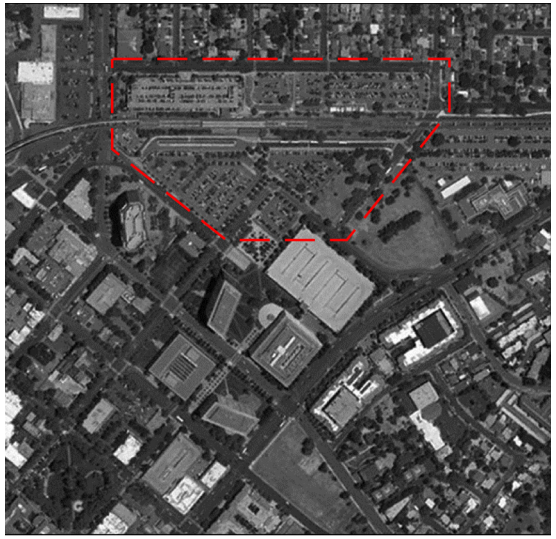
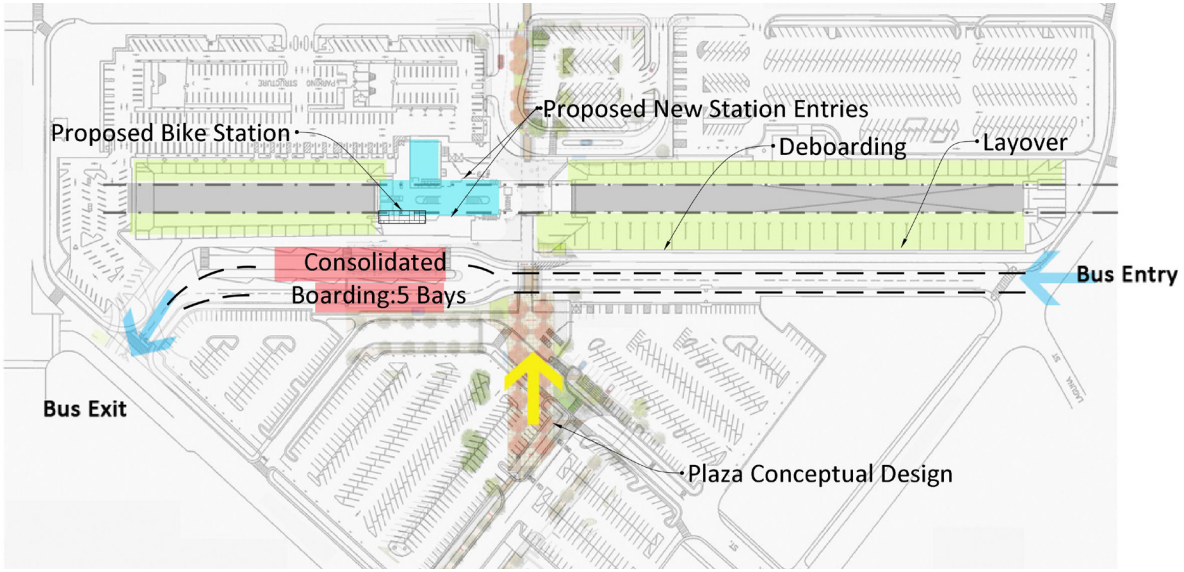


At this stage of design three alternative conceptual strategies are proposed

- near term,
- medium term
- long term

- **Concept 1- Near Term: Consolidate Loading**

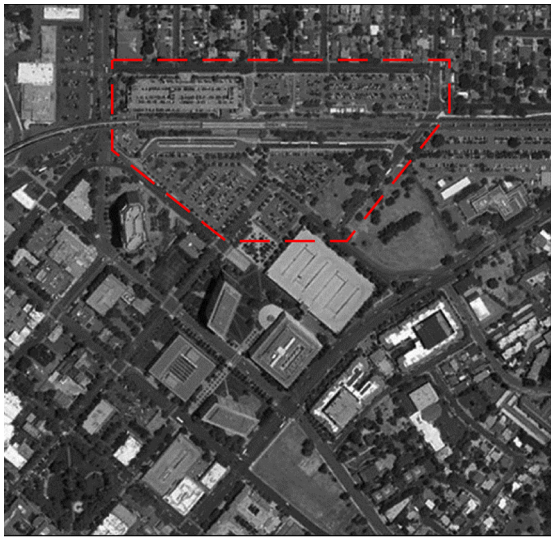


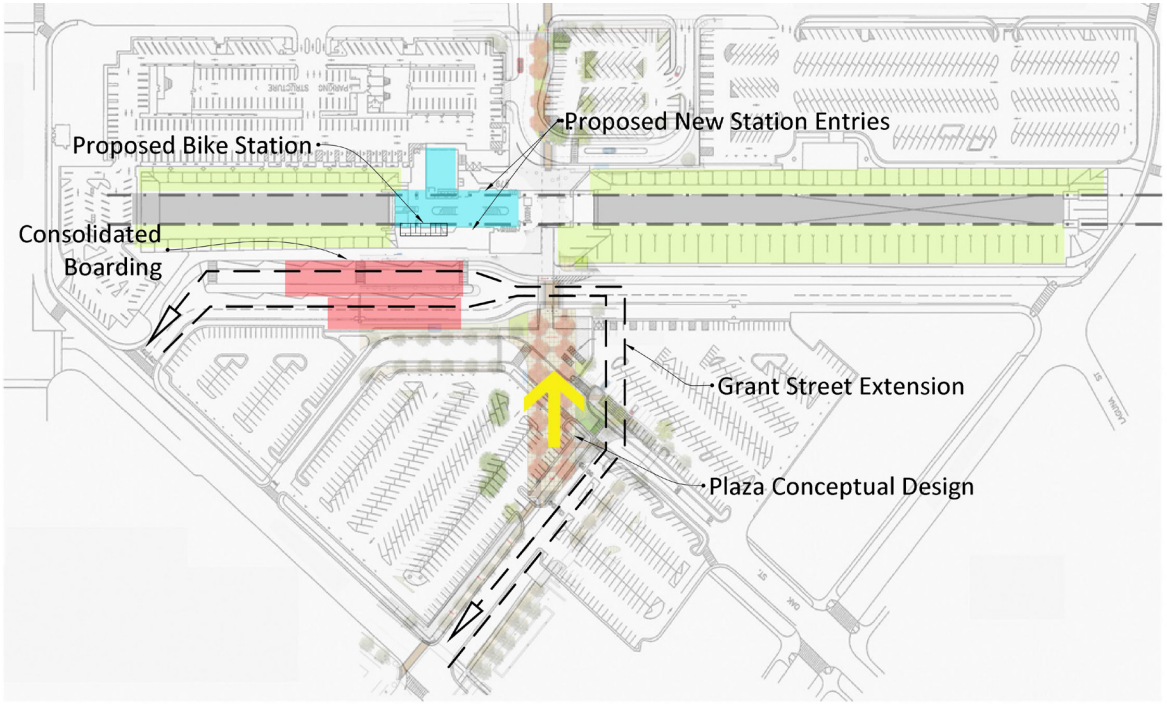


N

- All drop-offs and layovers at south end
- All loading consolidated to five 80-foot bus bays within current loading area
- Opportunity for dynamic bay assignment
- No change to operations
- Reduces bike/pedestrian conflicts
- No change is required to the current plaza design (see above)

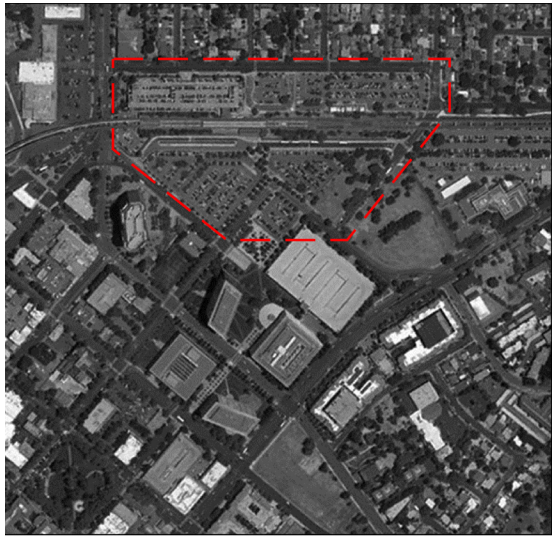
Concept 2- Medium Term: Grant Street, Two-way Access

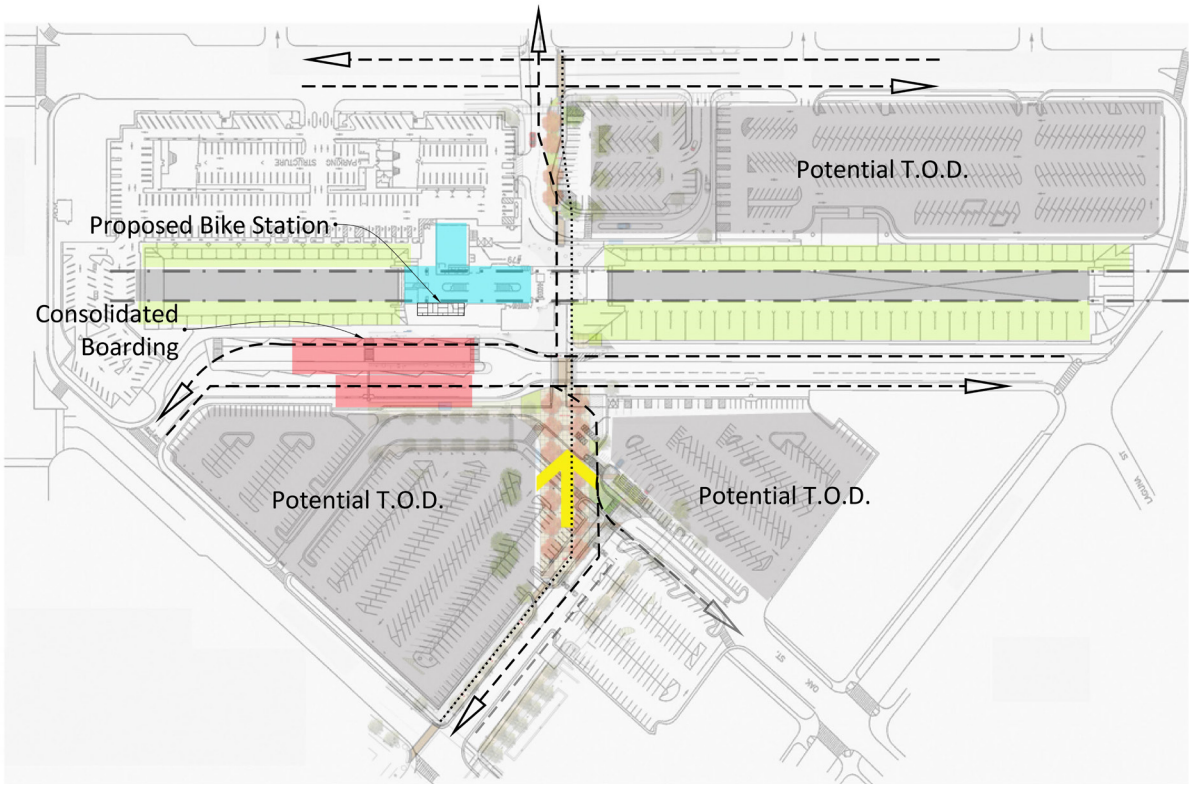




- Two-way access at Grant and Park
- Disembarking/layovers and loading accommodated along south edge of plaza
- Extends Grant Street into station area
- Improves passenger access
- Flexible bus access
- Provides room for expansion

Concept 3- Long Term: Street Grid Connections





- Re-connects street grid
- Accommodates two-way bus access
- Supports future T.O.D./ Mixed-use development
- Continuity between downtown and neighborhoods to the east
- Flexible bus access
- Flexible layout options

7.2 Station Conceptual Strategy

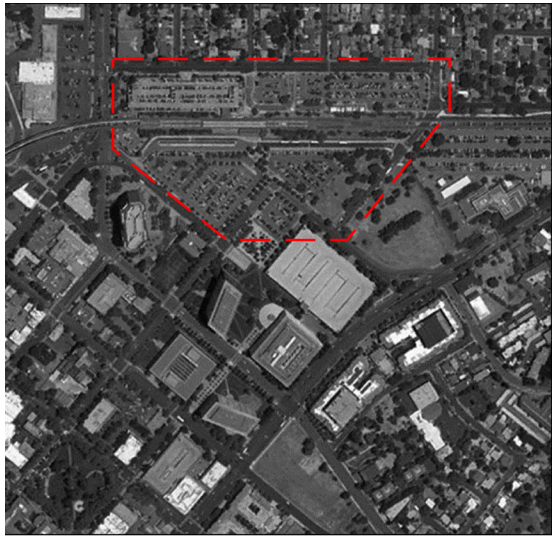
- The existing station aesthetic is an example of 1970's Brutalism, also know as béton brut (raw concrete)
  - Many of the BART stations employ a similar aesthetic
  - Brutalism was a popular aesthetic in the 1970s among governmental and institutional clients internationally
  - Brutalist architecture typically employed bold graphic and formal expression, is thought to have intended expression of strength, functionality, materiality and economy
  - Repetition and modularity are characteristic of many Brutalist structures
  - An important theory of Brutalism considers it an expression of an atmosphere of "moral seriousness"
  - Concord Station is not an historically significant instance of Brutalist style but it is a clear example
- Critique of Brutalist Architecture
  - Raw concrete tends to lose its' fresh aesthetic appeal relatively quickly, especially in marine environments
    - Concrete is relatively porus, making it susceptible to cracking, dust retention, air pollution, staining and vandalism such as graffiti
    - Raw concrete is not light reflective and becomes less so as it becomes soiled
  - Expressions of strength in Brutalist buildings have been interpreted as expressions of oppressive power in some cases
  - Expressions of economy in Brutalist buildings are not always or necessarily economical
  - Universal formal solutions may also be understood as anonymous impositions on particular places
- The proposed response is to preserve some aspects of the stylistic expression while mitigating deficits
  - Retain and develop a strong repetitive modularity
  - Retain and strengthen diagrammatic and formal expressions of function
  - Employ durable and truly economical materials taking into account material and building life-cycle
  - Develop an aesthetic foil of lightness and transparency in support of economy, security and durability
  - Re-construe "moral seriousness" in terms of
    - The continuing BFS emphasis on patron safety and comfort
    - A broad contemporary concern for sustainability

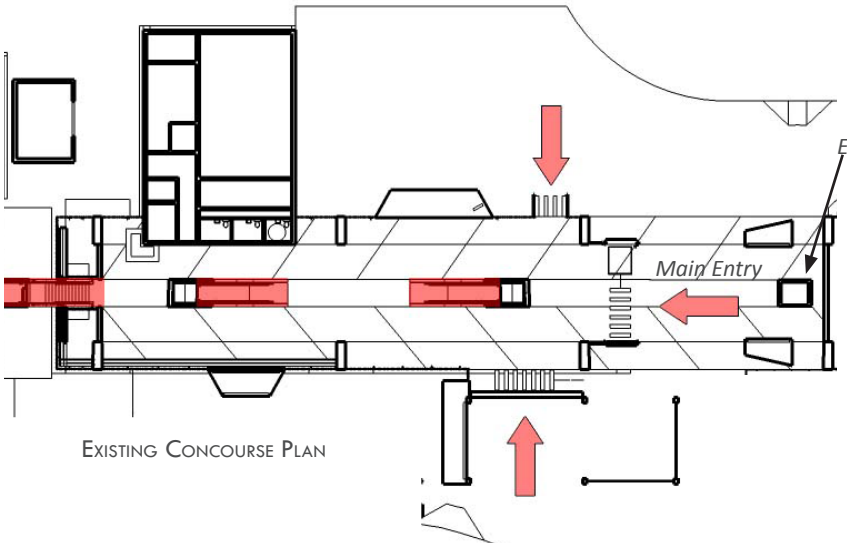
CONCORD STATION 1980-SITE

CONCORD STATION 1999-PLATFORM

7.3 Proposed Functional Plan Improvements

Opportunity: address indirect and inefficient travel paths, circulation pinch points and center platform crowding



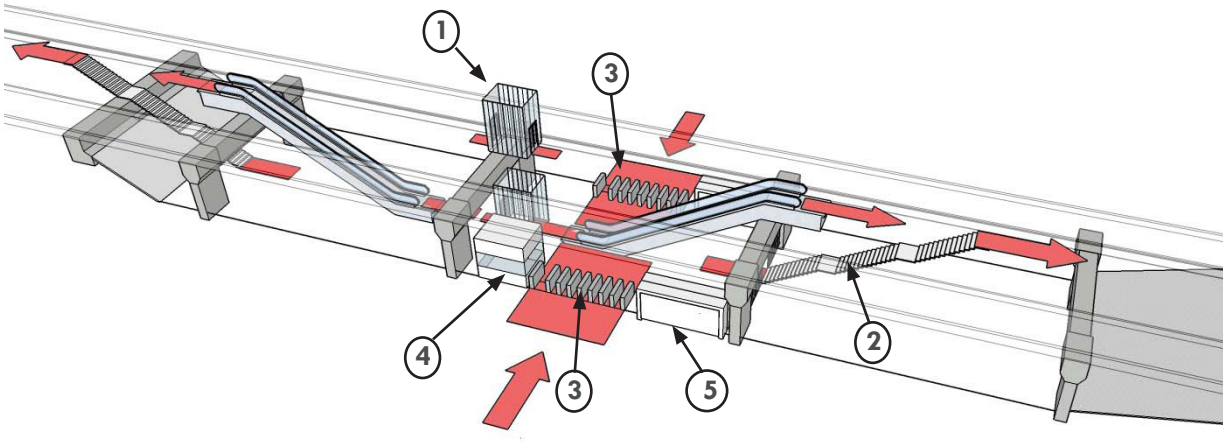


Existing Concourse Plan

- 3 entry points
- Indirect and conflicting circulation
- Elevator outside of fare paid zone

