Enclosure

22nd Street Station ADA Access Improvement Feasibility Study

March 2023

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San Francisco County Transportation Authority

Table of Contents

List of Tables

List of Figures

Acronyms and Abbreviations

ADA	Americans with Disabilities Act
BAA	Boarding Assistance Area
BART	Bay Area Rapid Transit
CAAC	Caltrain Accessibility Advisory Committee
Caltrans	California Department of Transportation
CBC	California Building Code
CID	Card Interface Device
CPUC	California Public Utilities Commission
DOT	United States Department of Transportation
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
I-280	Interstate Highway 280
MAAC	Multimodal Accessibility Advisory Committee
NFPA	National Fire Protection Association
OCS	Overhead Catenary System
PA	Public Address
PAX	Pennsylvania Avenue Extension
PCEP	Peninsula Corridor Electrification Project
PCJPB/JPB	Peninsula Corridor Joint Powers Board
PNA	Passengers Needing Assistance
RAB	Rail Alignment Benefits
ROW	Right-of-Way
SERSS	Southeast San Francisco Rail Station Study
SF Planning	San Francisco Planning Department
SFCTA	San Francisco County Transportation Authority
SFMTA/Muni	San Francisco Municipal Transportation Agency
TASI	TransitAmerica Services, Inc.
VMS	Variable Message Sign

1 EXECUTIVE SUMMARY

The 22nd Street Station Americans with Disabilities Act (ADA) Access Improvement Feasibility Study investigates the feasibility of potential street-to-platform accessibility (ADA access)[1] improvements at the 22nd Street Caltrain station in San Francisco. The following Executive Summary presents a high-level overview of the Study findings, including recommendations and next steps.

1.1 Background and Purpose

Caltrain is the product of centuries-old freight and commuter rail alignments and is surrounded by cities that were built over time around the right of way. Passenger service on the Peninsula corridor began on October 18, 1863 under the authority of the San Francisco and San Jose Railroad Company. Ownership and operation of the passenger rail service changed hands multiple times over the following century from a series of private to public entities until the Peninsula Corridor Joint Powers Board (PCJPB), which operates Caltrain, was formed in 1987. Caltrain agreed to assume operating responsibilities effective July 1, 1992, and to shoulder 100 percent of the operating subsidy a year later. In December 1991, Caltrain purchased the rail right of way from San Francisco to San Jose and secured trackage rights to Gilroy, with an option to acquire half the right of way in the future. Union Pacific, retains rights to operate freight service in the corridor. In addition, the state deeded 26 stations (including the 22nd Street Caltrain station), 20 diesel locomotives and 73 bi-level passenger cars to Caltrain.

A number of the stations that PCJPB originally inherited were not fully ADA accessible. Since then, Caltrain has worked to continuously upgrade its facilities and expand accessibility to individuals with special mobility needs. In accordance with the ADA, Caltrain now provides meaningful access to its services and system to passengers with disabilities. As of this writing, twenty-six Caltrain stations are fully ADA accessible and all train sets are fully ADA-accessible and can accommodate at least three wheelchairs at a time. Caltrain's Accessible stations also have a hand powered, mobile wheelchair lift that provides back up to on-board train powered lifts. Accessible ramps ("Mini-highs") have been installed at the majority of stations to facilitate boarding and alighting for disabled patrons on and off of Bombardier train consists. The hand powered, mobile wheelchair

[1] For ease of communication, we use the phrase "ADA access" in this study to refer to street-to-platform accessibility improvements at the station including for individuals using certain mobility devices, such as wheelchairs.

lifts provide access to Bombardier consists at stations not equipped with mini-high platforms.

The 22nd Street Caltrain Station is one of three stations in the City/County of San Francisco. It is located between the 4th and King and Bayshore stations, in the Dogpatch/ Potrero Hill neighborhood. On weekdays, the station is served by baby bullet trains traveling southbound in the morning and northbound in the evening, as well as limited and local service throughout the day. On weekends, the station is served by local trains throughout the day. In addition, it is served by Muni's 48 bus line with a stop located on the 22nd Street Bridge above the station, while bus lines 10 and 22 and the T-Third LRT line are located about a quarter mile to the east, on 3rd Street. Prior to the COVID-19 pandemic, the station attracted approximately 1,700 Caltrain riders daily and is expected to serve many more in the future, as there is a significant amount of high-density development planned or anticipated in the station area.

22nd Street Station was built in the early 20th century and is the product of an ever-changing rail line and built environment. This evolution has resulted in a unique, semi-submerged station located underneath the elevated Interstate Highway 280 (I-280) viaduct. The layout and locational constraints of the station present several challenges including limiting opportunities for street-to-platform access. Currently, the northbound and southbound platforms are only accessible via stairs from Iowa Street and 22nd Street, making the station inaccessible to individuals using certain mobility devices, including wheelchairs. In the absence of street-to-platform ADA access at 22nd Street Station, riders who use mobility devices must instead use the nearby 4th and King or Bayshore stations or supplemental paratransit services provided by the San Francisco Municipal Transportation Agency (SFMTA).[2] When the construction of the new South San Francisco Station was completed in 2022, 22nd Street Station became the only non-wheelchair accessible station that receives regular weekday Caltrain service.

In early 2020, Caltrain initiated the 22nd Street Station ADA Access Improvement Feasibility Study (Study) to explore potential street-to-platform ADA access improvements at the station. The Study was undertaken at the request of Caltrain Board Member and District 10 Supervisor Shamann Walton and is part of a larger effort by Caltrain to continually improve the accessibility and usability of its service to riders with

[2] Caltrain does not provide any demand-response services and paratransit service is not a direct responsibility of the agency. Paratransit services in the Caltrain service area are provided by the local transit agencies in each county — SFMTA, San Mateo County Transit District, and the Santa Clara Valley Transportation Authority.

mobility impairments. A specific funding source has not yet been dedicated for the installation of access improvements at 22nd Street Station.

This Study is one of several ongoing planning efforts regarding the potential future location, layout, and functionality of 22nd Street Station. As part of the Pennsylvania Avenue Extension (PAX), the San Francisco County Transportation Authority (SFCTA) is studying tunnel options that would move the rail line under Pennsylvania Avenue as part of the southern approach to a future extension into Salesforce Transit Center. While the exact impact of the PAX tunnel on 22nd Street Station has yet to be determined, the station may need to be relocated or reconfigured. In a related effort, the Southeast Rail Stations Study (SERSS) evaluated station reconfigurations and replacement locations in the vicinity of the existing 22nd Street Station. While these studies are not directly focused on the current accessibility of 22nd Street Station, their results have the potential to impact the long-term future of the station.

The primary purpose of this Study is to provide a planning level analysis[3] of the feasibility of vertical access improvements, within the context of the station's constrained existing footprint and potential long-term relocation/reconstruction plans. To achieve this, the Study first analyzed the site's existing conditions to identify the primary constraints to installing ADA upgrades. A set of initial design alternatives and evaluation criteria were then generated and refined through a series of external and internal stakeholder engagement efforts. Once the conceptual design alternatives and evaluation criteria were finalized, a constructability analysis was performed to evaluate the feasibility of constructing each alternative within the existing station area. Estimates for the capital costs, operating costs, and implementation timeline were also generated for each alternative. This information was then compiled into an evaluation matrix, which informed the selection of a recommended alternative. Finally, potential funding sources were identified for street-to-platform ADA access improvements at 22nd Street Station.

1.2 Existing Conditions and Design Constraints

22nd Street Station is a uniquely challenging area for constructing large-scale upgrades. An existing conditions analysis identified the following elements as primary constraints to the implementation of new street-to-platform access facilities.

[3] Engineering analysis of the improvements explored in the Study did not exceed 15% design.

Significant Vertical Street-to-Platform Distances

The southbound platform has a 22-foot vertical travel distance from the surface level of 22nd Street. The northbound platform has a 12.5-foot vertical travel distance from Iowa Street at the south end of the platform and a 19-foot vertical travel distance at the north end of the platform. Both platforms are currently only accessible by stairs.

There is no legal standard for the vertical distances between streets and platforms, but the vertical distances at both platforms are on the higher end of what is typically served by ramps at transit stations. Caltrain criteria states elevators are not a preferred method of vertical accessibility but may be considered for locations where the vertical distance is 10 feet or more.[4] Given the significant vertical distances between the platforms and the surrounding street, both elevators and ramps may be considered, however, ADA-compliant ramps at 22nd Street Station would be quite long and would require multiple intermediate landings.

Freeway Columns on Platforms

Throughout the station area, I-280 support columns create significant platform-level obstructions. These columns constrain the space available for potential ramp/elevator landings and access/egress points.

Street Level Space Constraints

In addition to highly constrained platforms, street level space around 22nd Street Station is limited. Potential ADA facilities must account for the buildings along Pennsylvania Avenue and 22nd Street as well as the city-owned street parking along Iowa Street and 22nd Street.

Platform Surface and Cross Slopes

For both the northbound and southbound platforms, cross slopes (transverse grades) of up to seven percent were recorded. This exceeds the current ADA standard for new construction, which allows cross slopes of up to two percent. To implement access routes which meet current ADA standards, it will be necessary to install compliant cross slopes within the identified access route.