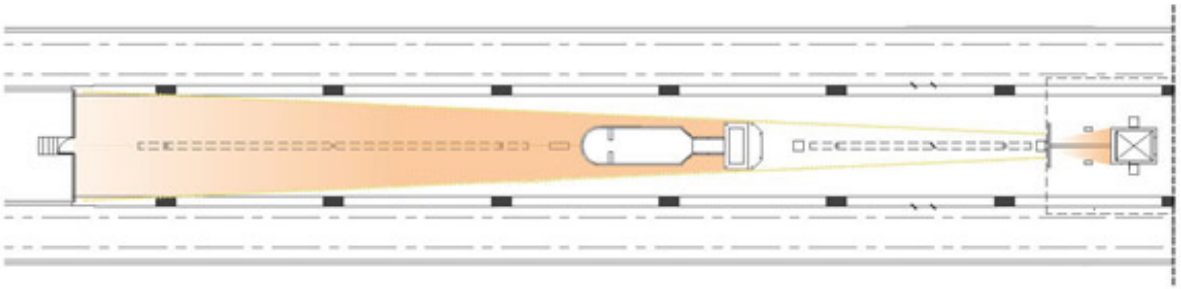
N

1. Locate a new elevator centrally in the fare paid zone
2. Add an additional normal use stair (requires demolition of the existing elevator, see below)
3. Revised entries centered on vertical circulation elements
4. Relocate the Station Agent Booth for better surveillance
5. Consolidate ticket vending equipment adjacent to entries



Proposed Functional Layout

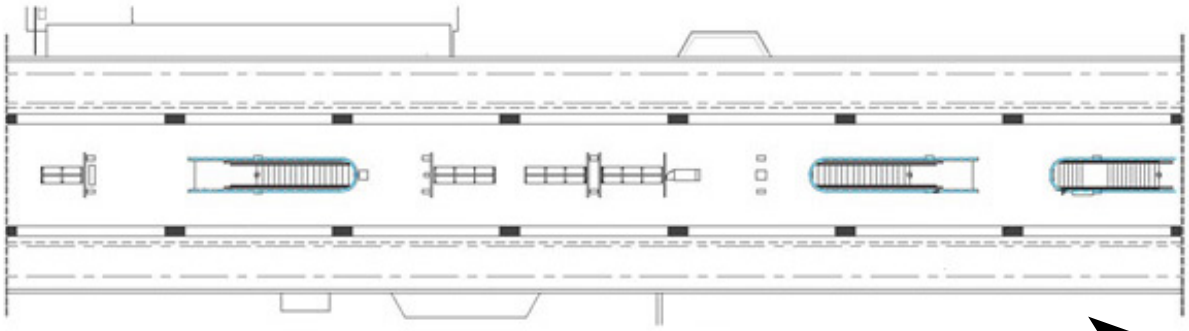
- Remove Major Platform Visual Obstructions
  - TM Booth
    - Currently not in use, recommended for demolition
    - Diminishes platform use and creates a large area of limited visibility (Figure 3.7)
    - Conflicts with full coverage canopy and canopy integrated systems



Operator Booth blocks views to south 1/3 of platform

Operator Booth

  - Concrete Stair/Escalator Guard Structures
    - Limit sightlines and platform transparency
    - Reduce vertical circulation light levels
    - Raw concrete soils easily, is susceptible to graffiti
    - Thickness consumes 2 feet of platform width on a narrow platform

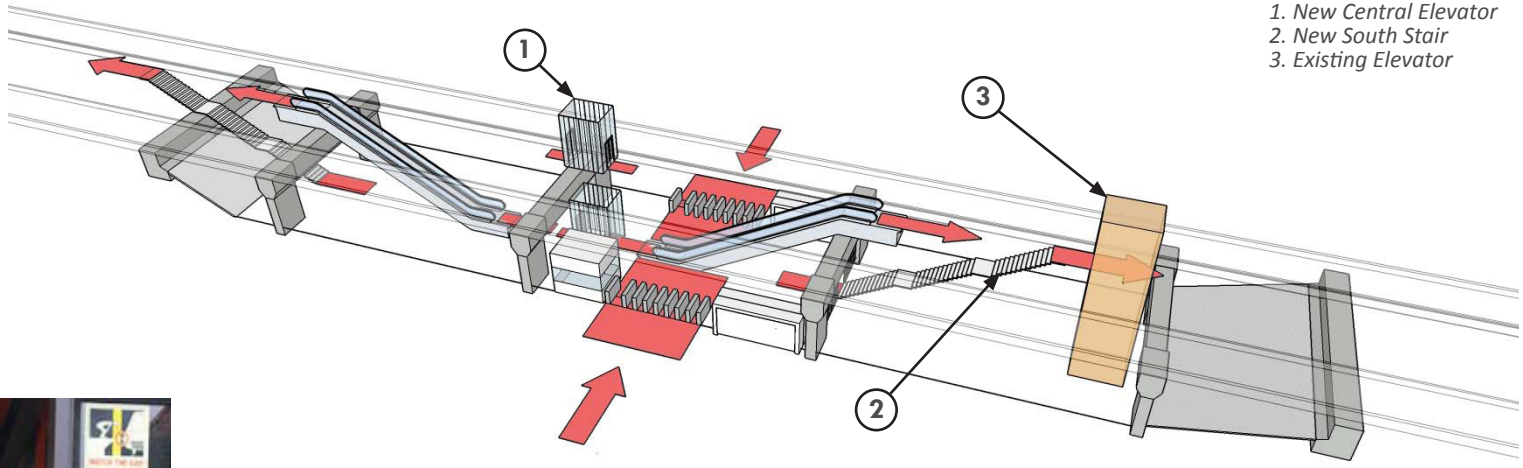


Platform Opaque Balustrades

Raw Concrete Escalator Guard

7.4 Vertical Circulation Improvements

- New Public South Stair
  - Improves distribution of patrons along the entirety of the 700 foot platform
  - Required for egress Code compliance.
  - The existing elevator presents queue zone conflict
  - Removal of the existing elevator will also improve sightlines at the platform

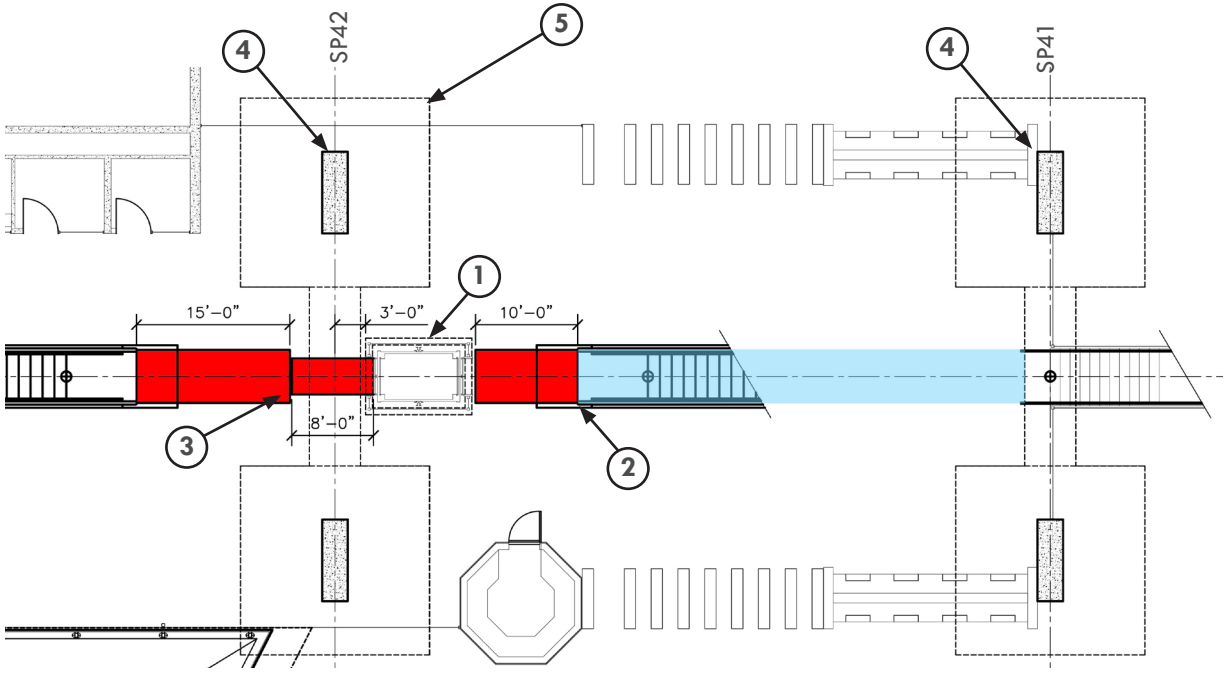


1. New Central Elevator
2. New South Stair
3. Existing Elevator

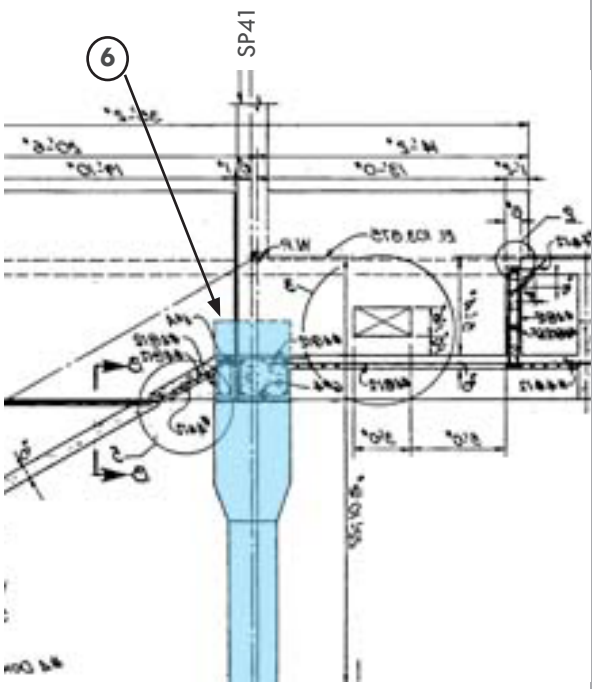
South Stair Queueing Zone Conflict

Existing Elevator

- New Elevator
  - Location
    - Moves elevator into fare-paid zone
    - Ideal location is midpoint between 2 escalators
    - Decreases distance between elevator and machine room
    - Bent and Bent footings at SP42 constrain placement of elevator
    - Proposed elevator cab depth is BFS standard 80”
    - South escalator location is constrained at top of Bent SP41



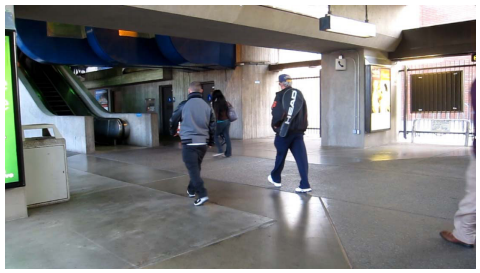
Proposed Elevator Plan View

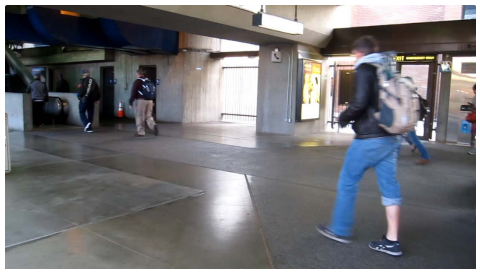


Section Detail At Top of Bent

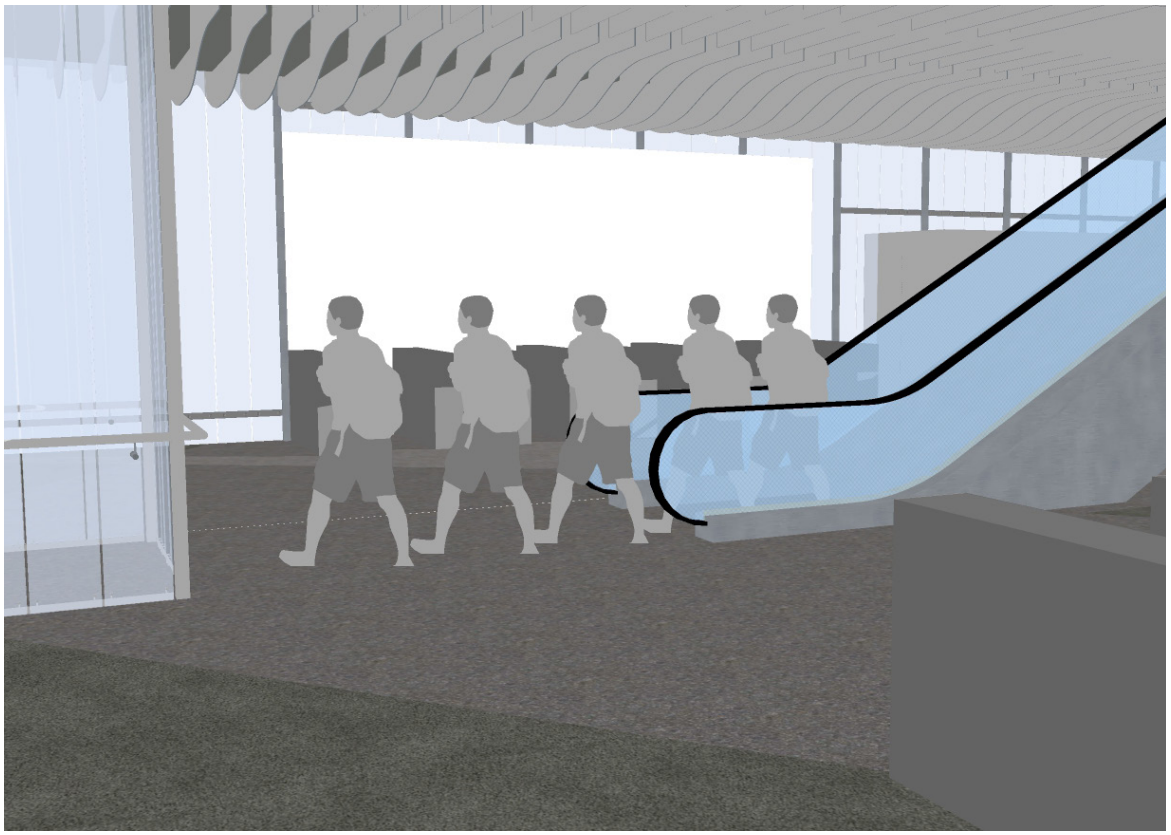
1. New Central Elevator (Cab Depth 80”)
2. Existing South Escalator
3. Queueing Zones (shown in red)
4. Existing Bent
5. Bent Foundation
6. Escalator Location Constraint

- Queue Zone Issue
  - Limited to 10 feet by elevator size and adjacency to guideway bents
  - Field observation during peek ridership hours demonstrates that escalator surges do not currently result in queueing at escalators
  - 3D modeling of the new configuration suggests that 10 feet of queueing space provides comfortable room for greater passenger loads than have been observed at peak hours
  - Further testing and projection of future loads is required
  - BFS queue zone exception required
  - Alternative solutions should be explored further as design progresses





Peek Queueing Zone Activity



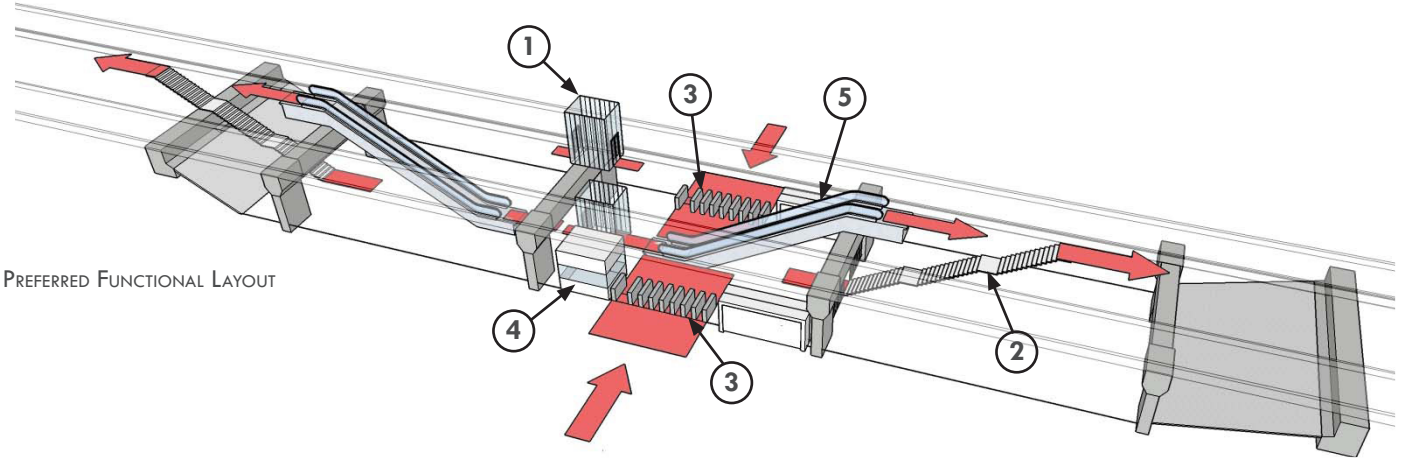
Queueing Zone Conflict Study

Pedestrian flow modeling was not scoped for 15 % design. Peak field observation did not discover Concourse queueing at escalators. Logical assumptions and available data also suggest there are no present queueing issues at escalators at the Concourse level and that there should be none even given the nearly 50% ridership increase BART projects for 2040. The following logic may support the 15% design recommendation to allow a 10 queue zone at the south escalator :

- Escalator in isolation
  - BART preferred operational speed is 100 fpm
  - Normal walking speed is 272 fpm (3.1) mph
  - Therefore queues can develop only at escalator boarding, will not normally develop at de-borading of escalator unless a patron stops walking
  - The south escalator could have up-mode queues in this isolated scenario
- Concord entries hypothesis
  - 2014 BART data indicates an average of 5300 entries per day
  - BART data indicates current Peak Boardings are 275 per 15 minute interval around 7:47 AM
  - BART projects an almost 50% increase in ridership by 2040
  - BART 2040 Peak projected boardings therefore might be assumed to be maximum 410 per 15 minute interval of 28 patrons per minute
  - BFS normal escalator capacity planning assumption is double the egress capacity of 4500 passengers per hour for an operational speed of 100 fpm or 75 passengers per minute x2
  - In less than three minutes one escalator can convey the maximum 15 minute projected 2040 peak entries
  - In one minute one escalator can convey nearly 5 times the present peak patron per minute flow
  - Some of those patrons will use the stairs (confirmed by observation)
- Fare gate metering hypothesis
  - BFS fare gate smart card processing speed is 45 patrons per minute
  - Concord has 16 fare gates. 3 are dedicated exit only gates
  - Maximum entries per minute = 585 patrons per minute or 1/10 of the daily entries in one minute (BART data shows this never happens and is not projected to happen)
  - If it did happen a single escalator operating at 100 fpm could convey those patrons to the platform in 3.9 minutes at maximum capacity
  - The platform maximum LOS C capacity of 2000 persons (nearly half of the daily entires or a full train load) would be reached in the same 4 minutes
  - There is no indication in data provided that has ever happened at Concord

The remaining factor that could routinely generate slower than normal patron movement and therefore bunching at escalators is circulation crossover. 15% Design has attempted to minimize crossflow and eliminate equipment (Add Fare) queue overlap with escalator flow.