In addition to excessive cross slopes, much of the existing southbound platform surface consists of uneven asphalt paving. Depending on the location of the access/egress points of potential access facilities, unpaved portions of the southbound platform may

[4] Caltrain Design Criteria, Chapter 3 Stations and Facilitates, Chapter E Access and Circulation, 3.3 Vertical Circulation, 3.3.1 Stairs and Ramps: *At locations where grade changes of 10 feet or more occur, for example at pedestrian overpass, elevators may be considered.*

need to be paved to provide a path of travel that is consistent with the ADA's accessibility standard.

Future Overhead Catenary System (OCS)

As part of the Peninsula Corridor Electrification Project (PCEP), the majority of the Caltrain corridor is being electrified through the installation of an Overhead Catenary System (OCS). This will require placing OCS poles at regularly spaced intervals, including within station platform areas. OCS poles and their foundations could further constrain the platform space available for accessibility improvements. The Study's conceptual designs assume the OCS pole locations from the 95 percent designs- the most advanced designs available at the time.

Underground Utilities

22nd Street Station is further constrained by the presence of underground fiber optic and gas transmission lines. Fiber optic cables run parallel to the tracks beneath the southbound platform and two PG&E gas transmission lines run perpendicular to the tracks on the northern end of both platforms. Relocating the existing utilities would make any ADA access improvement project considerably more complicated and expensive.

The full Existing Conditions Analysis can be found in Chapter 2, EXISTING CONDITIONS ANALYSIS.

1.3 Conceptual Design Alternatives Summary

As detailed above, the southbound and northbound platforms have distinct characteristics and physical constraints. Due to this fact, each platform was assessed independently, with each of the Study's conceptual design alternatives addressing street-to-platform access of a single platform. To achieve ADA accessibility improvements at 22nd Street Station, one alternative must be selected for each platform.

After several rounds of internal and external stakeholder engagement, the following five Conceptual Design Alternatives were developed:

1. Southbound Platform Ramp: A 465-foot ramp with a 6.1 percent slope and three switchbacks from the existing station plaza area to the southbound Boarding Assistance Area (BAA).
2. Southbound Platform Elevator: An elevator connecting to the existing 22nd Street sidewalk via an extended queuing platform.

3. Northbound Platform Ramp A: A 305-foot ramp with a 6.5 percent slope and one intermediate switchback from Iowa Street to the middle of the northbound platform.
4. Northbound Platform Ramp B: A 240-foot ramp with a 6.9 percent slope, running straight from the south end of the Iowa Street retaining wall to the northbound BAA.
5. Northbound Platform Elevator: An elevator connecting to the Iowa Street sidewalk via an extended queuing platform.

Chapter 3, INITIAL ALTERNATIVES DEVELOPMENT, provides a detailed description of how internal and external stakeholder feedback, as well as planning-level analysis, informed the development of these five alternatives. The full designs can be found in Chapter 4, FINAL CONCEPTUAL DESIGNS.

While all five conceptual designs were found to be feasible at a planning-level, additional work will be needed to further validate the designs. Prior to advancing the designs further, additional work will need to be conducted, including geotechnical and engineering work, coordination with Caltrans, and identification of a funding source/sources.

1.4 Alternative Evaluation

After the planning-level feasibility of the five conceptual design alternatives was confirmed, each was evaluated according to the following criteria: Ease of Use, Safety & Security, Reliability, Ease of Maintenance, Operational Impacts, Construction Cost, Construction Time, and Constructability. Stakeholder feedback informed both the creation of the evaluation criteria themselves and the scores that each alternative received. The complete evaluation matrix can be found in Section 4.9.

The Study's evaluation process revealed a number of substantial challenges that would result from installing elevators at 22nd Street Station. Because the station itself is not staffed and the surrounding area remains relatively inactive outside of commute hours, there is a particularly high risk of unsafe, unsanitary, and generally problematic behavior occurring inside and around the elevators. These issues have been observed at the existing elevators within the Caltrain system[5], which have all experienced maintenance

[5] Elevators are currently in use at the Bayshore, San Bruno, Millbrae, San Mateo, Belmont, and Tamien Caltrain stations

issues and frequent outrages. The unreliability of elevators adds a considerable burden to riders who depend on such facilities for street-to-platform access.

While the ramps proposed under the Study's conceptual designs are longer than those that are typically used at transit stations, they are expected to yield a better overall user experience than elevators would at 22nd Street Station. Furthermore, they require less maintenance, have longer anticipated lifespans, and have fewer operational impacts.

1.5 Study Recommendation and Next Steps

After evaluating the five feasible design alternatives, the Study recommends that Conceptual Design 1 (Southbound Platform Ramp) and Conceptual Design 3 (Northbound Platform Ramp A) be considered for further analysis and design. A conceptual plan of the recommended alternative is shown in **Figure 1**, below. While subject to change, bringing the combination of these two alternatives from preliminary engineering through construction is estimated to cost $11.8 million and require approximately 2.5 years to implement.

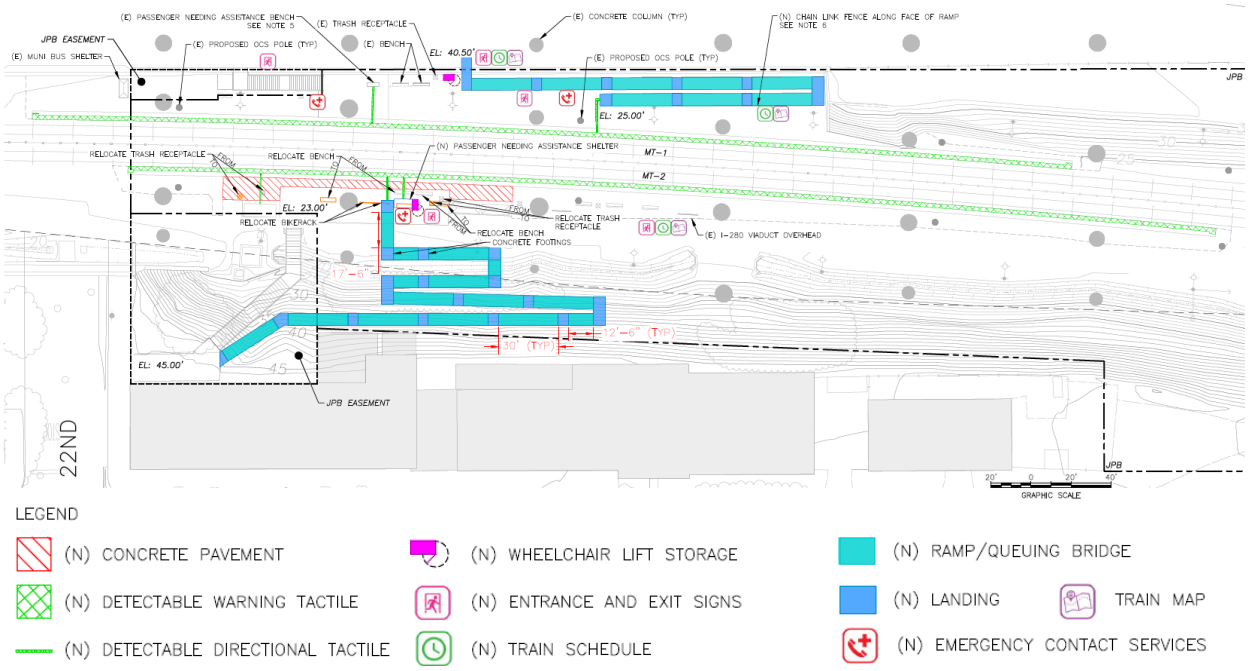

Figure 1 Recommend Conceptual Design Alternative

Because the Study only represents planning level analysis, further design and engineering work is required to proceed with the implementation of street-to-platform ADA access improvements at 22nd Street Station. The following next steps should be taken if the decision is made to advance the recommended alternatives.

- Confirm the outcomes of the SERSS and PAX studies, if available
- Advance and finalize design of the recommended alternatives including:
    - Identify and finalize a funding plan to advance the project through construction/implementation
    - Conduct additional studies (e.g., geotechnical analysis and utility potholing)
    - Confirm final Caltrain electrification plans for the station area
    - Refine the slope, length, location of ramps via outreach and engineering analysis
    - Conduct additional analyses of the station's lighting and auditory announcement system
    - Conduct environmental clearance
    - Complete construction documents (plans and specifications)
    - Coordinate the necessary third-party review processes, including the implications of the easement with Caltrans
    - Obtain the necessary right of way and easement agreements

2 EXISTING CONDITIONS ANALYSIS

The Existing Conditions Analysis was conducted from January 2020 to May 2020. This effort included reviewing recent and on-going planning studies pertaining to the station area, analyzing relevant as built and record drawings, and verifying the current station area against the most recent Caltrain Design Criteria. A site visit and survey were also conducted to confirm key elements from the documentation analysis and record any new pertinent field findings.

2.1 Relevant Planning Studies

A review of existing studies, plans, and projects related to 22nd St Station and the surrounding area was conducted. The purpose of this review was to better understand the current and potential future conditions that could affect the station. Relevant findings from the review are discussed below and a complete summary of additional studies and plans reviewed is available in **Appendix A**.

Rail Alignment and Benefits Study

In 2018, the San Francisco Planning Department completed the Rail Alignment and Benefits (RAB) Study, which assessed future transportation and land use alternatives in southeast San Francisco. One of this Study's key outcomes was the identification of a subterranean rail tunnel beneath Pennsylvania Avenue (just west of the existing Caltrain right of way) as the recommended alignment for the southern approach to a future extension into the Salesforce Transit Center. The RAB Study did not specifically identify the impacts a Pennsylvania Avenue tunnel would have on 22nd Street Station as it exists today.

Pennsylvania Avenue Extension

SFCTA advanced the RAB Study's recommendations and conducted preliminary environmental and engineering work for the Pennsylvania Avenue extension (PAX). This work provided more specificity on the proposed Pennsylvania Avenue tunnel and considered the potential impacts to 22nd Street Station in its current form. The existing station may require substantial alterations or could potentially be relocated entirely. The earliest anticipated timeline for completion of PAX is mid to late 2030s. SFCTA will be advancing the next phase of PAX in 2023.

Southeast Rail Stations Study

The San Francisco Planning Department (SF Planning) conducted the Southeast Rail Stations Study (SERSS) which examined potential locations for a future Caltrain station(s)

in southeast San Francisco. The Study considered multiple options for keeping 22nd Street Station in its current location (with varying degrees of modification to the existing station configuration), it also explored options for building a new station in a nearby location. Findings from the 22nd Street ADA Access Improvement Feasibility Study were a consideration in the SERSS 22nd Street Station alternatives. The SFCTA will be progressing the SERSS effort to the next phase.

2.2 Existing Station Plans

As-built drawing and record drawings of 22nd Street Station and the surrounding area were thoroughly reviewed. These drawings document a number of the station's unique characteristics. For instance, the station is located under an Interstate Highway 280 (I-280) overpass, with sizable support columns intersecting the platforms at regular intervals. The station is also positioned 12.5 to 22 feet below the surrounding streets (Iowa Street to the east and 22nd Street to the north). Currently, the only means of platform access are steel staircases on the north end of each platform.

While not yet present at the station, an OCS will soon be installed on the 22nd Street Station platforms as part of PCEP. This Study used the latest available plans for the OCS pole locations, which were at 95 percent design.

Maps of the overhead and underground utilities were also reviewed. In addition to the standard lighting, electrical power, and drainage infrastructure, the station area includes sizable underground PG&E gas transmission lines and a JPB-owned fiber optic line.

Finally, plans for recent upgrades near both of the station's platform entrances were reviewed. In early 2019, SFMTA added electronic bike lockers and reconfigured parking along the stretch of Iowa Street near the northbound platform entrance. In a separate effort, Caltrain, with support from the Dogpatch and NW Potrero Hill Green Benefits District, completed upgrades to the plaza in front of the southbound platform entrance in 2019. These upgrades included an enhanced entrance plaza with landscaping, lighting, and fencing improvements.

2.3 Site Visit

On March 12, 2020, a site visit was conducted to gather more detailed information on the station's existing conditions. This exercise was organized by a checklist of facilities and elements integral to improving station access. This checklist was informed by Caltrain's Draft 2020 Design Criteria (the most current version available prior to the site visit), the 2010 ADA Standards for Accessible Design, and the California Building Code

(CBC).[6] This station was built in the early 20th century and has not been legally required to comply with the updated standards absent major modifications. In order to provide a more comprehensive picture of overall station access, the checklist was not limited to elements that are specifically required for ADA access.

The elements of the Site Visit Checklist were grouped into the following categories.

Site Access and Station Facilities

Site access to the station was examined, including physical elements of the streets adjacent to the station entrance, public transit stops, and the availability of accessible loading zones.

Vertical Circulation Elements

A Vertical Circulation Elements portion of the checklist was developed to verify the existing means of vertical access and evaluate them against the current design criteria and code requirements (mentioned above).

Platform Elements

The checklist identified key physical elements and furnishings, including benches, ticket vending machines, and trash receptacles. Longitudinal slopes (the change in elevation over a specified distance along the length of the platform) and cross slopes (the change in elevation over a specified distance across the width of the platform) were measured at several locations along the platform. Caltrain-required design elements, such as striping, boundary markings, furniture spacing, and areas reserved for passengers with disabilities, were also assessed.

Wayfinding

Wayfinding refers to elements used to help orient and navigate people through physical spaces with a goal of minimizing confusion and improving the user experience. In order to assess the existing conditions of wayfinding elements, the following qualitative components were included on the checklist: posted train schedule, entrance and exit signs, train map, platform signs (schedule and advisory messaging), variable message signs (VMS), auditory train information (platform boarding, train on platform), and the public address (PA) system.

[6] Caltrain Design Criteria refers to the California Code of Regulations (CCR), Title 24, which includes the California Building Code, for specific elements such as vertical circulation elements.

Safety and Security

The safety and security checklist elements focused on the following station components: emergency exit signs, emergency contact services, and passenger assistance and communications telephones. Caltrain Design Criteria do not currently mandate emergency telephones.

2.4 Site Visit Findings

The findings of the site survey discussed below are organized by platform (northbound and southbound), as each has unique elements.

Northbound Platform

Site Access and Station Facilities

Figure 2 Northbound Platform, Facing South from the Top of the Staircase

As shown in **Figure 2**, the northbound platform is immediately adjacent and parallel to Iowa Street, with a retaining wall at the back of platform. The vertical distance between the street and platform varies, from 12.5 feet at the south end to 19 feet at the north end. The platform is accessible by a staircase off Iowa Street.

The surrounding sidewalks and street parking are owned by the City of San Francisco. While identifying accessibility improvements on City property was outside of the scope of this Study, additional analysis of the accessible path of travel on surrounding sidewalks may be desired in future design phases.

Vertical Circulation Elements

The only existing means of access to the northbound platform is an 84-inch-wide steel staircase at the north end of the platform, near the intersection of Iowa Street and 22nd Street. This staircase covers 19 feet of vertical distance and was built in compliance with the prevailing accessibility and building code requirements at the time of installation. Any new vertical circulation elements at the platform would be required to conform to all relevant sections of the most recent ADA Standards and California Building Code.

Platform Elements

The northbound platform stretches about 520 feet (shorter than the current Caltrain standard for platform length of 875 feet[7]), and the majority of the platform is located adjacent to a retaining wall supporting Iowa Street (see **Figure 3** below).

Figure 3 Northbound Platform Retaining Wall

Throughout the platform, I-280 support columns, message signposts and light poles intrude into the walkway space. The I-280 columns were retrofitted after the 1989 Loma Prieta earthquake, doubling their original diameter. A column near the end of the retaining wall makes it difficult for passengers to reach southern end of the platform without crossing over onto the yellow safety stripe (see **Figure 4**). These columns limit the available space for station access improvements, as they cannot be moved or

[7] Caltrain Design Criteria 2020, Chapter 3 Stations and Facilitates, Chapter D Station Configuration, 1.0 Boarding Platforms, 1.1 Platform Dimensions. 1.1.a Platform Length: *The standard platform length shall be 875 feet to accommodate a 10-car EMU consist.*

demolished. Furthermore, per an easement Caltrans holds, no permanent structures may be constructed within a certain proximity of the columns without written approval by Caltrans, nor shall highway structure maintenance activities be impeded by Caltrain use of the right of way.

Figure 4 Northbound Platform Circulation: I-280 Column Obstruction

Additionally, Caltrain will be installing OCS poles parallel to the length of the platform, about eight feet from the platform edge. Any new facilities at the station must account for these OCS poles in their design.
The platform is generally flat longitudinally (1.0 percent minimum and 1.2 percent maximum), however, cross slopes vary greatly across the platform (0.3 percent minimum at the northern end and localized sections of 4.7 percent maximum at the southern end). The platform surface consists mainly of asphalt concrete and is generally smooth, but there are several localized areas with uneven paving.

There are no shelters or ticket vending machines located on this platform, although Clipper Interface Devices (CID) are installed. The platform includes two benches, a trash receptacle, and a train schedule display case at the retaining wall.

The boarding area is marked by a standard yellow safety stripe but lacks detectable warning tactile paving[8] and detectable directional tactile paving.[9] Because the 22nd Street Station was built in the early 20th century, warning and directional tactiles are not *currently* required at the station but would be if street-to-platform access improvements

[8] Caltrain Design Criteria 2020, Chapter 3 Stations and Facilitates, Chapter D Station Configuration, 2.0 ADA Requirements, 2.3 Detectable Warning Tactile: *The tactile shall be ADA-compliant and installed at the following locations: a. Platform edge on the track side: The tactile shall be 2 feet wide along the entire length of the platform, and 3 feet wide at the returns at each end of the platforms.*

[9] Caltrain Design Criteria 2020, Chapter 3 Stations and Facilitates, Chapter D Station Configuration, 2.0 ADA Requirements, 2.3 Detectable Directional Tactile*: Platforms shall be treated with directional and guide tactiles to assist sight-impaired persons in locating the persons needing assistance (PNA) shelter, and one of the TVMs at each platform.*

were implemented. A Boarding Assistance Area (BAA) with a dedicated bench is provided near the bottom of the staircase. The platform does not currently include a mini-high platform.