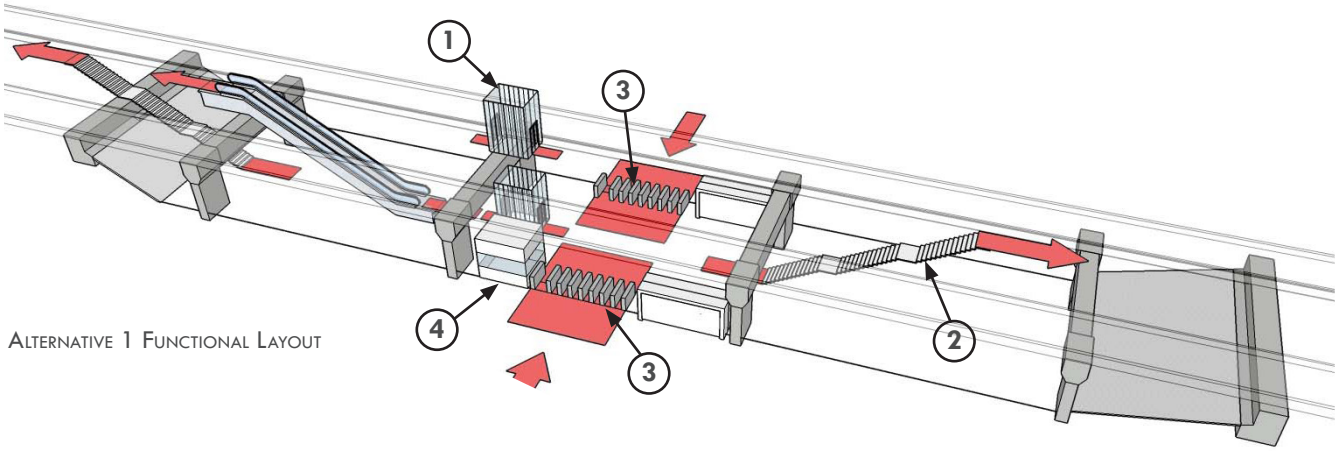
- Alternative Solution if BFS compliant queue zone is exception is not permitted: Single Escalator
  - Remove the south escalator to comply with BFS 15 foot queue zone
  - Maintain exit lanes with wider new south stairs
  - The new elevator could be a high speed unit to supplement the escalator
  - Permits more flexibility in location of the new elevator, perhaps centered location between new entries with front and back doors
  - The Pleasant Hill Station is a precedent single escalator station



Preferred Functional Layout

1. New Central Elevator
2. New Southern Stair
3. Relocated fare gate arrays
4. New, relocated station agent booth
5. Existing South Escalator

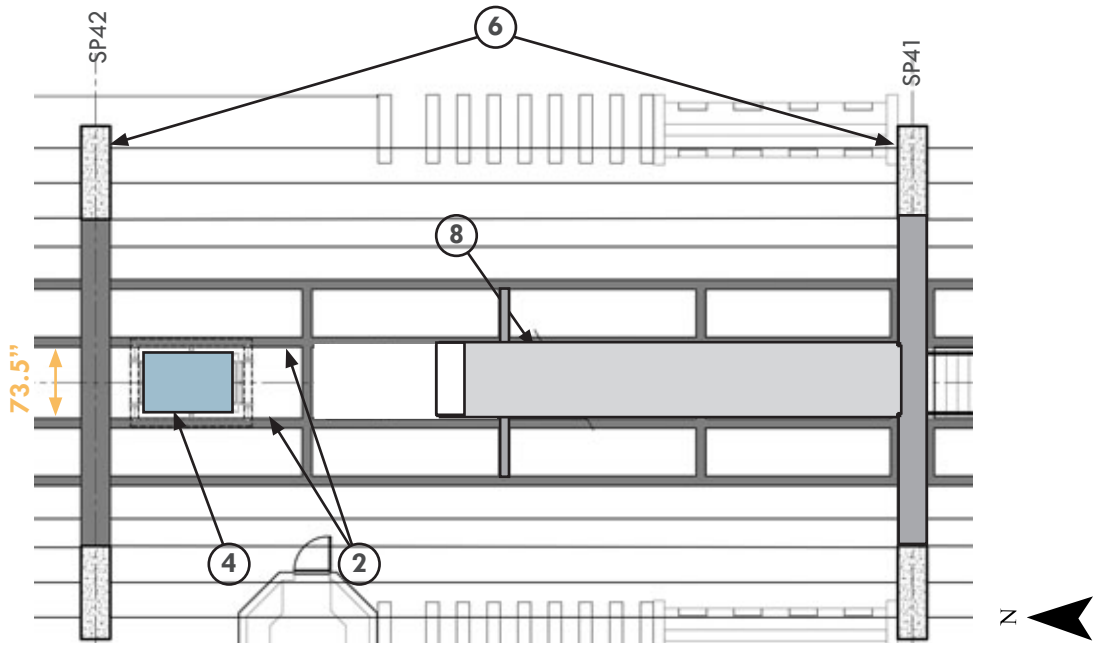
N



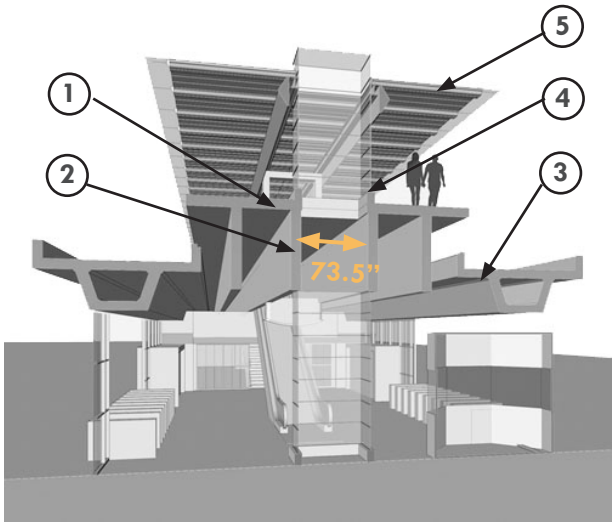
Alternative 1 Functional Layout

1. New Central Elevator
2. New Southern Stair (Wide)
3. Relocated fare gate arrays
4. New, relocated station agent booth

- New Elevator Cab Size
  - The existing platform cast in place beam inside clear dimension is 73 1/2”
  - BFS compliant elevator cab is 80” x 63” x 96”
  - Assume:
  - Cab Width = 63”
  - Cab Walls = 4”
  - Rail Space = 16”
  - Clear shaft width needed for BFS Elevator = 83”
  - BFS cab cannot be accommodated
  - An ADA compliant cab capable of accommodating a horizontal stretcher (80”) is feasible



Concourse Reflected Ceiling Plan



Section at New Central Elevator

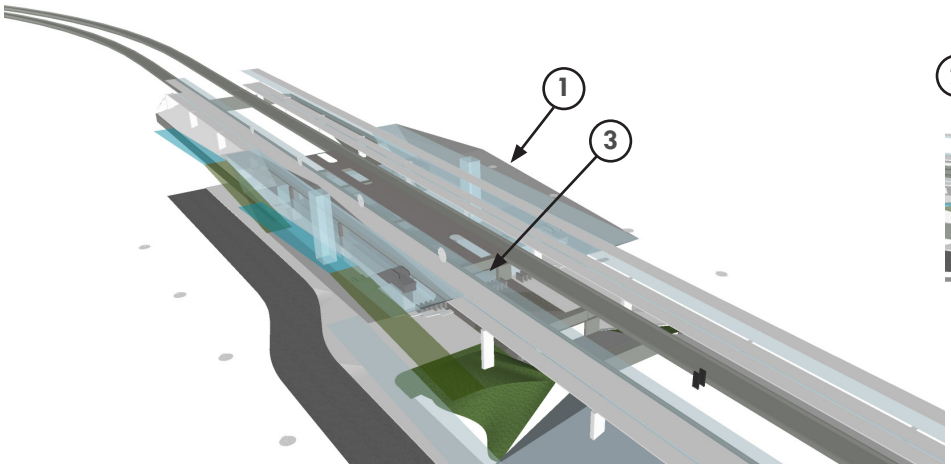
1. Existing Platform
2. Existing C.I.P. Beams
3. Guideway
4. New Elevator
5. New Canopy
6. Bent
7. Existing C.I.P. Diaphragm
8. Escalator

- System Wide Structural Conditions
  - The structural constraints at Concord station may be found at other stations in the East Bay with center platform configurations.
  - New elevators in future modernizations will likely encounter similar dimensional constraints as those at Concord
  - Figure shows the stations, highlighted in orange, where similar structural constraints are likely

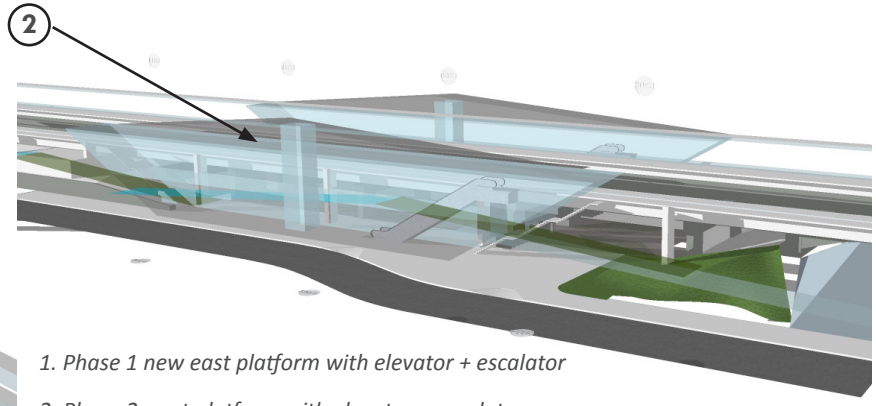
Station Map

- Seismic Constraints and the proposed elevator cab size
  - Structural scope for 15% design did not include elevator seismic design
  - The 2013 seismic upgrade did not include modifications to the existing elevator shaft or clearances
  - 15% design assumptions for a new elevator in the fare paid zone will be further tested at the next level of design when access to an elevator consultant and further structural analysis will determine the exact feasible elevator cab dimensions
  - The risk exists that code and structural analysis beyond 15% level will demonstrate that an ADA compliant cab will not fit between the existing structural beams.
- Alternatives:
  - Maintain the existing elevator outside of the fare paid zone and assume other modifications will do not trigger current code
  - Extend the fare paid zone to the existing elevator (closing off the community connection between the south bents)
  - Modify the existing platform structure between the middle bents
    - Technically challenging
    - Expensive
    - Could not be done with the station in operation
- If BFS /ADA compliance for the elevator cab becomes an absolute driver there is a conceptual alternative to construct side platforms to replace the center platform.
  - The resulting station configuration would permit BFS compliant elevator cabs outside of the existing structure
  - Explored schematically below
  - Not been taken to 15% level and comparison
  - Costing has not been performed on this alternative as it is a solution type that is beyond station modernization scope

- Side Platform Conversion Alternative
  - Considered for due diligence but not proposed at this level of design
  - Beyond the scope of station "modernization"
  - Fits on existing BART property
  - Avoids all configuration constraints imposed by existing structure
  - Simplifies construction, avoids special construction constraints and costs posed by working under and over the guideway
  - Phased construction process to maintain operation and accommodate funding increments
  - Existing operational areas service could be maintained with minimal impact during construction
  - Resolves future capacity constraints such as limited existing platform width
  - Assures comprehensive seismic update
  - Updates normal and egress capacity
  - Opportunity to improve weather protection



Side Platform Alternative



1. Phase 1 new east platform with elevator + escalator

2. Phase 2 west platform with elevator + escalator

3. Phase 3 demolition of existing center platform

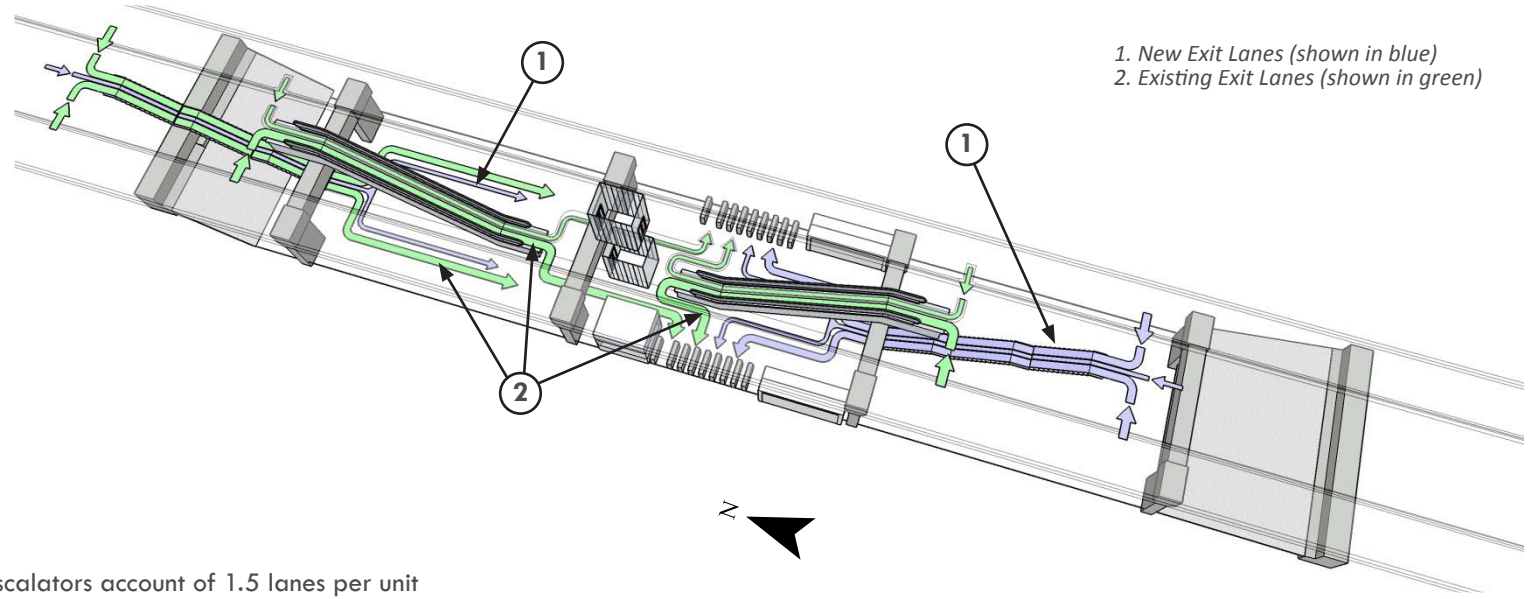
- Exit Lane Recommendation

Scenario	Exit Stair Lanes - Assumes 22” Lanes, 1.5 Lanes per Escalator
Existing	5.5 (2.5 total stair lanes, 3 total escalator lanes
CBC Load	18.5
CPUC Load	**7.3**
Recommended	**8 (5 total stair lanes, 3 total escalator lanes)**

Exit Lane Recommendation

- Escalators account of 1.5 lanes per unit
- The existing stair accounts for 2.5 lanes
- The proposed new stair accounts for 2.5 lanes

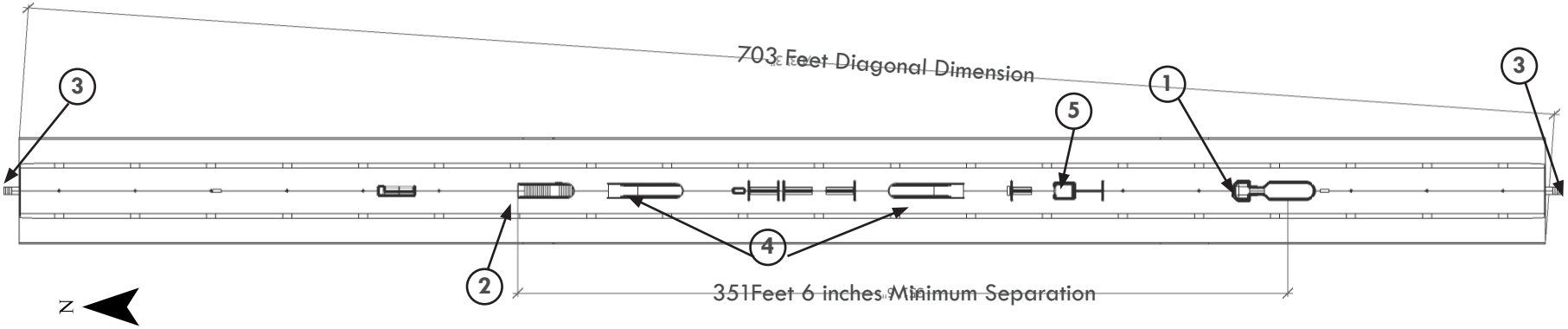
- Exit Lanes Verification



1. New Exit Lanes (shown in blue)
2. Existing Exit Lanes (shown in green)

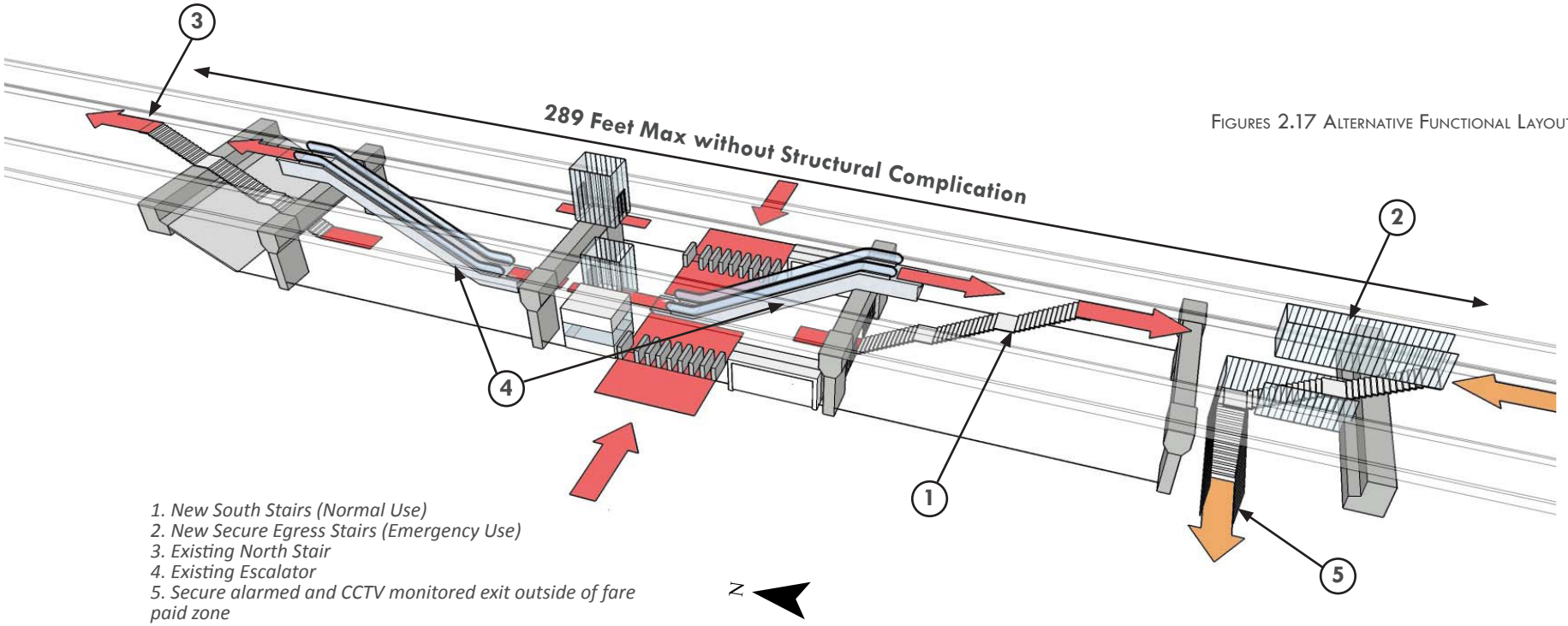
- Escalators account of 1.5 lanes per unit
- The existing stair accounts for 2.5 lanes
- The proposed new stair accounts for 2.5 lanes
- Total exit lanes = 8 lanes

- Exit Stair Separation
  - The recommended functional plan satisfies the CPUC quantity of exit lanes but CBC and BFS also impose an exit separation requirement: separation of exits by 1/2 the diagonal platform distance.
  - The platform at Concord station is approximately 703'-3" resulting in a required exit separation of 351'-6"
  - The station does not comply with current requirements for separation of exits



1. Existing Supervisor Booth (proposed to be demolished)
2. Existing North Stair
3. Existing end of platform stairs from track to platform (do not lead to a point of safety)
4. Existing Escalators
5. Existing Elevator

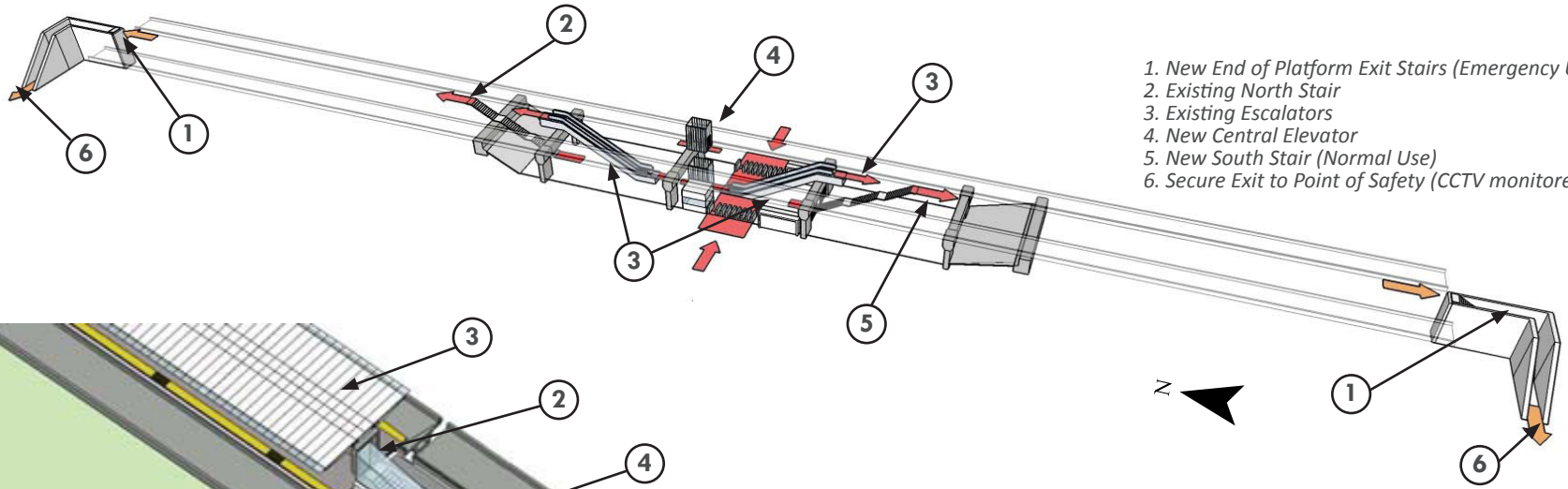
- Stair Separation Alternative 1
  - Add exit only stair from the platform through the south abutment
  - Secured, alarmed at both the platform and grade
  - Achieves approximately 285' of exit separation, still non-compliant
  - The most practical and economical available alternative
  - Requires a code exception based on feasibility
  - It does not require alteration of the recommended functional plan
  - Creates an new visual obstruction at the platform level
  - Relies on signed identification, not intuitive



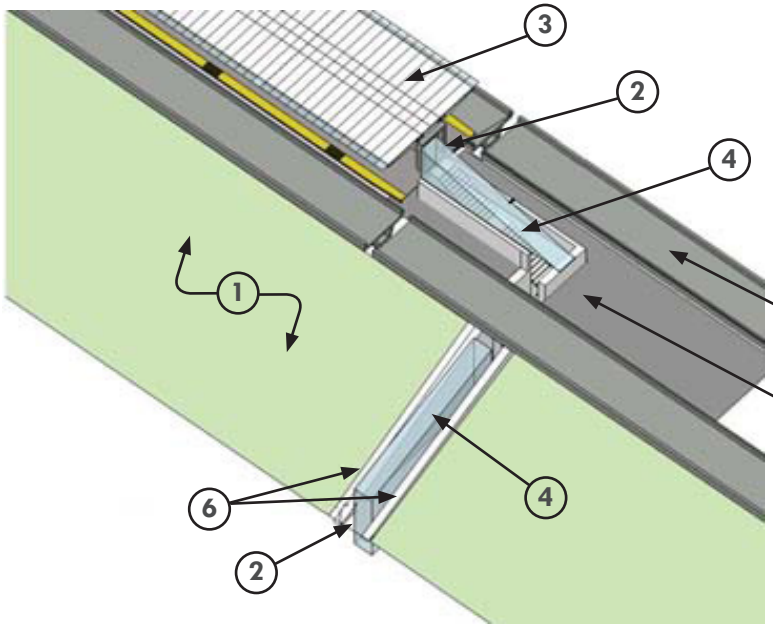
1. New South Stairs (Normal Use)
2. New Secure Egress Stairs (Emergency Use)
3. Existing North Stair
4. Existing Escalator
5. Secure alarmed and CCTV monitored exit outside of fare paid zone

FIGURES 2.17 ALTERNATIVE FUNCTIONAL LAYOUT

- Stair Separation Alternative 2 : Build secured emergency only exits at each platform end
  - Code compliant and assures compliance with all likely future code
  - Secured and alarmed at platform and at grade
  - Adds additional exit lane capacity to the recommended 8 lanes
  - More expensive than Alternative 1
  - New stairs also provide exit from trackway emergency walkways



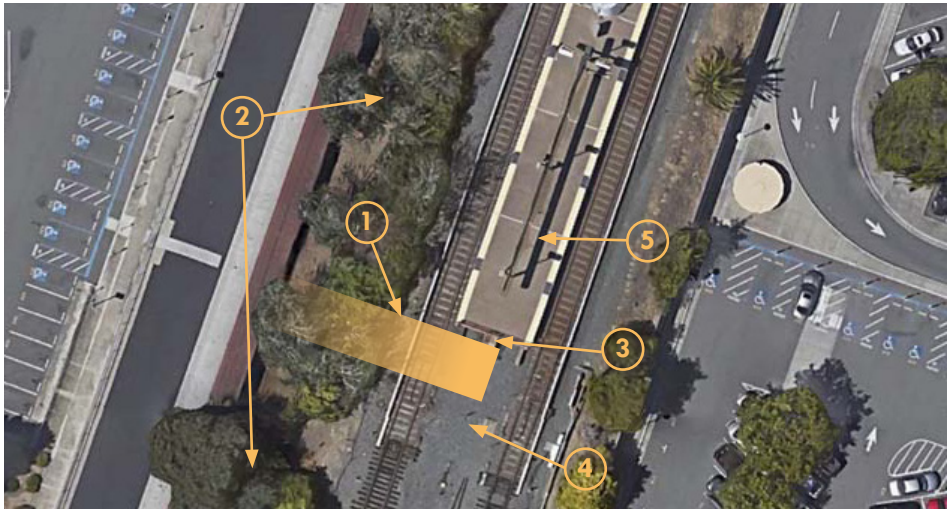
1. New End of Platform Exit Stairs (Emergency Use)
2. Existing North Stair
3. Existing Escalators
4. New Central Elevator
5. New South Stair (Normal Use)
6. Secure Exit to Point of Safety (CCTV monitored)



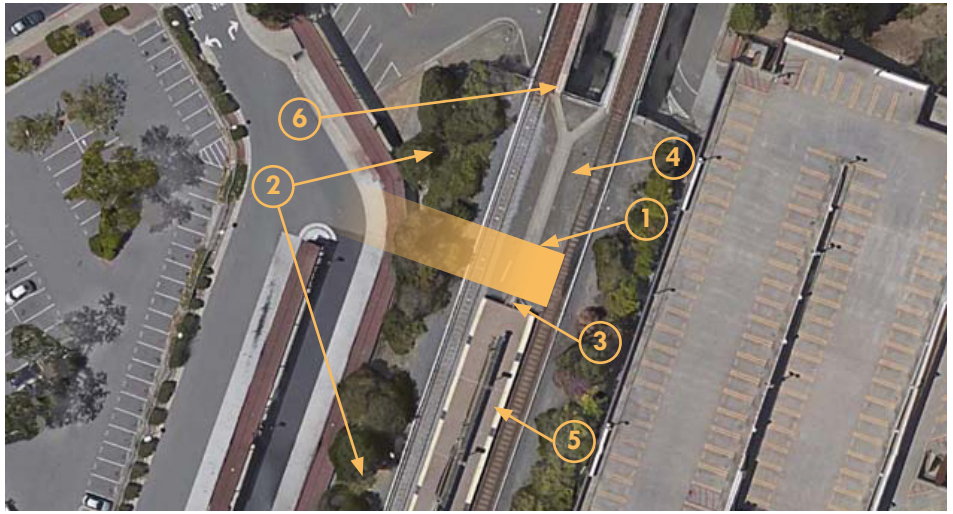
1. Existing Berm
2. Secured Exit Gate
3. New Canopy
4. Safety Enclosure
5. Existing Guideway
6. New Retaining Walls
7. Maintain stair access from guideway

1. *Proposed Emergency Exit Tunnel*
2. *Existing Berm*
3. *Existing End of Platform Stair*
4. *Existing Guideway*
5. *Existing Platform*
6. *Emergency Walkway*

Existing End of Platform Stairs



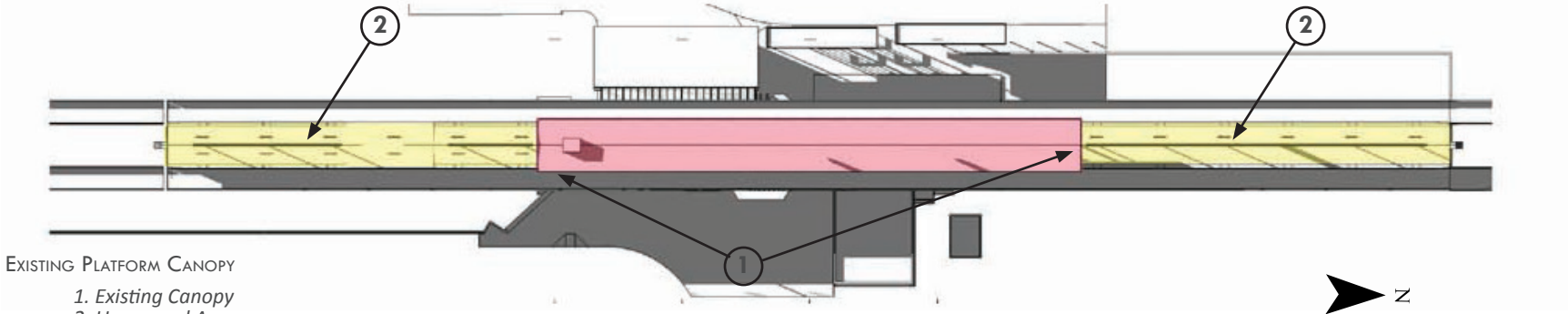
South End of Platform



North End of Platform

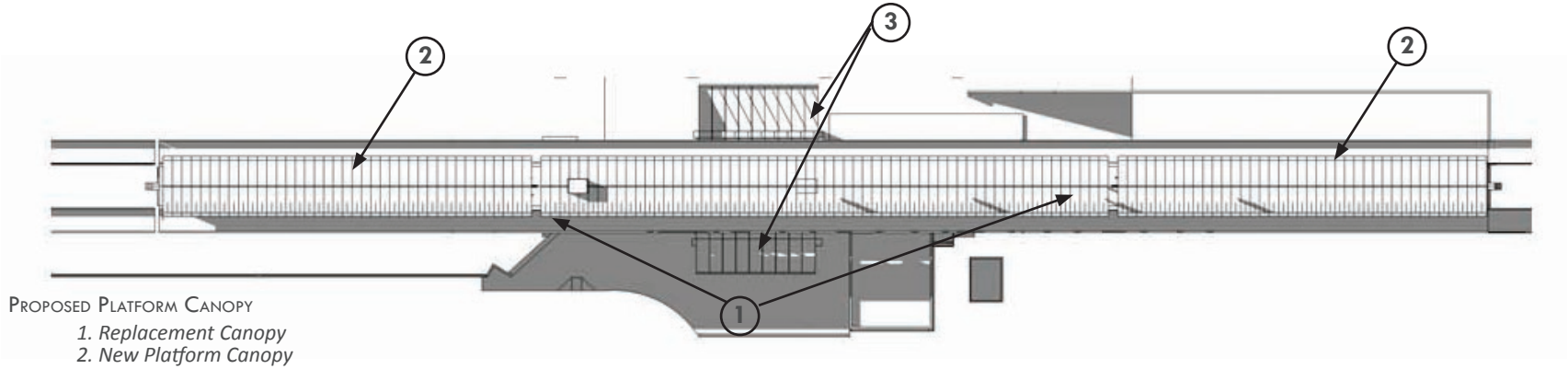
7.6 Canopy Re-Design and Weather Protection

- Full Coverage of length of platform
- Slightly wider canopy for improved sun and rain protection
- Added benefits
  - Better acoustical performance
  - Better light reflectivity
  - Better functional support for systems
  - Opportunity to improve solar reflectance and mitigate heat island effects



EXISTING PLATFORM CANOPY

1. Existing Canopy
2. Uncovered Area

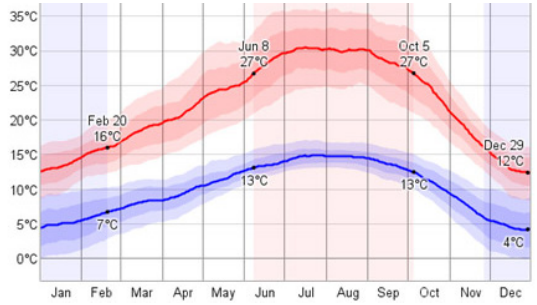


PROPOSED PLATFORM CANOPY

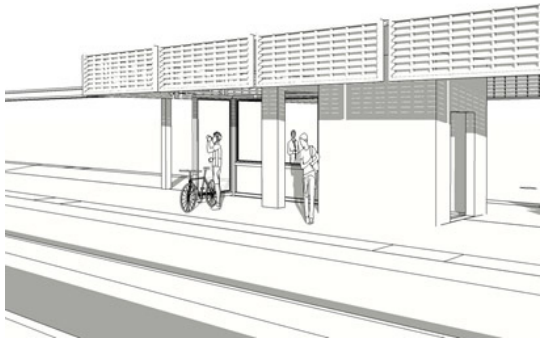
1. Replacement Canopy
2. New Platform Canopy
3. New Entry Canopies

BFS: “As a minimum, platforms shall be covered over 40 percent of their length. Consideration should be given to providing cover for their entire length and width.”