Two PG&E gas transmission lines (26-inch and 30-inch in diameter) are located beneath the staircase (at platform level). These pipelines (which extend outwards from a retaining wall above ground) are locked behind a fence, making them inaccessible to the public. From this location, the pipelines run underneath the northern end of both platforms. Any station improvements which require modifications to these pipelines would be very costly and present significant constructability challenges.

Wayfinding

The entrance to the northbound platform of 22nd Street Station contains a case that displays train schedule information (see **Figure 5**). This sign is the only element identifying the staircase as a station entrance.

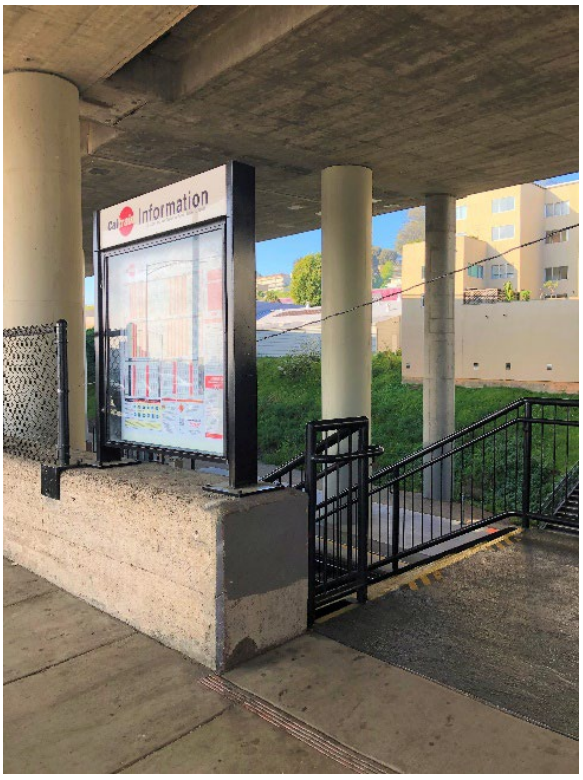

Figure 5 Northbound Platform Entrance

Figure 6 Southbound Platform Directional Sign

There are platform speakers that provide an auditory mention of the upcoming and arriving trains. During the site visit, the volume of the speakers appeared to not be audible to some patrons. Variable message signs (VMS) are visible and provide

announcements about departure time, train status, travel updates, and general safety and security messaging. The platform also has wayfinding signs that inform passengers which station they are at and where the train is headed (see **Figure 6**).

The VMS are placed at a height of 8 feet, which is lower than the minimum height of 8 feet 2 inches under current Caltrain Design Guidelines. The VMS provides safety information, train information and upcoming train notices.

Safety and Security

Emergency exit signs and evacuation maps are not visible on the northbound platform. During the site visit, the VMS were live updating changes to train schedules and safety instructions on the platform. The platform does not include emergency communications telephones. While not required by Caltrain Design Guidelines, emergency telephones are an industry best practice.

Southbound Platform

Site Access and Station Facilities

The southbound platform is accessible via a staircase from the recently renovated plaza off 22nd Street. This plaza serves as a gateway to the station and features a wide sidewalk at its entrance. The plaza and Caltrain right-of-way are immediately adjacent to a private building which faces Pennsylvania Avenue.

A bus stop for the 48-Quintara and 55-Dogpatch Muni bus routes is located on the bridge structure above 22nd Street Caltrain Station, between the existing entrances to either platform. The bus stop and shelter can be seen in **Figure 7**, on the right.

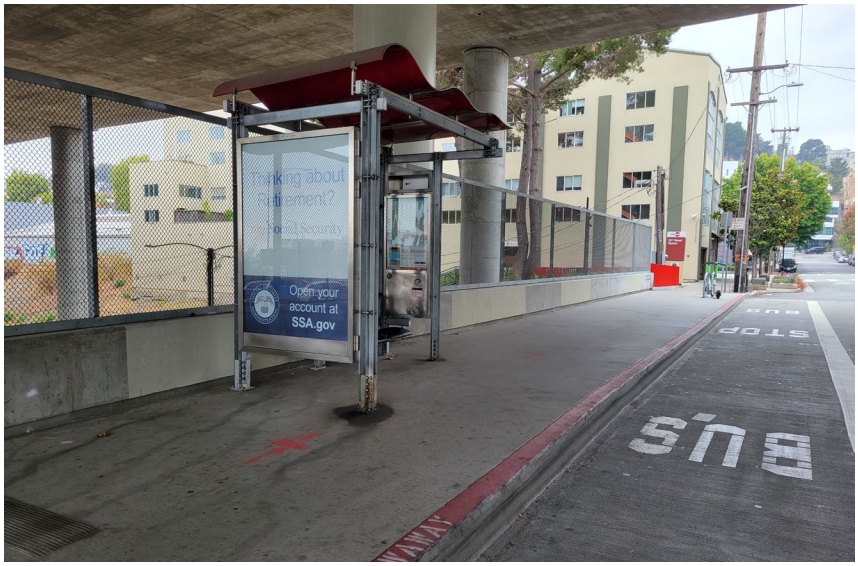

Figure 7 SFMTA Bus Stop and Bus Shelter on 22nd Street

A gravel access road connects the southern end of the platform to Pennsylvania Avenue (**Figure 8**). This road is fenced off and is currently only accessible to authorized motor vehicles.

Figure 8 Southbound Platform Gravel Access Road

Vertical Circulation Elements

The only existing means of access to the southbound platform is a 84-inch-wide steel staircase at the north end of the platform, near the station entry plaza on 22nd Street. This staircase covers 22.5 feet of vertical distance and was built in compliance with the prevailing accessibility and building code requirements at the time of installation. Any new vertical circulation elements at the platform would be required to conform to all relevant sections of the most recent ADA Standards and California Building Code.

Figure 9 Southbound Platform Staircase

Platform Elements

Figure 10 Southbound Platform Looking Southward from TVM

As shown in **Figure 10**, the southbound platform stretches about 550 feet long (below current Caltrain standard[10]). The platform is largely composed of asphalt concrete

[10] Caltrain Design Criteria 2020, Chapter 3 Stations and Facilitates, Chapter D Station Configuration, 1.0 Boarding Platforms, 1.1 Platform Dimensions. 1.1.a Platform Length: *The standard platform length shall be 875 feet to accommodate a 10-car EMU consist.*

paving, with a large concrete pad at the bottom of the staircase. However, the majority of the platform area south of the concrete pad is unpaved gravel. The transition points between asphalt concrete paving and concrete, as well as the unpaved gravel at the back end of the platform, create instances of uneven pavement. The paved portions are generally flat across the length of the platform (0.2 percent minimum and 0.7 percent maximum slope). Cross slopes vary throughout the platform, including a 3 percent cross slope in the concrete loading area at the north end of the platform and 7 percent cross slope in the asphalt concrete paving at the southern end of the platform. Cross slopes greater than 2 percent do not meet Caltrain and ADA's accessibility standard.[11]

A sump pump house for the southbound train tunnel is located adjacent to the bottom of the staircase, as seen in **Figure 11**. The sump house and its associated utilities (including a 12-inch storm drainpipe connecting to the north side of the building) may create additional challenges in the design and installation of station improvements.

An unlined ditch runs along the entire back length of the platform (see **Figure 12**). This ditch transitions into a short culvert near the south end of the platform, however it is mostly an open channel. While the ditch is a considerable distance away from the edge of the platform, there is no clearly defined marking or barrier between passengers and the ditch.

Figure 11 Southbound Sump Pump House

Figure 12 Southbound Platform Drainage Ditch

[11] Caltrain Design Criteria 2020, Chapter 3 Stations and Facilitates, Chapter D Station Configuration, 1.0 Boarding Platforms, 1.1 Platform Dimensions. 1.1.d Platform cross slope: *This slope is required for drainage purposes. The slope shall generally be 1 percent (2 percent maximum, in accordance with ADA Standards) and shall be sloped away from the tracks, to minimize the risk for persons in wheelchairs of natural rolling effects toward the tracks.*

The southbound platform also includes several the large gas transmission lines noted on northbound platform and an underground fiber optic duct bank that runs parallel to the platform edge.

Columns from the I-280 bridge structure intersect the southbound platform at regular intervals. Several of the columns obstruct passenger circulation and, in some instances, create narrow pinch points between the yellow safety stripe and edge of column. As shown in **Figure 13** below, these columns do not meet the 7-foot minimum clearance from the platform edge established by Caltrain Design Criteria[12] and make traversing the platform without crossing the yellow safety stripe difficult. Furthermore, these columns may create additional challenges during construction of improvements to the station.

Figure 13 Southbound Platform Circulation Obstruction by I-280 Column

Similar to the northbound platform, OCS poles will also be installed parallel to the entire length of the southbound platform. ADA access improvements to the station must consider these poles, as they may limit the space available for new facilities.

[12] Caltrain Design Criteria, Chapter 3 Stations and Facilitates, Chapter D Station Configuration, 1.1 Platform Dimensions, 1.1.b Platform Width: *A minimum clear walkway width of 7 feet from the edge of the yellow safety stripe shall be maintained for the entire length of the platform for outboard platforms.*

Benches and bicycle racks are provided in the middle section of the platform. Unlike the northbound platform, the southbound platform features two ticket vending machines. Clipper CIDs are available on both sides of the bottom staircase landing as seen in **Figure 14**.

Figure 14 Southbound Platform TVM and CID

Similar to the northbound platform, the boarding area is marked by a standard yellow safety stripe but lacks detectable warning tactile paving[13] and detectable directional tactile.[14] Both are required at ADA accessible stations by current Caltrain Design Criteria. There is currently no mini-high platform to assist with level boarding. A BAA with a dedicated bench is located just south of the staircase.

Wayfinding

The street-level southbound platform entrance plaza includes an information display case similar to the one located at the northbound platform entrance. The plaza also

[13] Caltrain Design Criteria 2020, Chapter 3 Stations and Facilitates, Chapter D Station Configuration, 2.0 ADA Requirements, 2.3 Detectable Warning Tactile: *The tactile shall be ADA-compliant and installed at the following locations: a. Platform edge on the track side: The tactile shall be 2 feet wide along the entire length of the platform, and 3 feet wide at the returns at each end of the platforms.*

[14] Caltrain Design Criteria 2020, Chapter 3 Stations and Facilitates, Chapter D Station Configuration, 2.0 ADA Requirements, 2.3 Detectable Directional Tactile: *Platforms shall be treated with directional and guide tactiles to assist sight-impaired persons in locating the persons needing assistance (PNA) shelter, and one of the TVMs at each platform.*

includes a Caltrain-standard station identification sign. The existing VMS are located on the platform level (**Figure 15**) and stand 8 feet high, lower than the current Caltrain Design Criteria required minimum height of 8 feet 2 inches.[15]

Safety and Security

There are no emergency exit signs, emergency contact phones, or evacuation maps on the southbound platform. While not required under the current Caltrain Design Criteria, emergency phones are an industry best practice.

The BAA is located immediately behind the yellow striped safety line and the dedicated BAA bench is approximately 7 feet away from the platform edge (**Figure 16**), which does not meet current standards.[16] The existing configuration of station amenities, such as bike racks and benches, allows for the BAA to be moved further away from the tracks.

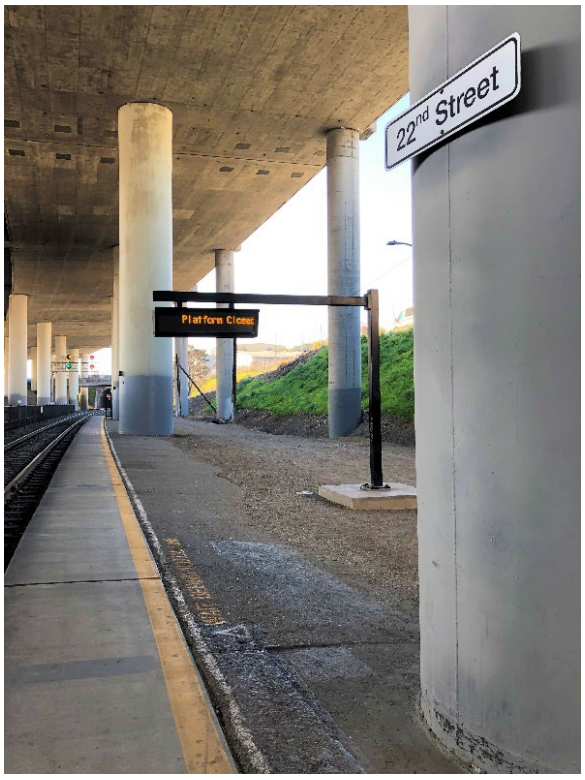

Figure 16 Southbound Platform VMS

Figure 15 Southbound Platform BAA

[15] Caltrain Design Criteria 2020, Chapter 3 Stations and Facilitates, Chapter F Furnishings and Amenities, 2.0 Station Amenities, 2.1.1 Variable Message Sign: *Typical vertical clearance from the platform floor to the message board shall be 8 feet 2 inches, and maximum clearance shall be 9 feet.*

[16] Caltrain Design Criteria, Chapter 3 Stations and Facilitates, Chapter E Access and Circulation, 2.1 Horizontal Clearances: *The following minimum horizontal clearances from nearest track center shall be observed. b: Minor Structures at Stations: 16 feet.*

2.5 Regulatory Environment

Through the course of this Study, concerns were raised by Caltrain staff about several regulatory standards which typically apply to access at transit centers. Given the unconventional nature of the existing 22nd Street Station, several of these regulations were reviewed to identify potential implications on the feasibility and design of certain street-to-platform access alternatives. Findings from this analysis are summarized below.

Ramp Geometry Requirements

While the ADA stipulates that accessible ramps must be at least 3 feet wide[17] and can have a slope of no more than 8.33 percent slope,[18] it does not limit their overall lengths. From a design perspective, a ramp covering 22 feet of vertical distance must be a minimum of 304 feet (including the required intermediate landings[19]) but may be even longer if the slope is decreased or intermediate landings require turns. While Caltrain stations are not subject to any standards or regulations which limit the vertical distance that ADA access ramps can cover, the vertical distance at both platforms are on the higher end of what is typically served by ramps at transit stations. Caltrain criteria states elevators are not preferred but may be considered for locations where the vertical distance is 10 feet or more.[20]

California Building Code

The CBC includes specifications for elements such as accessible routes and accessible means of egress. As 22nd Street Station is a fully exposed transit facility, the CBC does not fully apply. However, specific requirements in the CBC, such as handrails and guardrails, are referenced in Caltrain Criteria and are applicable.[21]

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[17] 2010 ADA Standards for Accessible Design, 405 Ramps, 405.5 Clear Width. *The clear width of a ramp run and, where handrails are provided, the clear width between handrails shall be 36 inches (915 mm) minimum.*

[18] 2010 ADA Standards for Accessible Design, 405 Ramps, 405.2 Slope: *Ramp runs shall have a running slope not steeper than 1:12.*

[19] 2010 ADA Standards for Accessible Design, 405 Ramps, 405.7 Landings: *Ramps shall have landings at the top and the bottom of each ramp run. Landings shall comply with 405.7.*

[20] Caltrain Design Criteria, Chapter 3 Stations and Facilitates, Chapter E Access and Circulation, 3.3 Vertical Circulation, 3.3.1 Stairs and Ramps: *At locations where grade changes of 10 feet or more occur, for example at pedestrian overpass, elevators may be considered*

[21] Caltrain Design Criteria, Chapter 3 Stations and Facilitates, Chapter G Safety and Security, 2.0 Handrails and Guardrails: *Handrails and guardrails shall also be provided in all appropriate locations and shall conform to all building code requirements and the accessibility standards of the ADA Accessibility Guidelines and CCR, Title 24.*

National Fire Protection Association Standards

The National Fire Protection Association (NFPA) provides advisory standards for fire protection and life safety, including the number and location of modes of egress for all buildings/structures. NFPA standards apply to new passenger rail systems, extensions of existing passenger rail systems, new rolling stock, and retrofitting of existing equipment or facilities, except in situations where compliance with the standard will make the improvement or expansion incompatible with the existing system. Strict adherence to these standards would limit the locations in which certain ADA access facilities can be installed at 22nd Street Station and could require significant modifications to the station and platform configurations. Because this would substantially diminish the feasibility of pursuing ADA access improvements, new street-to-platform access facilities would not be required to fully adhere to NFPA egress requirements, so long as their installation does not adversely impact the station's existing early warning and evacuation systems, fire separations, structural adequacy, or tenable environment.

Level Boarding Requirements

Implementing street-to-platform accessibility improvements or performing substantial repair work at 22nd Street Station could potentially trigger a federal Department of Transportation (DOT) requirement to provide a level boarding option for riders who use mobility devices, unless the Federal Transit Administration (FTA) and Federal Railroad Administration (FRA) agree that level boarding is not feasible. The DOT recognizes in its regulations that level boarding may be infeasible for railroads that share tracks with existing freight service. Indeed, regulations from the California Public Utilities Commission (CPUC) have prevented level boarding from being implemented at stations which share tracks with freight trains. Freight trains do not currently run through the 22nd Street Station. However, Union Pacific Railroad (UPRR) does maintain trackage rights through 22nd Street Station so freight conditions could potentially change in the future.