- Existing coverage is 40%
- Concord California has high temperature averages June through October, perhaps uniquely high in the BART system
- The uncovered North and South platform areas are underutilized, resulting in inconvenient and potentially dangerous crowding at center platform areas
- Full coverage supports recommendations above for new vertical circulation to distribute patrons to the ends of the platforms
- Full coverage supports recommendations for improved lighting and acoustics at the platform
- Preliminary analysis and modeling of the existing canopy configuration demonstrated that the edge grille produces negligible shading benefit
- Full coverage with a system that has high solar reflectance consistent with CalGreen Non-residential voluntary measures is recommended

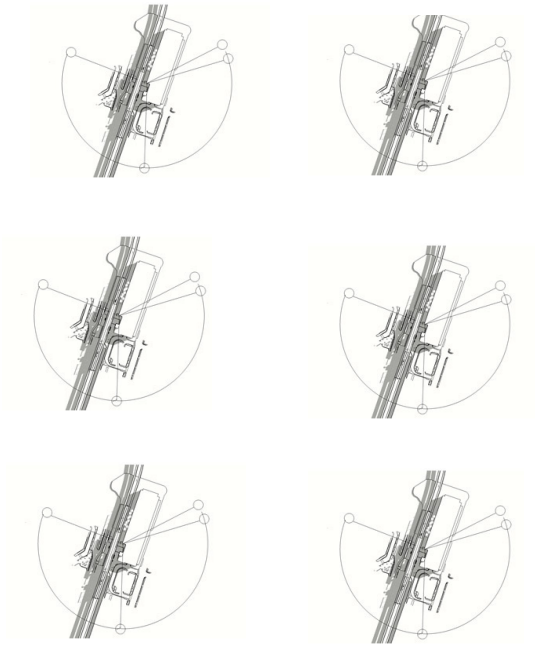


Concord Average Temperatures



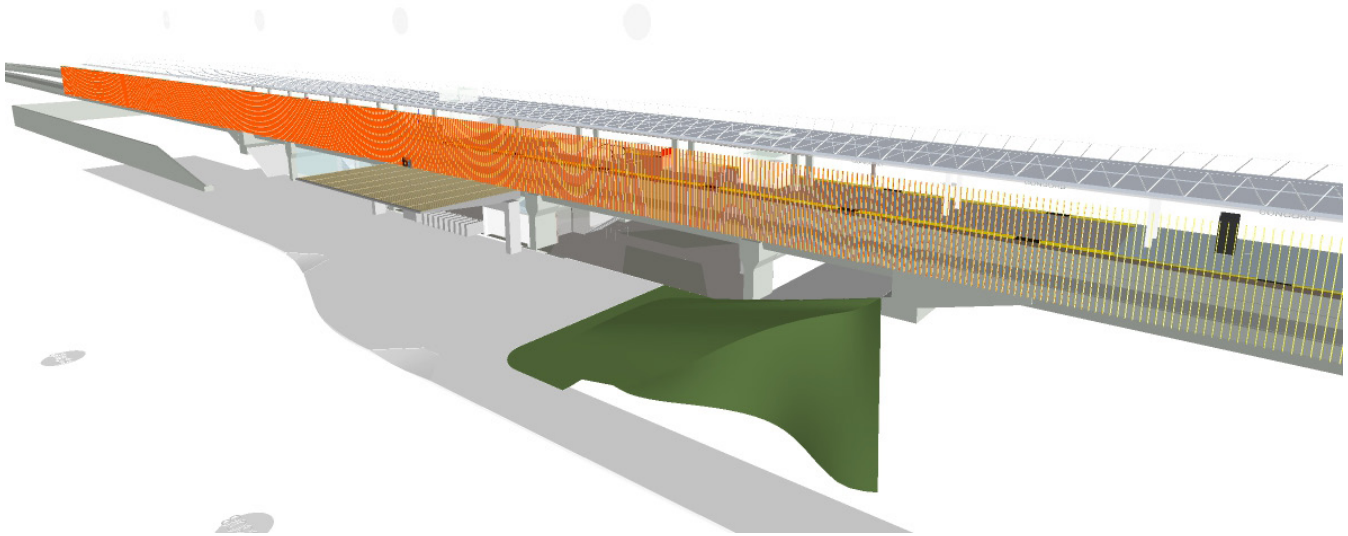
6:00 June 21 shading, Existing

18:00 June 21 shading, existing canopy



Sun Path Diagrams

- Shading/temperature analysis indicated that late afternoon sun and high temperatures could in fact only be mitigated by a vertical screen on the outside of the inbound guideway
- A sun screen was excluded from preferred option recommendations but a similar device might be reconsidered as train noise mitigation and visual screening if T.O.D. is considered for the BART parking lot on the west side of the station

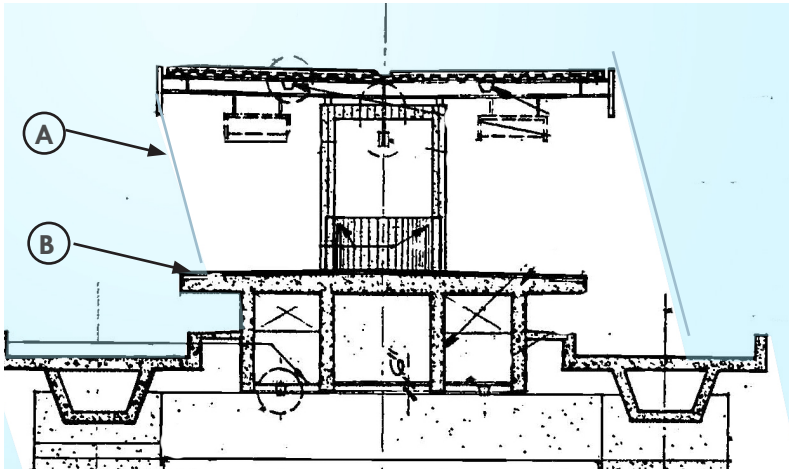


- **Wider Canopy**

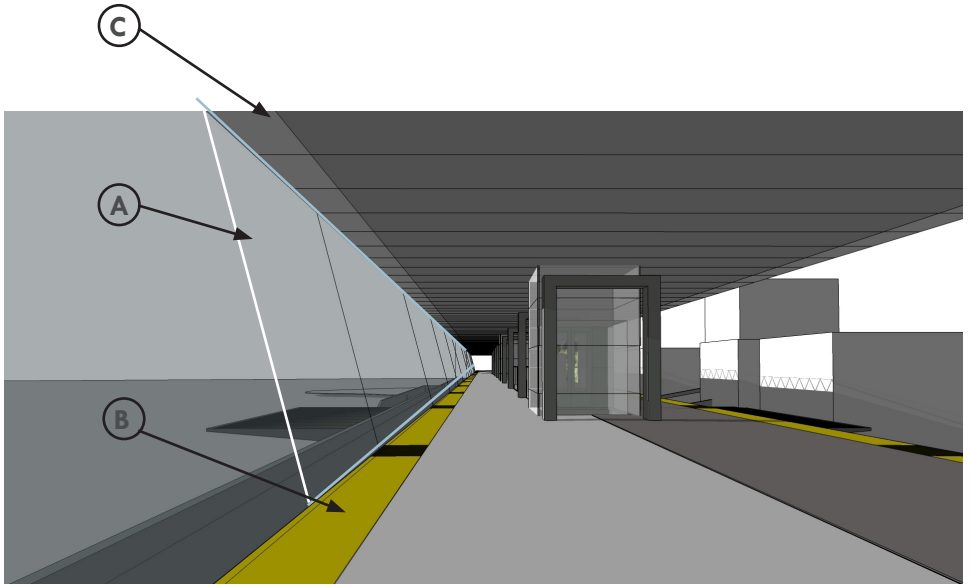
  - Benefit

    - Preliminary analysis of wind blown rain angles demonstrated that the existing 28' wide canopy allows direct rainfall on the full width of the platform tactile edge under most recorded wind conditions in Concord
    - A 2' extension of the canopy on both sides is possible outside of the train dynamic envelope and results in rain coverage of the tactile strip for an average 15 degree angle of wind-driven rain

A. 15 degree angle of wind-driven rain
B. Tactile warning strip
C. Proposed 2' extension



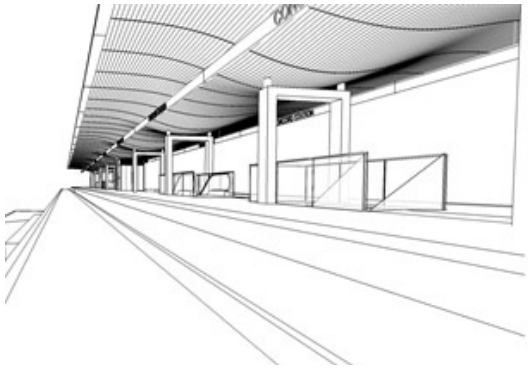
EXISTING CANOPY PERFORMANCE WITH 15 DEGREE RAIN ANGLE



PROPOSED CANOPY PERFORMANCE WITH 15 DEGREE RAIN ANGLE

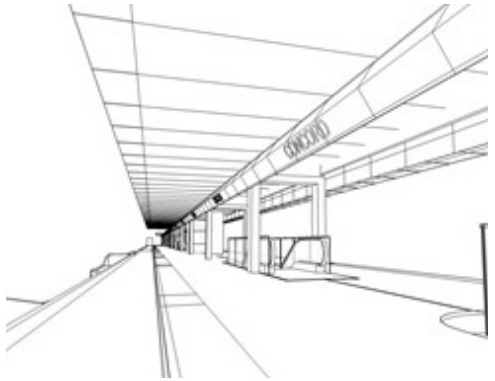
- New Rain Water Collection System and Rain Garden Filtration
  - Full canopy coverage and new rainwater system may present an opportunity, consistent with the goals of the MS4 permit, to provide rain garden or bioswale filtration of stormwater
  - Existing berms in four locations may be candidates for location of the facilities
  - The northeast and southwest berms (1 &2) may be prime candidates for reconfiguration since they are not retained structures

- Inherent capabilities and formal properties of modular canopy systems should be explored in further design iterations
  - Integrated support structure
  - Inherent structural capacity as with Cross Laminated or other Heavy Timber
  - Appended elements such as acoustic baffles



Canopy Formal Option with Integrated Structure

Canopy Formal Option with Inherent Structural



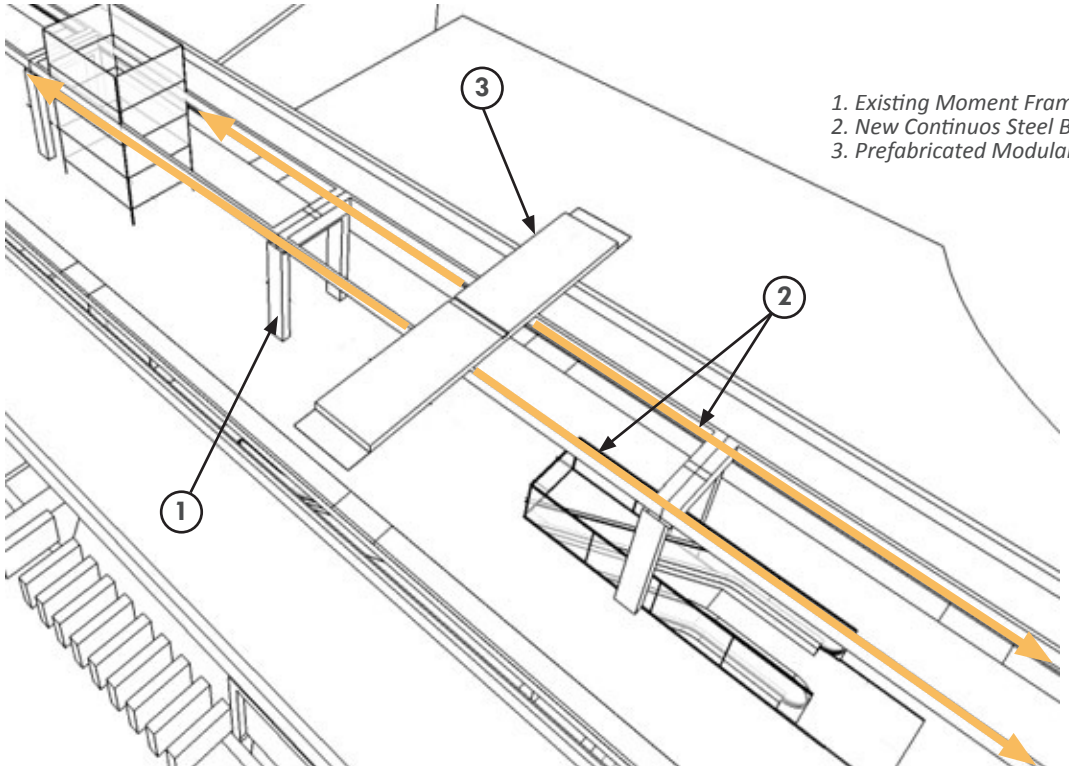
Canopy Formal Option with Appended Elements

Example Modular Canopy

- **Canopy Constructability**
  - The existing canopy can be replaced and canopy extensions constructed with minimum disruption to station operations
  - A prefabricated modular system mounted on double HSS would not require permanent scaffolding on the platform
  - A new canopy system should be designed so as not to exceed the existing canopy loading to avoid impact on the 2013 seismic upgrades
  - North and south extensions should be seismically separated from the center canopy supported on existing moment frames
  - Existing foundations and footings under berm supported portions of the platform are located on the same structural grid as the existing moment frames at the center platform
  - North and south extensions can be supported on steel moment frames 35' o.c. to match the existing structural grid and permit identical beam depth
  - Further analysis of footings and foundations at the berm supported portions of the platform is required

Prefabricated modular canopy Instillation

Modular Canopy Off-Site Prefabrication

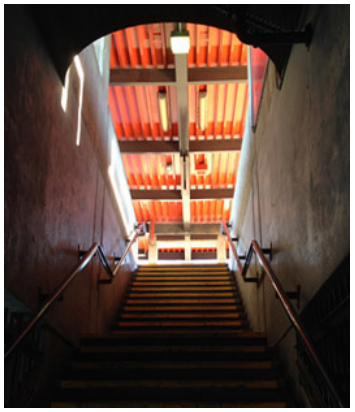


Proposed modular canopy on existing moment frames

7.7 Lighting

- L.E.D. and strategy upgrades
  - Existing lighting produces glare and inconsistent illumination
  - Improve efficiency and passenger experience
  - Both up and down lighting have potential to be effective strategies
  - Light reflective flooring would increase efficacy of both systems
  - Alternatives to consider
    - Up-lighting at light-colored canopy
    - Downlight at light-colored platform (new finish)
    - Baffled canopy with light focused on baffles, at platform edge

Existing Canopy Lighting Glare

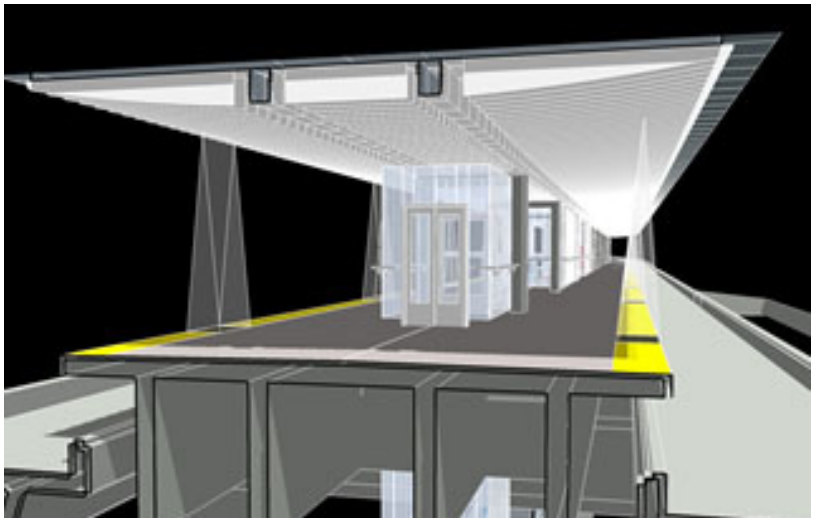


Existing Inconsistent Lighting

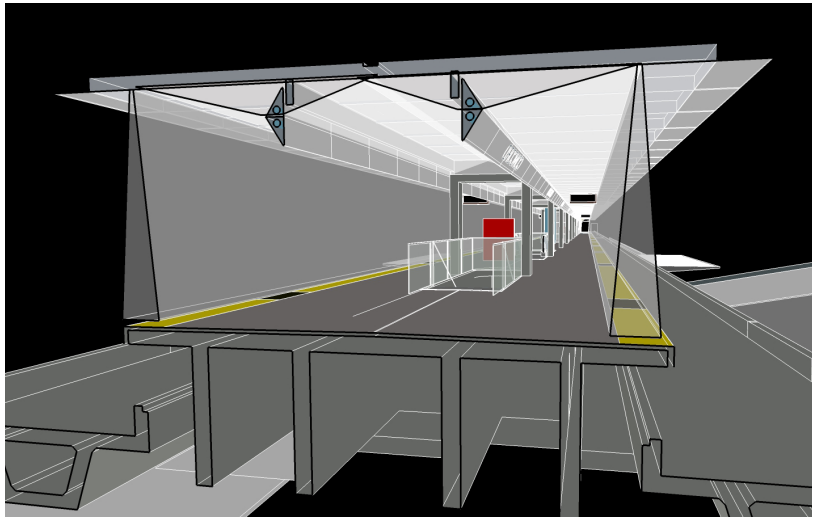
Illustration of Effective Down Lighting

Example Implementation of Effective Up Lighting

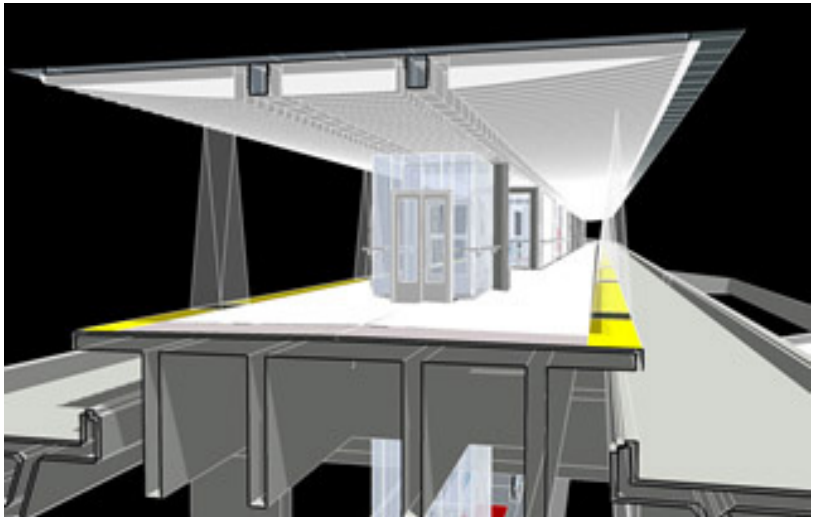
- Predominantly Up-Lighting
  - Works best with clean, flat light-reflective underside of canopy
  - Eliminates glare on platform and site
  - Contributes to night time place-making
  - May entail additional maintenance to keep lenses clean for sustained design level photometrics
- Predominantly Down-Lighting
  - Works best with baffled canopy and light colored floor
  - Can eliminate glare on platform and mitigate site spill
  - Baffles double as acoustic dampeners
    - Baffle detail design must accommodate ease of cleaning (e.g. power washing)
    - Baffle detail design must prevent bird perching
- Down-lighting & Reflective Floor
  - Concrete floor coating or
  - Porcelain tile replaces existing 1 1/2" concrete topping



Predominantly Down-Lighting



Predominantly Up-Lighting



Down-Lighting & Reflective Floor

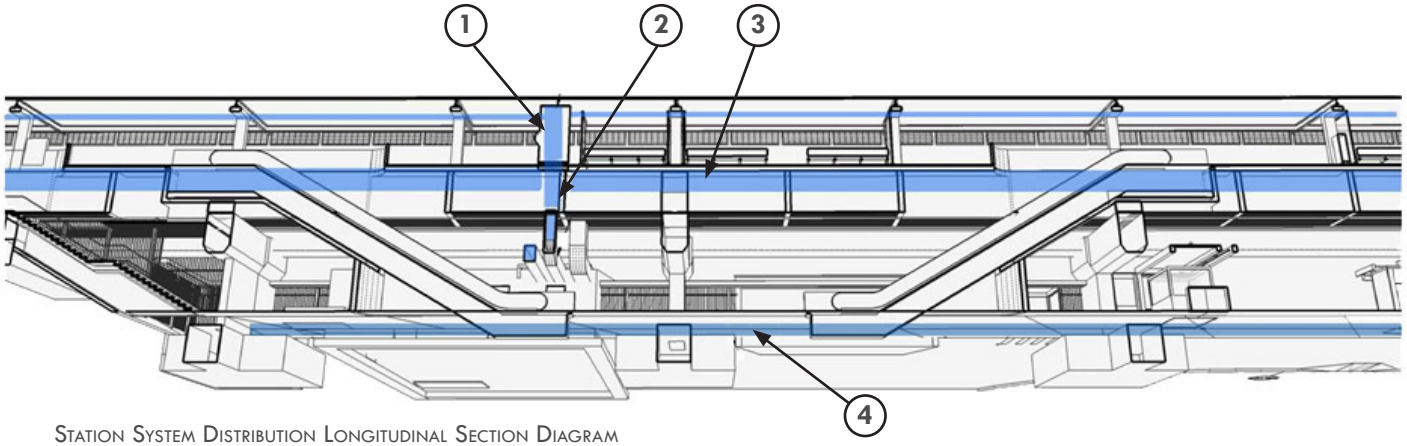
7.8 Systems Distribution

The existing conditions report found that systems modifications over time have resulted in ad hoc solutions that detract from the appearance of the building and possibly function less efficiently than might be ideal.