Furthermore, because freight services run through all Caltrain stations south of 22nd Street Station, there are currently no stations in the system with level boarding. Installing level boarding at 22nd Street Station, before the existing conflicts with CPUC regulations are resolved, would create significant operational challenges. If Caltrain were to configure the Station to provide level boarding, the configuration would differ from all other platforms along the Peninsula Rail Corridor. This would present a considerable, and potentially insurmountable, operational challenge. Altering Caltrain vehicles to align with level boarding platforms at this one station could potentially make the previously-

accessible cars incompatible with the existing mini-high ramps at other stations. Additionally, level boarding platforms are a component of Caltrain's interoperability plans with the California High Speed Rail Authority (CHSRA). However, an agreement has yet to be reached with CHSRA regarding precise platform dimensions. Should level boarding platforms be installed at the Station before these plans are finalized, there is a risk that they would have to be reconfigured shortly after their construction. In addition, as noted above, UPRR maintains trackage rights through the station and there is a risk that freight could run through the station; level boarding platforms would cause a conflict with any such freight traffic.

In order to qualify for an exemption to the level boarding requirements, Caltrain would need to seek concurrence from the FTA and FRA that level boarding is not feasible at the 22nd Street Station for the reasons articulated above.

ADA Path of Travel Requirements

ADA requirements stipulate that accessible routes of travel generally coincide with the station's general path of travel.[22] In other words, the accessible routes should be constructed to minimize the distance which persons with disabilities may have to travel as compared to individual who do not have disabilities. This was taken into account during design development.

[22] 2010 ADA Standards for Accessible Design, 206 Accessible Routes, 206.3 Location. *Accessible routes shall coincide with or be located in the same area as general circulation paths. Where circulation paths are interior, required accessible routes shall also be interior.*

3 INITIAL ALTERNATIVES DEVELOPMENT

Following the existing conditions analysis described in Chapter 2, EXISTING CONDITIONS ANALYSIS, an initial set of planning-level conceptual design alternatives for street-to-platform ADA access improvements were developed.[23] A set of criteria was also created to evaluate the advantages and disadvantages of each alternative. This chapter summarizes the initial set of design alternatives and evaluation criteria.

A series of engagement efforts were conducted with external stakeholders and relevant Caltrain staff to gather feedback on how the initial design alternatives and evaluation criteria could be improved. This chapter also includes an overview of how specific points of stakeholder feedback were used to refine the initial design alternatives and evaluation criteria into the final deliverables presented in Chapter 4, FINAL CONCEPTUAL DESIGNS.

3.1 Initial Alternatives

Accounting for the physical constraints at the station, the following four initial alternatives were developed. The below initial alternatives are compliant with the 2020 Caltrain Design Criteria and 2010 ADA Standards for Accessible Design. See **Appendix B** for larger scale exhibits of the initial alternatives.

[23] This effort did not include engineering analysis beyond the planning level (15 percent design) of the improvements explored in the Study.

Initial Alternative - Option A

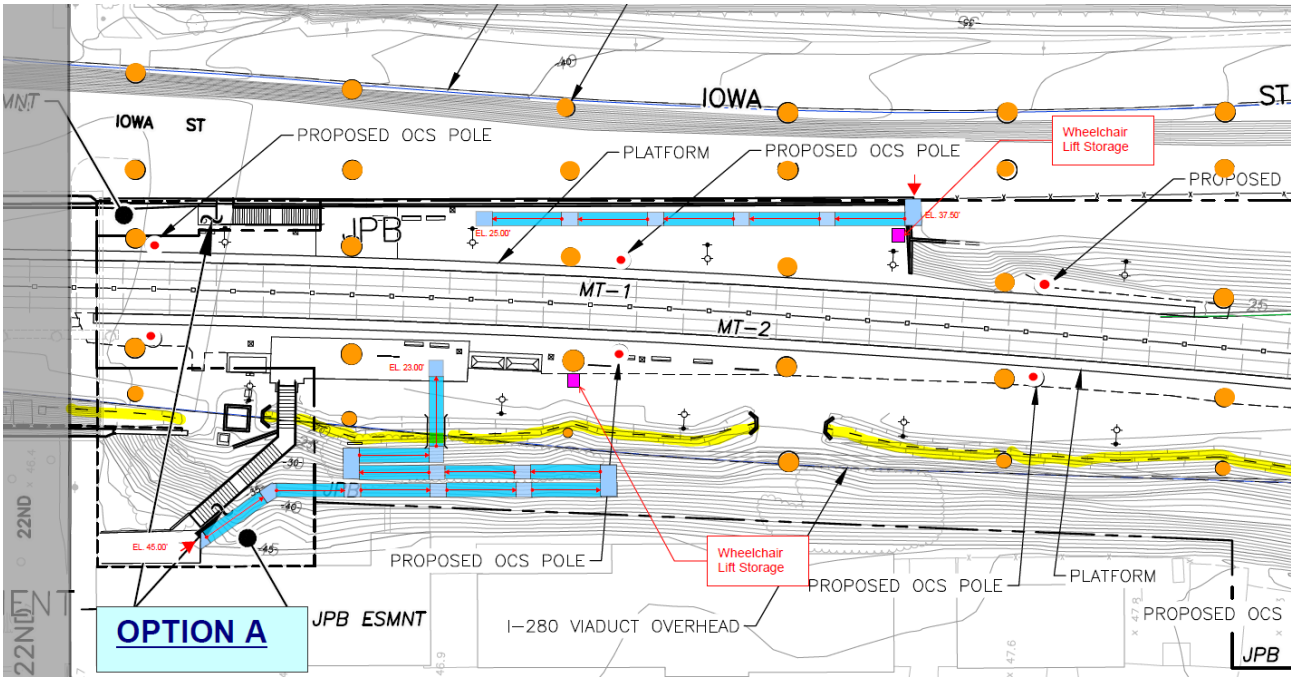

Figure 17 Initial Alternatives - Option A

Design Summary:

- Install ADA standard ramps at both platforms.
- Each ramp includes a 60-inch landing area at street level, followed by an alternating sequence of 30-foot sloped sections and intermediate landing areas until the ramp touches down at a 72-inch-long landing area on the platform. Each ramp is 72-inches in width, which exceeds the ADA standard but improves the user experience for all.[24]
- Each ramp's platform-level landing is positioned near the Boarding Assistance Area (BAA).
- The ramp to the southbound platform has a 7.3 percent slope and a length of approximately 385 feet (including landings). This ramp was designed with two switchbacks to achieve proximity to the BAA. A new culvert is constructed to bring the ramp over the existing drainage ditch.

[24] 2010 ADA Standards for Accessible Design, 405 Ramps, 405.5 Clear Width. *The clear width of a ramp run and, where handrails are provided, the clear width between handrails shall be 36 inches (915 mm) minimum.*

- The ramp to the northbound platform has an 8.3 percent slope and a length of approximately 195 feet (including landings). This ramp has a straight configuration, beginning at street-level near the southern end of the platform, where the elevation difference between street and platform levels is the least.

Initial Alternative – Option B

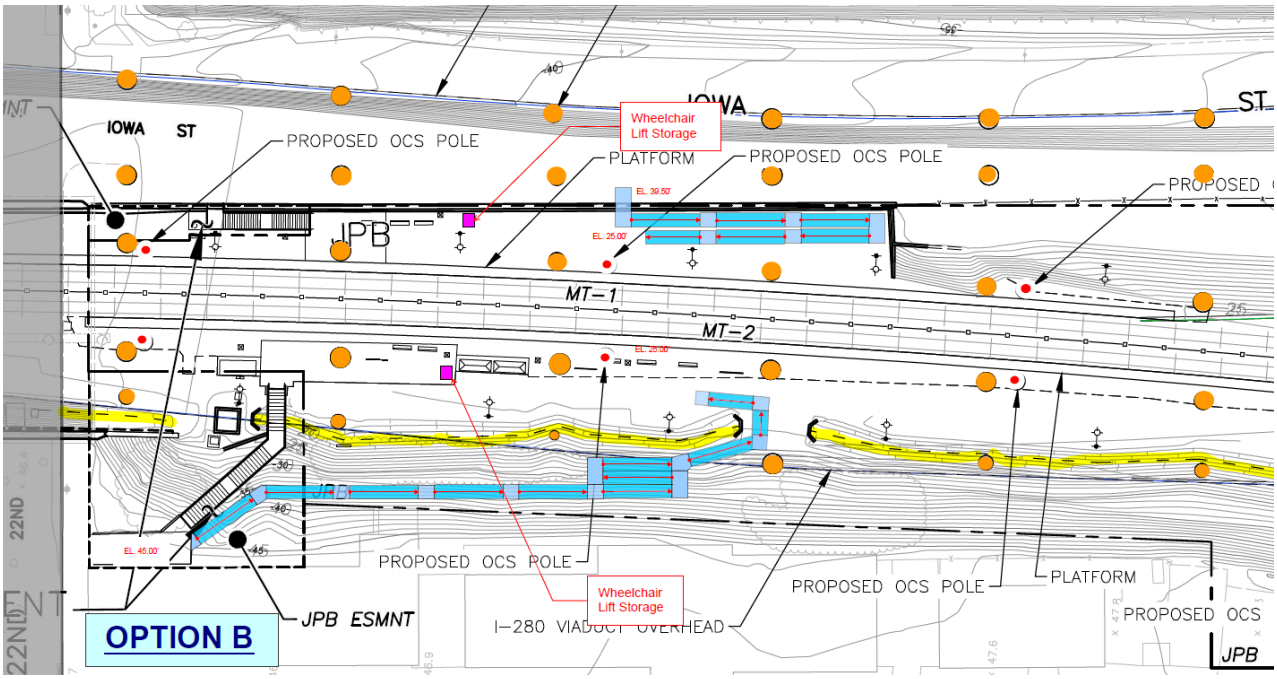

Figure 18 Initial Alternatives - Option B

Design Summary:

- Install ADA standard ramps at both platforms. They include similar slopes, widths, and landing dimensions as detailed in Option A.
- The ramp to the southbound platform has a 7.3 percent slope and a length of approximately 386 feet (including landings). This ramp is placed over the existing culvert near the center of the platform to avoid construction of a new culvert (as required in Option A). This ramp includes two switchbacks, as well as two additional turns near platform level. This ramp ends in a larger landing area, further from the existing ticket vending machines and BAA, than Option A.
- The ramp to the northbound platform has an 8.4 percent slope and a length of approximately 240 feet (including landings). This ramp begins at the center of the northbound platform (which is 1.5 feet higher than the southern end of the platform) and contains a single switchback to reach platform level. While this ramp is further from the BAA and Clipper payment devices than Option A, it

leaves more room between the retaining wall and tracks on the northern half of the platform which creates the potential for improved passenger circulation compared to Option A.

Initial Alterative - Option C

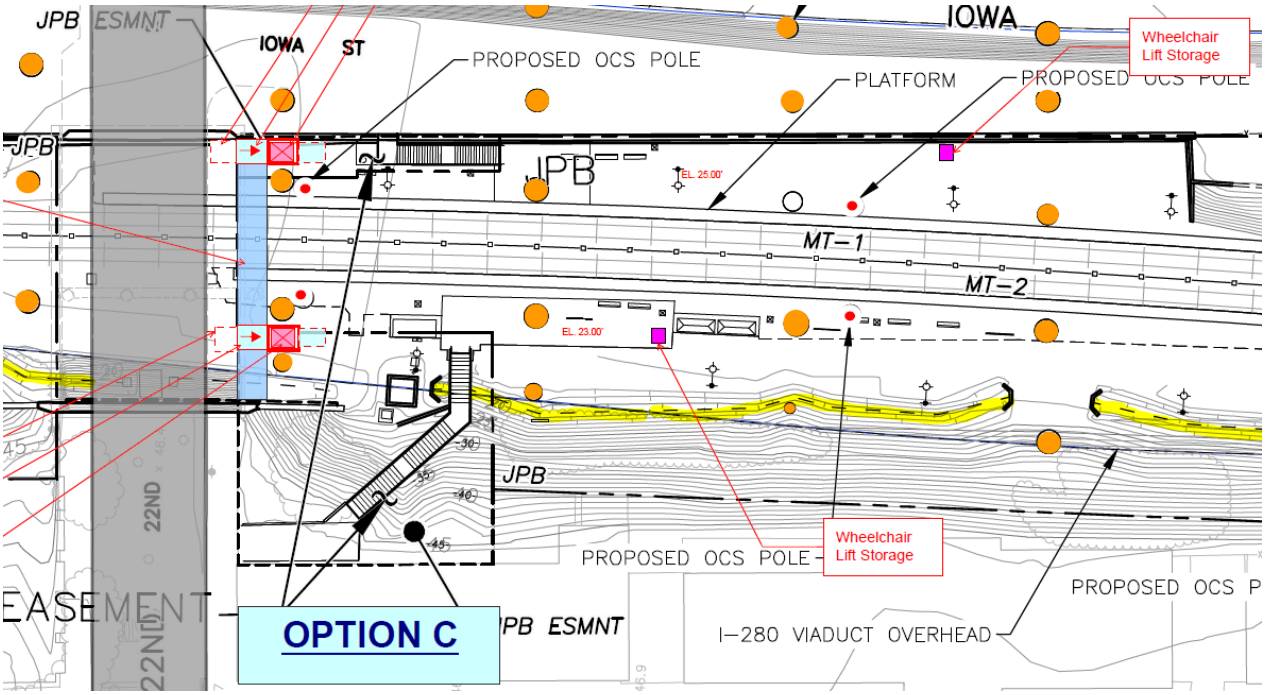

Figure 19 Initial Alternatives - Option C

Design Summary:

- Install ADA standard elevators for each platform. Each elevator operates in an eight foot by ten-foot shaft and has a machine room at platform level.
- The elevators are placed on the northern end of each platforms, away from the main waiting area for passengers, and located directly adjacent to the 22nd Street overpass.
- An extension of the 22nd Street sidewalk is cantilevered from the southern edge of the existing 22nd Street bridge. The extended sidewalk width would also serve as the ADA-required passenger queuing area for the elevator at street level with additional queuing areas provided at platform level.

Initial Alternative – Option D

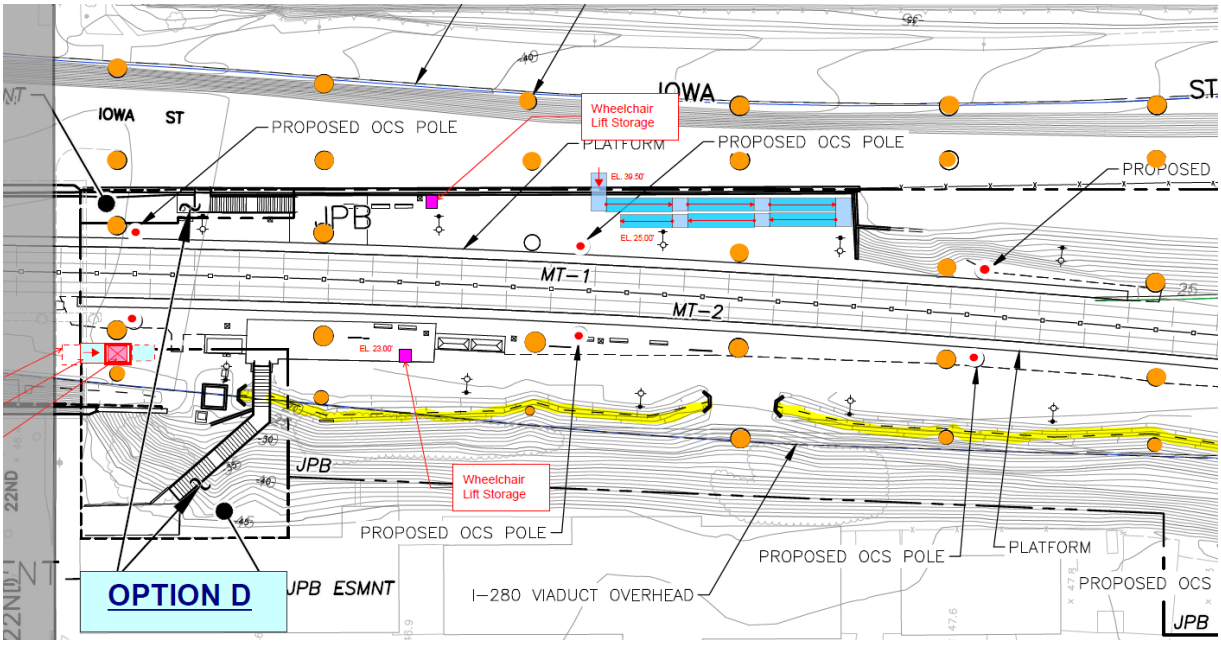

Figure 20 Initial Alternatives - Option D

Design Summary:

- Install an ADA standard elevator for the southbound platform and an ADA standard ramp to the northbound platform.
- An elevator (similar to that shown in Option C) was selected for the southbound platform due to its greater vertical distance to adjacent streets from the platform (about 7 feet greater than the northbound platform).
- The switchback ramp from Option B was selected for the northbound platform; however, the northbound ramp from Option A would also work in this option.

3.2 Initial Evaluation Matrix Development

In order to assess the merits of the individual design alternatives, a set of evaluation criteria was developed by the Study team. These criteria were conceptualized as a way to identify important accessibility design elements and challenges, evaluate conceptual design alternatives against each other, and eventually recommend a single preferred alternative.

The initial evaluation criteria were based on design and operational elements and challenges (see **Table 1**). They were the result of the Existing Conditions Analysis as well as knowledge of Caltrain and ADA accessibility requirements, and Caltrain subject matter expert input.

Table 1 Initial Evaluation Criteria

CRITERIA	EVALUATION METHOD
Ease of Platform Access	Comparative; low medium high
Safety	Comparative; low medium high
Ease/Cost of Maintenance and Operational Impact	Comparative; low medium high
Construction Cost	Lowest to highest; must be considered within context of funding source(s)
Constructability	Comparative; easy medium hard

3.3 Internal Stakeholder Engagement (IWG Meeting 1)

Following the development of initial design alternatives and evaluation criteria, the materials were presented to a team of internal Caltrain subject matter experts. Key takeaways from the feedback received during the project's first Internal Working Group (IWG) meeting are summarized below.