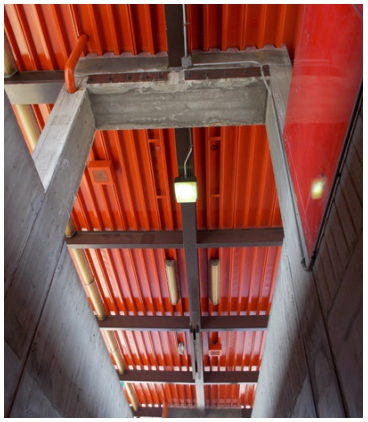
At the concourse level systems and architecture were originally well coordinated but designed in such a way that modifications are not integrated well because access is difficult. Systems in the floor are never easily updated. Systems above the ceiling are difficult to access because of the ceiling type.

At the platform level systems are more accessible but modifications have often resulted in non-integrated ad hoc or expedient solutions simply.

The original solution to distribution does not seem to have anticipated the need for modification.

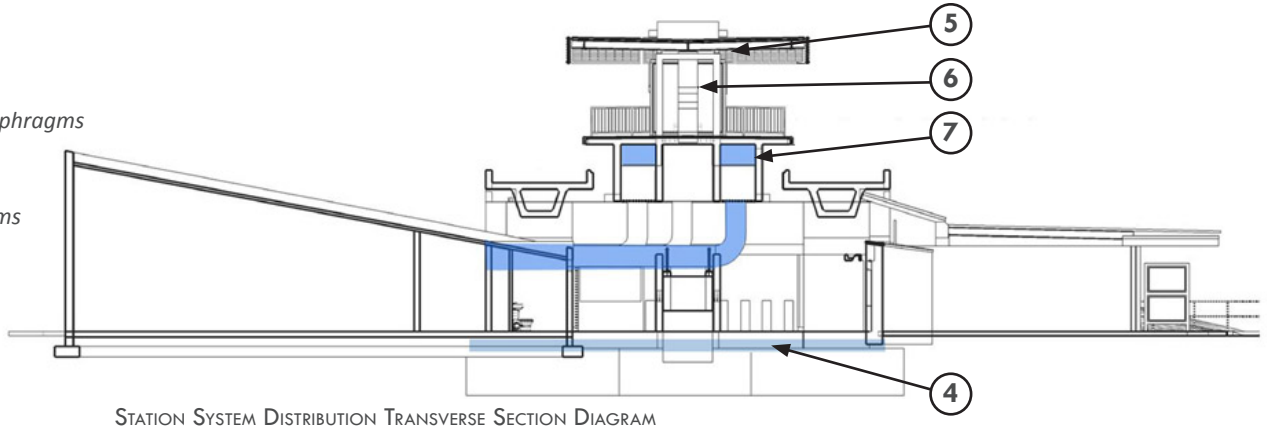


Station System Distribution Longitudinal Section Diagram



Existing Canopy Systems

1. Riser to Canopy
2. Enclosed Chases from Ancillary Building
3. Conduit Runs above East and West Structural Diaphragms
4. Plumbing, Hydraulics and Electrical (in floor)
5. Original Conduit at Wide Flange Beams
6. Riser Chase
7. Concourse Level Runs above Structural Diaphragms



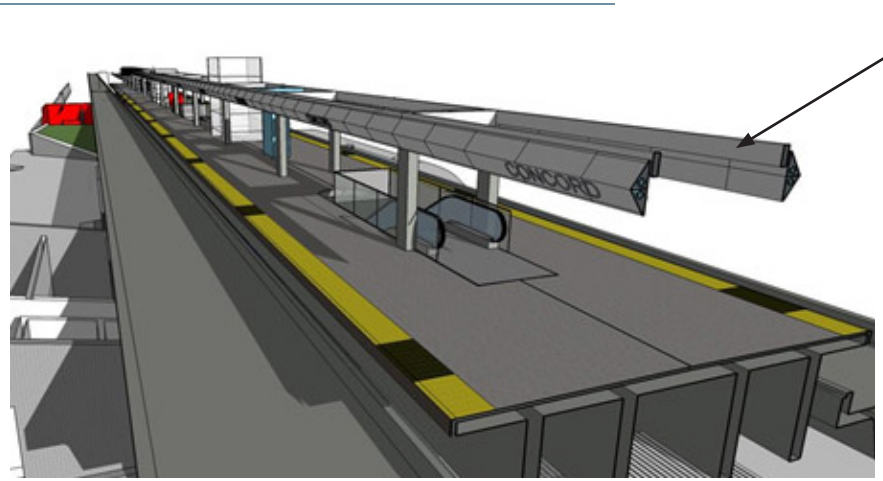
Station System Distribution Transverse Section Diagram

Options

- The new canopy design recommendations include a new approach to systems distribution to allow for more efficient function and adaptability.
- Alternative 1: Enclosed chase system
  - Integrated with canopy structural beams
- Alternative 2: Dedicated Cove
  - Integrated with baffled soffit

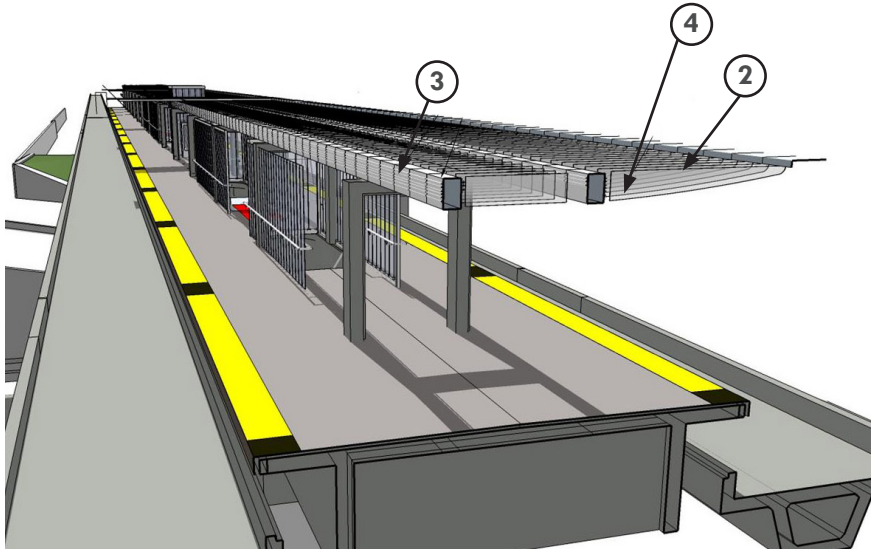
The respective benefits and limitations of the two options are:

- Enclosed Chase
  - Supports lighting, signage, PA and real time displays
  - If UL rated then possibly no conduit inside
  - Works best if deployed system wide for uniformity of information systems
- Baffle Coving
  - Easy and direct access
  - No new system-wide implications
  - Economical
  - Not multipurpose-station signage, lighting and PA systems are not integral
  - Relative independence of systems enhances flexibility in updates



Enclosed Chase Diagram

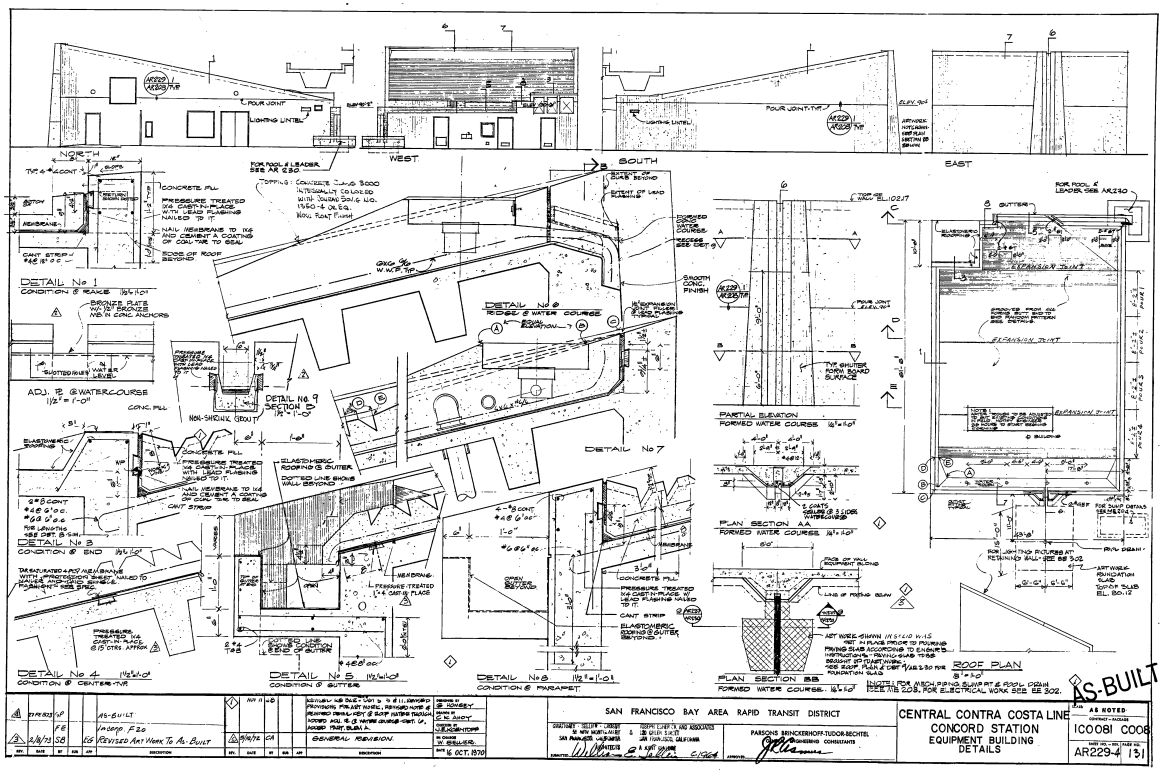
1. Accessible Conduit and Cables in Continuous Chase
2. Baffled Soffit
3. New Canopy Structural Beams
4. Exposed Conduit in Baffle Cave

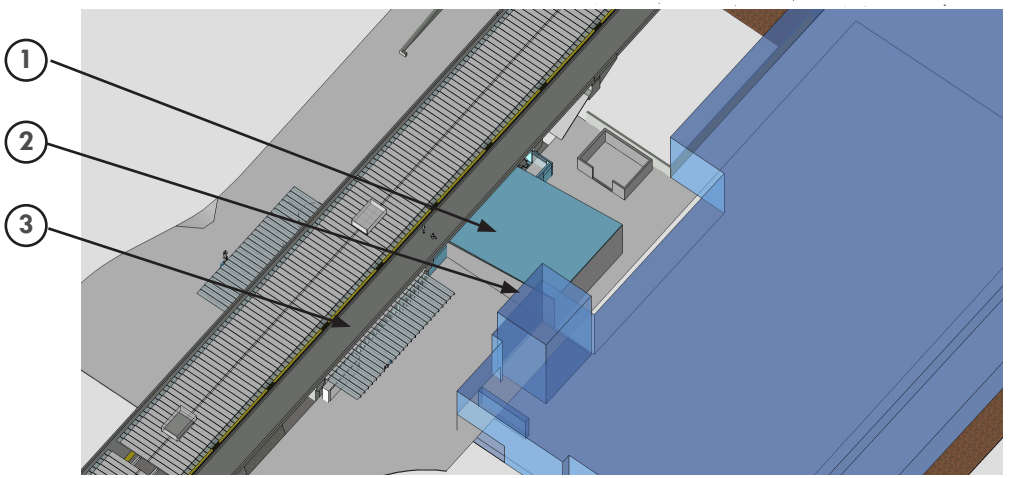


Cove in Baffle Canopy

7.9 Ancillary Building Improvements

- Roof
  - Original roof was designed as a water feature (waterfall)
  - Water intrusion identified in Existing Conditions Memo
  - Existing roof system: ribbed concrete slab on top of membrane on CIP concrete structure
  - Recommended Improvement:
    - New metal roof placed on top of existing ribbed topping slab
    - Consider adding rigid insulation under new metal roof

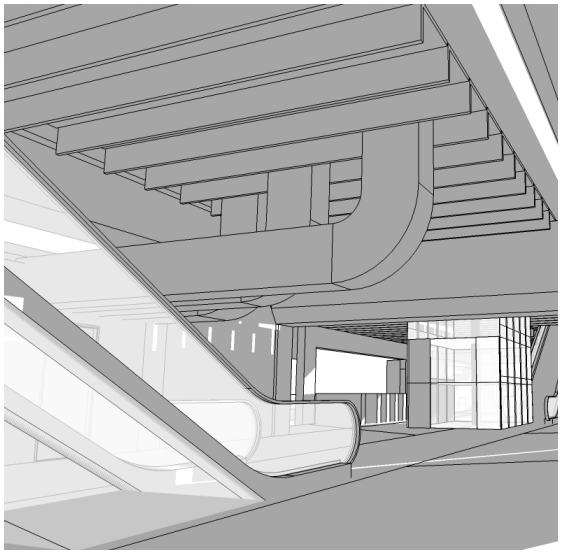


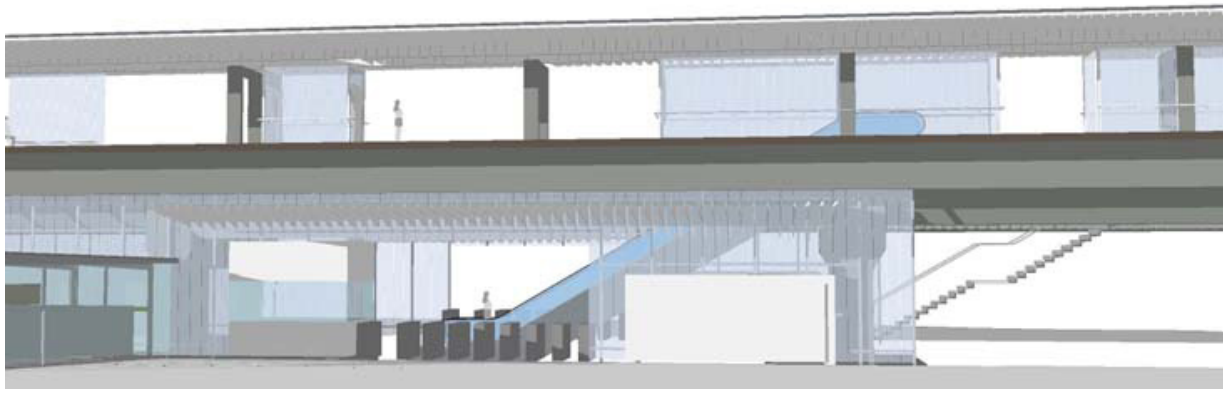


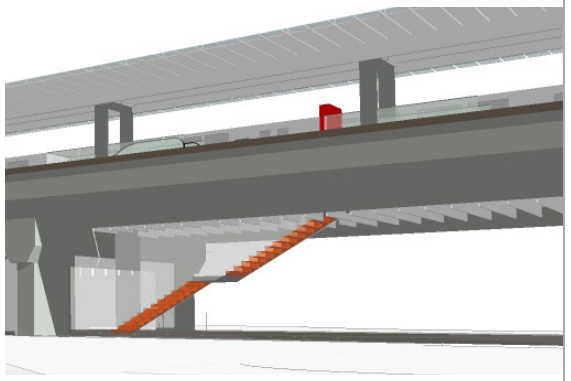
1. Ancillary Building Roof
2. Parking Garage
3. Guideway

7.10 Station Transparency and Sightlines

- Concourse Level
  - Demolish concrete escalator enclosures
  - Modernize escalators (retaining the trusses) with glazed baluster units
  - Suspend new stair from platform to minimize incursion into community connecting space
  - Enclose the new stair with glazed enclosure
  - Replace existing perimeter concourse enclosure with glazed enclosure
  - Provide glazed elevator shaft at new elevator

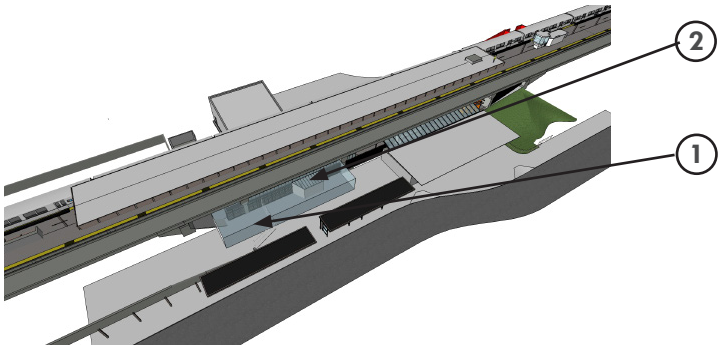






In a separate concurrent project BART has proposed a new Bike Station for implementation at Concord Station. The proposed location is identified in another concurrent project, the Plaza Project illustrated in Section 2.1 above and the diagram to the left.

To accomplish the proposed location for the Bike Station a new location for an existing staff room has been proposed.



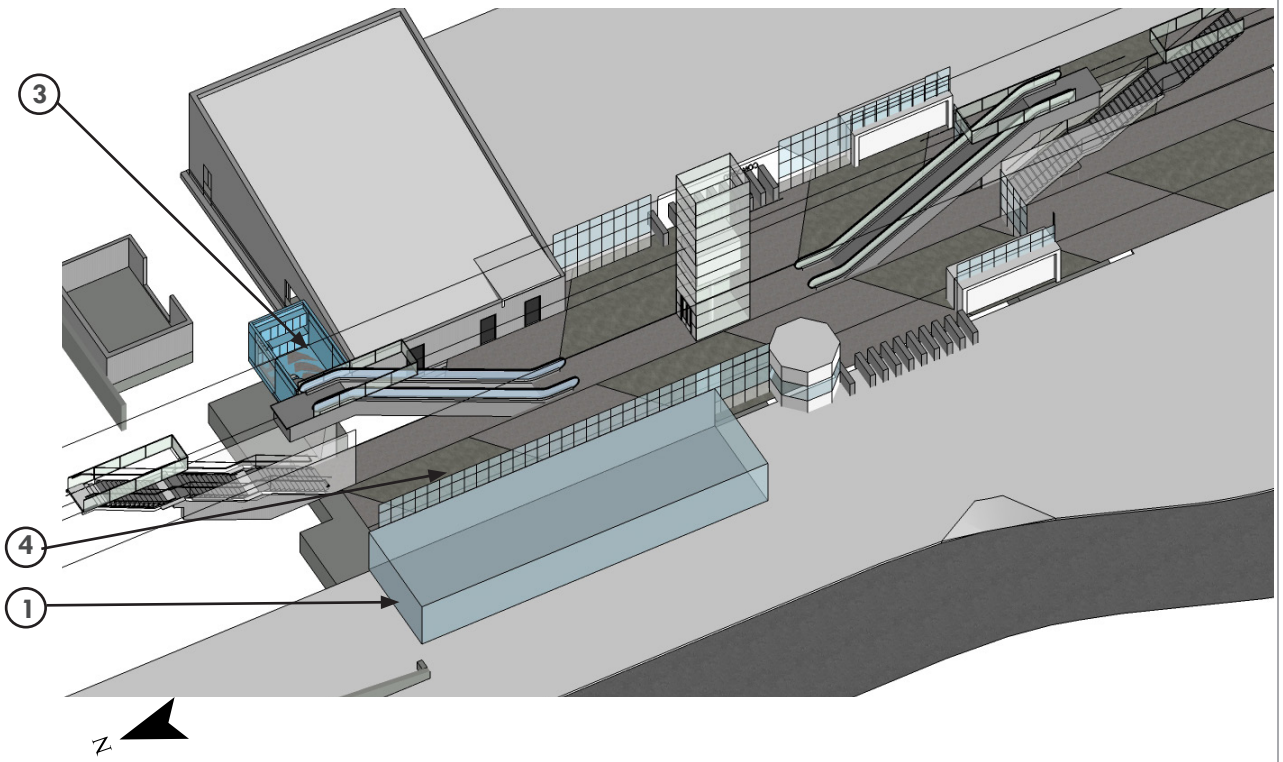
1. Bike Station Location Proposed by another project

2. Existing Staff Room converted from former TVM structure, to be removed for Bike Station placement

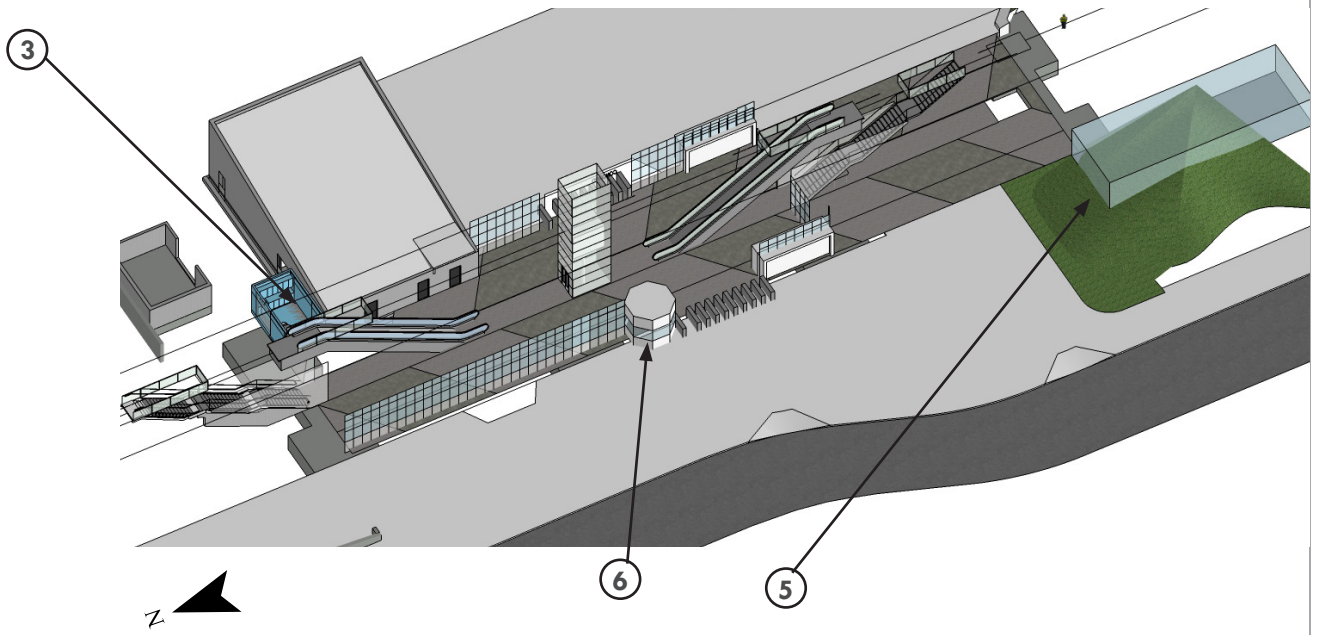
3. Proposed location of new Staff Room

4. Proposed improvements in station transparency, new enclosure

- Relocation of the staff room supports improved concourse transparency
- The proposed location of the Bike Station can support station transparency if Bike Station enclosure is sufficiently transparent
- The proposed Bike Station roof will decrease daylight in the concourse
- Transparency at the north end of the concourse is critical to proposed daylighting and CPTED improvement through transparency of envelope
- Consider an alternative location for the Bike Station



- Consider an alternative location for the Bike Station
  - Both locations require retaining walls
  - Both locations can be surveilled from the new Station Agent Booth location
  - The BART proposed location requires modification of storm drain structures
  - The alternate location does not require modification of storm drain structures
  - The alternate location will add activity to a bus layover area that is otherwise often not active
  - The alternate location could potentially be combined with berm modification to accommodate a rain garden to handle canopy rain water
  - It is recommended that the staff room be re-located in



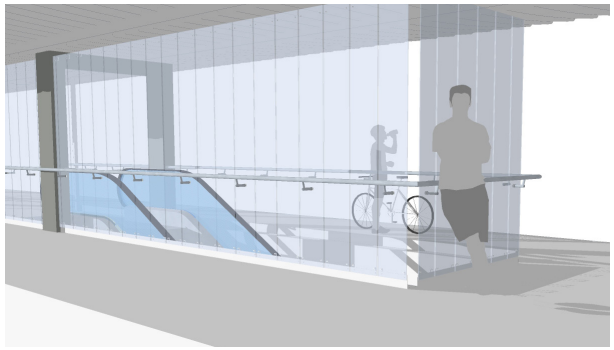
3. Proposed location of new Staff Room in current Bike Station project

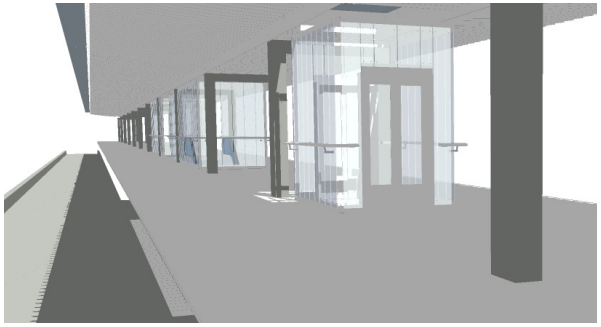
5. Alternative Bike Station locations

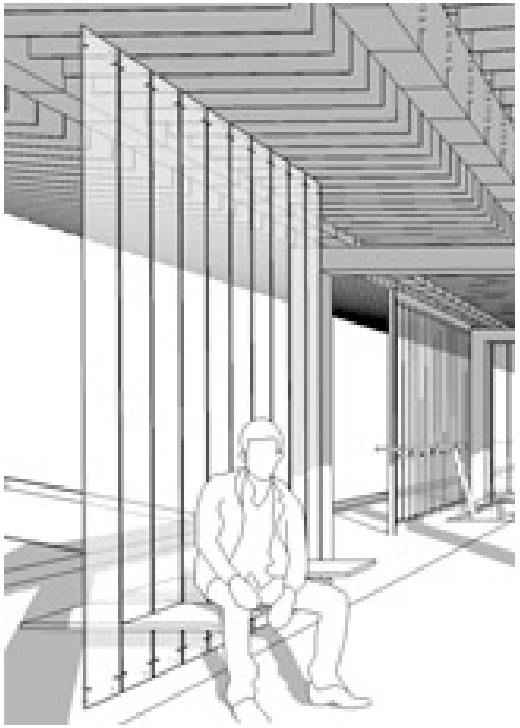
6. Proposed location of new Station Agent Booth

- Platform Level Transparency

    - Improve transparency in windscreen design
    - Remove unused structures (TM building and concrete storage structure)
    - Transparent elevator shaft
    - Transparent guard walls at vertical circulation
    - Construct new windscreens with seating at platform end areas (see canopy extension below)







Existing width of platform at concrete guards is only 7' + 2' wide and that condition occurs for a total of 90 L.F or 1/3 of the covered platform.

Observed peak crowding and circulation conflicts occur at theses locations and may present safety issues if use increases.

The existing circulation pinch points are exacerbated by the current windscreen design, another 50 L.F. of center platform length that has only 6' of usable platform width on either side.

Full height glazed guards add almost 1 foot of usable platform at each side at the openings, also adding effective windscreening.

New windscreen units can be located at the proposed covered ends of the platform, freeing up 50 L.F. of center platform for directional mixing and flow.

7.11 Materials and Configurations

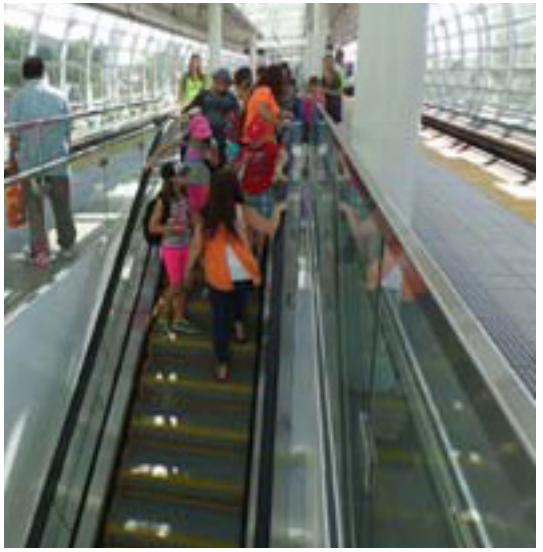
- Replace the existing steel grate enclosure system with a transparent enclosure type such as laminated glass
- Locate the station enclosure outside of the structural bent
- Extend the enclosure to full height glazing to reduce the dominance of the guideway
- Maintain a limited station material palette to two or three materials, colors and textures
- Utilize an enclosure modular dimension that corresponds to the existing structural grid as well as component maintenance and replacement criteria
- Rely on advanced structural engineering, contemporary glass types and advanced glazing techniques to minimize visual impact of structural supports for transparent enclosures
- Preclude the use of enclosure planes for opaque advertising elements

Existing steel grating enclosure with advertising panels

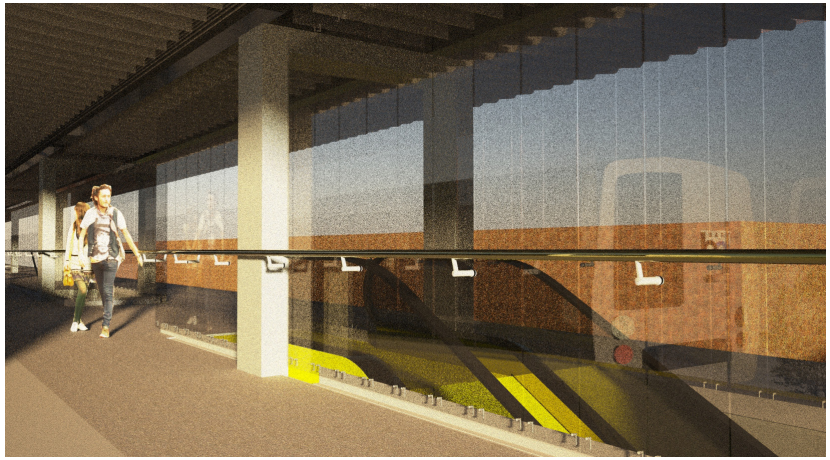
Proposed balance of existing heavy/opaque character with new light/transparent character

Ganzenhoef Metro Station

- Employ maximum transparency for windscreens, elevators and stair/escalator guards at the platform level
- Adopt full height glazed guards at vertical circulation elements
  - Double function as wind screens
  - Scale more consistent with other station glazing
  - Adds usable platform width
- Adopt single plane windscreens with the same glazing system
  - Responds to actual local wind patterns
  - Improves platform longitudinal sightlines
  - Increases usable platform width
- Adopt transparent elevator shafts with details similar to the enclosure and windscreen systems



Example glazed platform

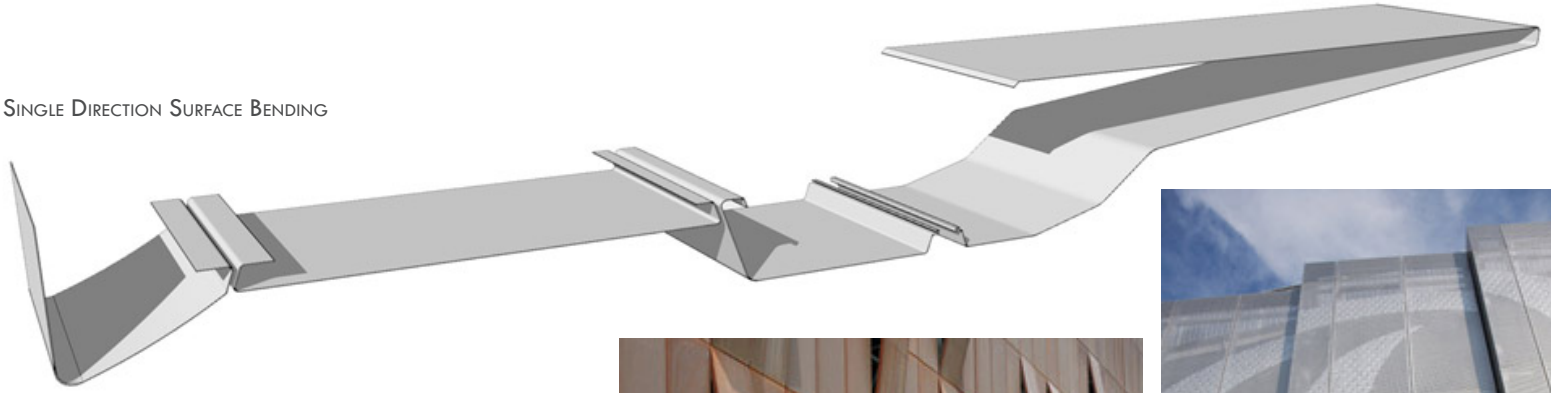


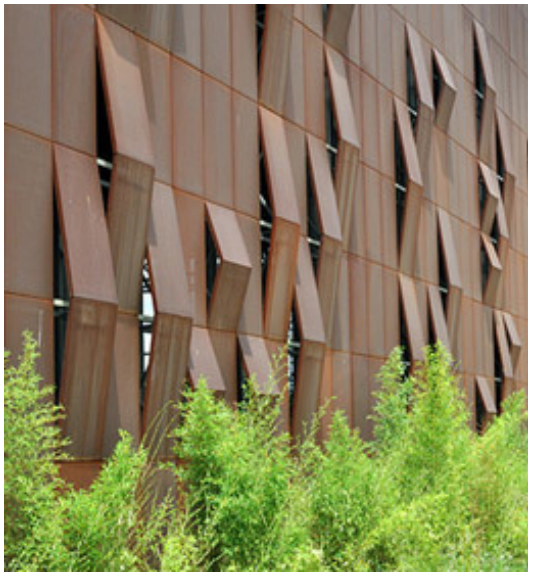
Full Height Stair Guards

Single Plane Modular Windscreen

- The Basic 3-Material pallet proposed is Concrete/Glass/Steel (Stainless and Painted)
- Optimize the performance of utilized materials, developing suitable geometries
- Emphasize the specific materiality of each
  - Example: many flat materials can be economically shaped by bending or folding it occurs in one direction

Single Direction Surface Bending



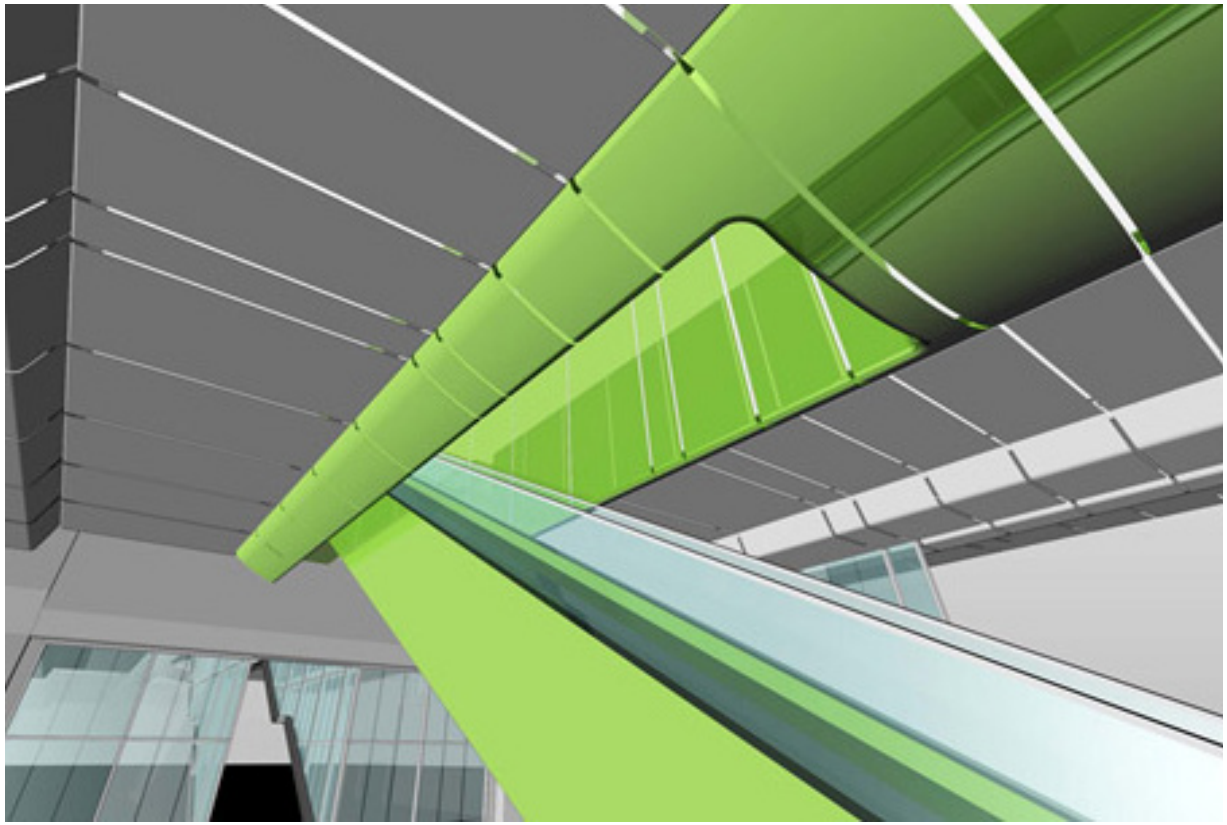


Folded Steel

Curved Perforated Aluminum

7.12 Signage Wayfinding and Advertising

- Reinvention of Brutalist diagramming and expression of circulation
  - Integrated wayfinding

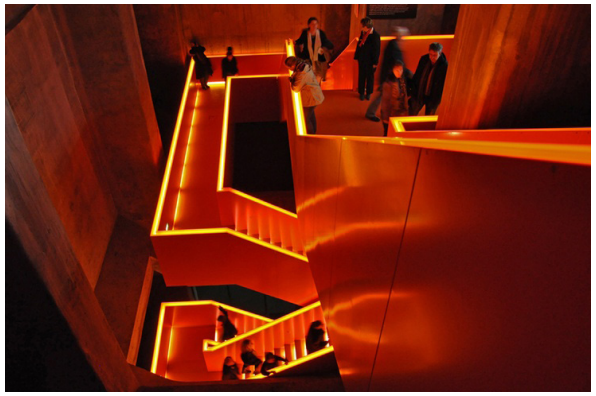


Vertical Circulation & Concourse Ceiling Design Opportunities

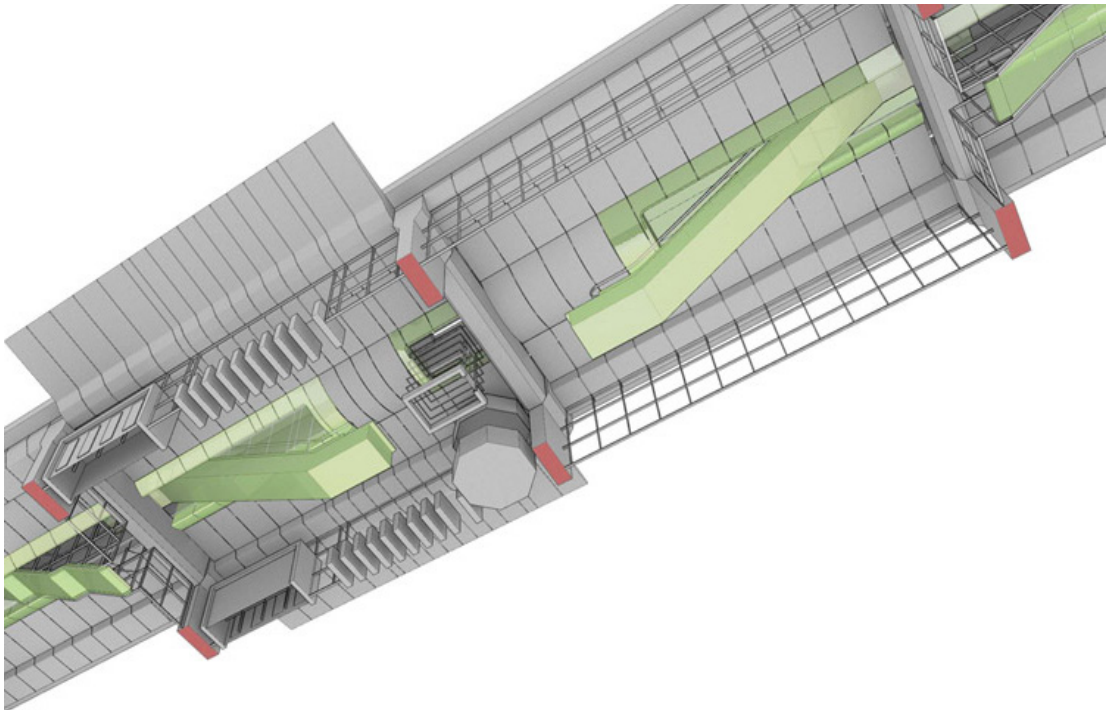
Seattle Public Library Escalator

- Consider interactive events such as supplementary lighting that responds to user needs or movements

Functional Dynamic Programmatic Lighting



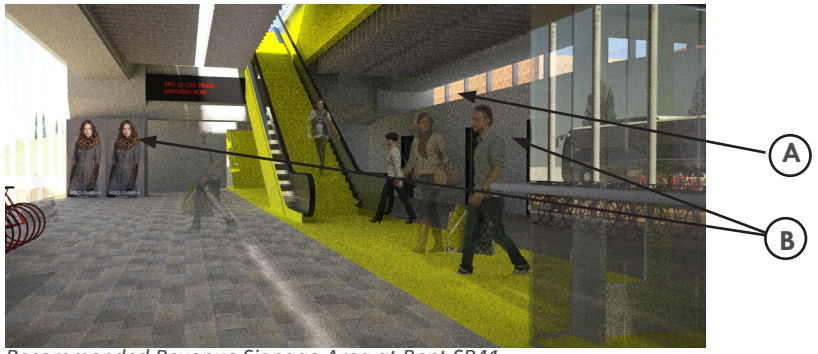
Vertical Circulation Illumination



Diagramming Vertical Circulation

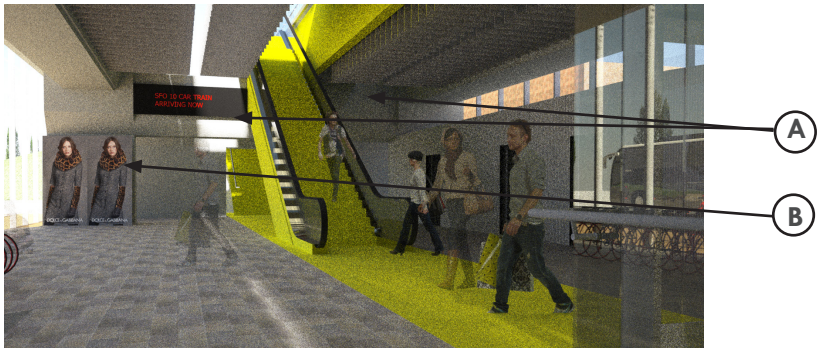
A *Face of bent span reserved for information essential to guide patrons to their destination (BFS, Overhead Signage)*

B *Face of bent column proposed Revenue Signage including potential for BFS permitted "special format" signage*



Recommended Revenue Signage Area at Bent SP41

Recommended Revenue Signage Area at Bent SP42



Recommended Revenue Signage Area at Bent SP43

Structural Bent columns may be ideal space to dedicate to Revenue Signage

- Consistent use for revenue signage could create an additional layer of visual logic to the station if those faces were the only locations revenue signage occurred.
- This strategy would double the function of the bents, information elements as well as engineering elements.
- The available area on the face of bent columns is: 640 square feet
- The area of existing advertising signage on the concourse level is 330 square feet including 2 signs that do not conform with the BFS restriction on overhead signage
- Proximity and orientation of revenue signage to primary patron circulation is improved (for both existing and proposed versions)
- The bent columns are large enough to accommodate current revenue sign types deployed at Concord and special format types*
- The form of the bent column provides a consistent datum for top of sign

** With the exception of the overhead type deployed at SP41 exterior and SP42 interior. That revenue sign type does not conform to the BFS restriction on overhead signs for information on transit functions.*

Recommendations for Revenue Sign Types at Concord Station

- *Opaque sign types should not be mounted on transparent materials*
- *Transparent sign types may be mounted on transparent materials if the degree of transparency does not conflict with functional sight lines**
- *Primary Concourse level revenue signage areas are bent surfaces*
- *Revenue signage should be scaled to the architectural element where it is mounted wherever possible (See BFS Special Format Signage)*
- *Revenue signage should be located in a consistent way to develop a logical distribution of information types*

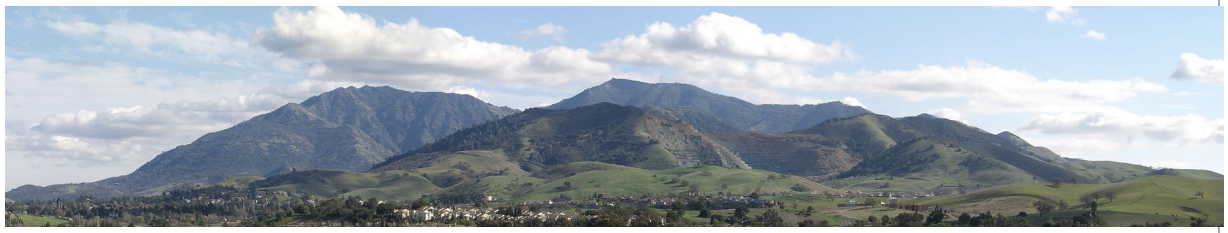
** Near future potential for interactive transparent information systems may enhance revenue signage and system information options. Conduit for those and current active display types is more easily accommodated at bents than on glazed walls. Current back-lit advertising units at bents deploy ad hoc conduit routing.*

7.13 Place-Making

Placemaking in rural Concord may involve recognition of and reference to the natural landscape in station and site configuration and expression

Strategy 1: Architectural and Public Art reference

- Contra Costa Landscape
  - Panorama
    - Mt. Diablo framed by the platform and canopy
  - Cave/grotto
    - Shade/refuge
    - Strong light/dark contrast typical of the Bay Area atmosphere
    - References to geological and seismic conditions that have shaped the region
  - Grove
    - Shade/refuge in hot climate
    - Modulated sunlight
    - Concord specific historical references and myth
    - Contrast with/mitigation of Brutalist architectural style
    -



"Mount Diablo Panoramic From Newhall" by Falcorian - Licensed under CC BY-SA 3.0 via Commons - https://commons.wikimedia.org/wiki/

Vasco Cave Regional Preserve, ebparks.org

"Mount Diablo from Quarry Hill in Shell Ridge Open Space" by Miguel Vieira - Licensed under CC BY 2.0 via Commons - https:commons.wikimedia.org/wiki/

Panorama:

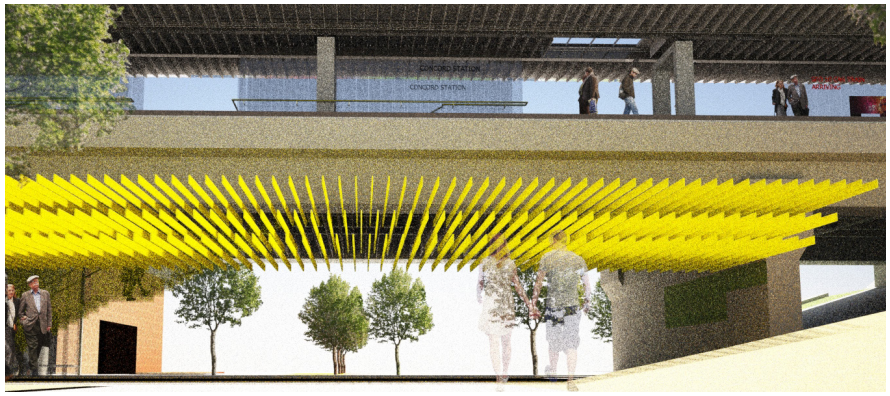
- Increased transparency on the platform as well as the proposed canopy extension affords an opportunity to frame a view of Mt Diablo,

- Laminated glass interlayer lends itself to integral public art opportunities as in this example

Seattle Cloud Cover, 2006 Artist Teresita Fernandez, Olympic Sculpture Park, Seattle Art Museum Photo By Lehmann Maupin (Own work) [CC BY-SA 4.0 (http://creativecommons.org/licenses/by-sa/4.0)], via Wikimedia Commons

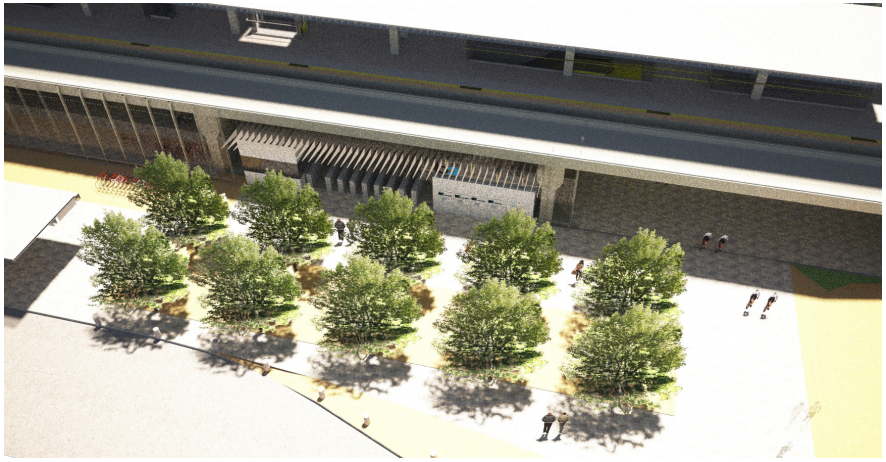
Grotto:

- The community connection between bermed ends of the station, may have potential as a large scale public art installation perhaps with the grotto theme.
- Potential and precedent exist for such an installation to incorporate programmed lighting effects that could have added benefit in promoting a sense of night activity and therefore security.



Grove:

- Redesign of the area outside of the new west entrance may provide an opportunity for a literal grove of trees that can enhance user experience providing visual shade and heat mitigation
- High crown trees for maintenance of transparency at eye level
- Consistent with Plaza Design project intent to establish a greened pedestrian friendly path through the surface parking to the station, and through the open area to the east side of the station
- Consistent with CPTED principle of engendering natural surveillance by promoting a sense of community and encouraging pedestrian activity
- Can be supplemented with reconsidered CCTV placement

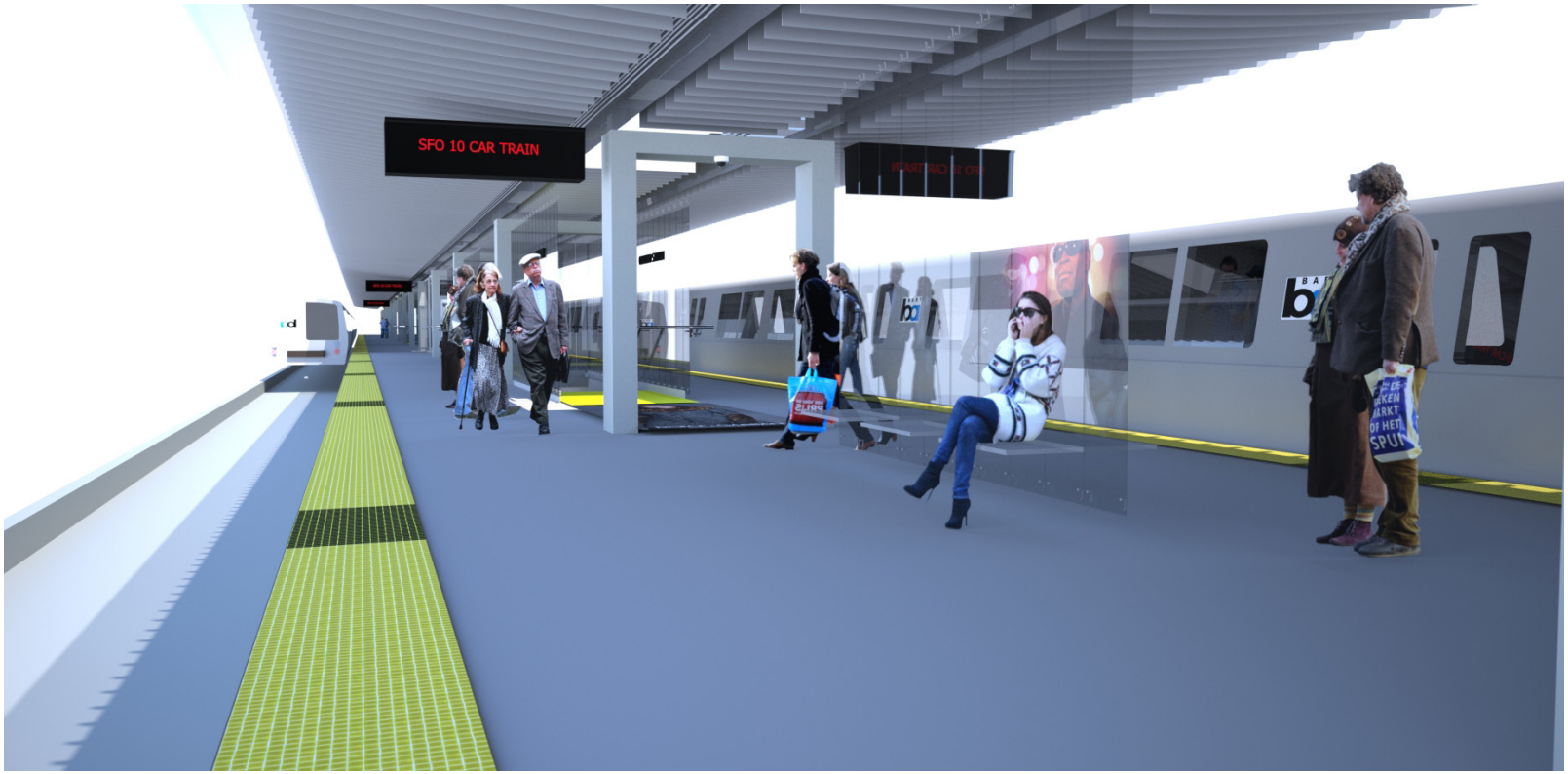


Coordinated Project: Plaza Project Planting Scheme

- Grove Implementation
  - Two examples from UCSF Mission Bay Campus
    - Both maintain eye-level transparency of site
    - Example 1 defines a place in an open landscape
    - Example 1 utilizes deciduous species
      - Seasonal variation
      - Seasonal/functional difference
    - Example 2 utilizes evergreen species to maintain a clear definition of place adjacent to a street with heavy vehicular traffic
      - Potential noise mitigation in dense crown

8.0 STATION RENDERINGS

Inbound Platform looking North



Grove, West Entry

Interior, Looking South at Structural Bent SP42 and New Elevator