- **Elevators present operational and maintenance challenges**
  Elevators present a significant risk of vandalism, particularly in secluded, low-visibility areas like 22nd Street Station. This inevitably leads to significant maintenance challenges and regular outages (as proven by the current status of BART and Caltrain elevators).

- **Include a non-vertical access improvements alternative**
  While street-to-platform improvements may prove to be technically infeasible, "low hanging" accessibility improvements such as lighting and wayfinding upgrades will likely still be desired and feasible. Such improvements should be captured in their own alternative.

- **Consider ramp entrances beyond 22nd Street and Iowa Street**
  The 23rd Street bridge and Pennsylvania Avenue access road were identified as potential alternative ramp entrance locations.

3.4 Community Stakeholder Engagement

In consultation with Supervisor Walton's office, a community stakeholder group was formed to provide input and feedback during the course of the Study. The Study Community Stakeholder Group was comprised of representatives from the following community organizations with an interest in 22nd St Station:

- San Francisco Mayor's Office on Disability

- Dogpatch Neighborhood Association
- Dogpatch & Northwest Potrero Hill Green Benefits District
- Potrero Boosters

For the initial round of community engagement, Caltrain staff conducted a series of individual interviews with the Study Community Stakeholder Group. The interviews were conducted using a standard set of questions, which can be found in **Appendix C**. Although the initial alternative designs were not shared with the community stakeholder group at that time, the potential opportunities and constraints related to ADA access improvements at 22nd Street Station were discussed in detail.

Key takeaways from the community stakeholder interviews were:

- **Ramps are preferred over elevators**
  While elevators can be less physically demanding for individuals with mobility impairments to navigate, they are less preferable due to sanitation and security concerns, maintenance issues, and frequent out-of-service closures which would make the station inaccessible to individuals with mobility impairments. Ramps were explicitly preferred from a customer experience perspective. It was also noted that ramps create active transportation benefits, beyond ADA accessibility, particularly for bicycles, scooters, and strollers. With these secondary uses in mind, stakeholders noted that ramps should be wider than the minimum ADA requirement, if possible.

- **Longer ramps with gradual slopes are preferred over short, steep ramps**
  Given the substantial vertical distance between 22nd Street Station platforms and the surrounding streets, the stakeholder group recognized that ramps at the station would have to be significantly longer than what is traditionally used for ADA access at transit stations. Despite this, some stakeholders discouraged building ramps with the maximum allowable slope of 8.33 percent[25] to minimize travel distances. To them, steeper ramp slopes were seen as a greater burden than longer ramp lengths.

- **Improve intermodal connections**

[25] 2010 ADA Standards for Accessible Design, 405 Ramps, 405.2 Slope. *Ramp runs shall have a running slope not steeper than 1:12.*

Most of the stakeholders mentioned the need for better service and schedule coordination with Muni services, particularly in the absence of vertical access improvements.

- **ADA access improvements should be implemented at 22nd Street Station**
  Increased transit connectivity at currently ADA accessible stations (4th and King and Bayshore) was not seen as an acceptable substitute for ADA accessibility improvements at 22nd Street Station. Additionally, a few stakeholders noted that, for many riders with mobility impairments, paratransit does not provide a convenient replacement for traditional transit services.

- **Thoroughly consider project cost and construction timeline versus potential relocation plans**
  Due to the potential for relocation and reconstruction of 22nd Street Station, most stakeholders stated that improvements which can be implemented quickly and at a lower cost are preferable. However, stakeholders also noted that usability and convenience for ADA passengers should not be sacrificed to reduce the project's budget.

- **Consider access from 23rd Street**
  Similar to the first IWG meeting, a few stakeholders identified 23rd Street as a potential access point for new ADA facilities.

- **Address "low hanging fruit"**
  In addition to enhanced intermodal connections, stakeholders identified and supported additional lighting and wayfinding as access improvements which can be quickly and easily implemented.

3.5 Initial Alternative Refinement

After feedback from both internal and external stakeholders was received, the initial design alternatives underwent a series of refinements:

- **Ramp slopes were reduced**
  Because members of the external stakeholder group identified steeper ramp slopes as a more significant impediment mobility than longer ramp lengths, the slope of each ramp alternative was decreased.

- **Wayfinding improvements were identified in all alternatives**

Because many external stakeholders identified wayfinding as a primary deficiency, specific wayfinding improvements (such as station area maps, entrance markers, and emergency exit signs) were included in each alternative.

- **A new alternative was added for non-vertical access improvements**
  In response to the desire from internal Caltrain stakeholders to reflect the reality that street-to-platform improvements might be infeasible, a new alternative was developed to show only the non-vertical access improvements. This particular alternative was not evaluated against the other design alternatives but is presented as a potential option for consideration, should street-to-platform improvements be found to be infeasible.

In addition to the adjustments made in response to stakeholder feedback, the following design changes were reached after deliberation within the project team:

- **Alternatives were decoupled to allow northbound and southbound platforms to be assessed independent of each other**
  While each initial design alternative included ADA access improvements for both platforms, it was determined that the optimal ADA access solution could best be identified by evaluating each platform independently. Given the unique layout of 22nd Street Station, the two platforms have very distinct physical constraints which could necessitate different ADA access solutions. Evaluating the platforms in an "a la carte" approach allows the design alternatives to be better tailored to the specific needs of each platform. **Table 2** below summarizes how the facilities for each Initial Alternative were split into the platform-specific conceptual designs presented in Chapter 4, FINAL CONCEPTUAL DESIGNS.

Table 2 Initial Alternatives to Draft Conceptual Design Connection

INITIAL ALTERNATIVE	FINAL CONCEPTUAL DESIGN
Option A – Southbound Platform	Conceptual Design 1
Option A – Northbound Platform	Conceptual Design 4
Option B – Southbound Platform	Removed
Option B – Northbound Platform	Conceptual Design 3
Option C – Southbound Platform	Conceptual Design 2
Option C – Northbound Platform	Conceptual Design 5 (with significant relocation)

- **Elevator shafts were relocated**

Following a more detailed analysis of the elevator facilities included in the initial alternatives, it was determined that the designs needed to assume a greater buffer between the elevator shafts and the existing I-280 columns and Iowa Street retaining wall. This required the southbound platform's elevator alternative to be extended further away from the 22nd Street bridge and the northbound platform's elevator alternative to be relocated to the center of the platform. The elevator shaft on the southbound platform was also shifted to the west to avoid conflicts with underground fiber optic and gas utility lines.

- **The new culvert was dropped from southbound platform ramp alternatives**
  Based on further review of the conceptual designs and the as-builts for the existing staircase at the southbound platform, it was determined that a new ramp structure would be prefabricated steel on pile foundations (similar to the existing staircase). As such, the ramp would span the culvert at the back of platform without the need of a new culvert.

- **Length of ramp "runs" were considered, decreased where possible**
  Given that the ramp alternatives at 22nd Street Station are relatively long, there were some safety concerns related to the potential for mobility devices to pick up speed if the user were to lose control. In an attempt to mitigate this risk, long, straight "runs" were broken up within the ramp designs where feasible. This, however, was not possible for every ramp alternative due to certain physical constraints.

Other suggested changes to the initial alternatives were considered but were not ultimately included in the conceptual designs. For example, entrances from 23rd Street were deemed infeasible due to their significant construction costs. In addition, utilizing the existing Pennsylvania Ave access road for a southbound ramp was deemed infeasible due to the ADA requirement for the accessible path of travel to be proximate to the general station path of travel.[26] A summary of all the alternatives considered can be found in **Appendix D**.

3.6 Evaluation Matrix Refinement

Significant changes were also made to the content and structure of the Evaluation Matrix following feedback from the internal and external stakeholder groups.

[26] 2010 ADA Standards for Accessible Design, 206 Accessible Routes, 206.3 Location. *Accessible routes shall coincide with or be located in the same area as general circulation paths. Where circulation paths are interior, required accessible routes shall also be interior.*

The initial set of evaluation criteria was expanded and organized into a table, with each alternative ranked across the criteria and an explanation of each ranking added. During outreach, many external stakeholders expressed clear preferences for certain criterion to be weighted more heavily than others. For example, they felt that ease of use for riders with mobility impairments should be prioritized above construction costs. To address this, a version of the Evaluation Matrix was drafted that used a numeric and weighted scoring system, rather than the original comparative (low to high) methodology. This allowed the scoring of each individual criterion to be weighted according to its relative importance and total scores for each alternative to be tallied across criteria.

However, after further consideration, the quantitative scoring approach was set aside. The hope had been that such an approach would provide an objective framework for identifying a preferred conceptual design for each platform, but once drafted, it was decided that the quantitative approach was still subjective. Assigning a definitive numeric scoring system to the criteria would require a more robust outreach program than what was scoped for in this Study.

Because this Study is a preliminary planning-level effort, a color-coded ranking system (red being less preferred and green being more preferred) was determined to be a more appropriate tool for evaluating the conceptual designs. Given that this Study focuses on determining the *feasibility* of potential ADA access improvements, the color-coded ranking system summarizes the relative strengths and weaknesses of the feasible alternatives and enables decision-makers to determine which alternative should be carried forward to future design phases, based on their understanding of which criteria are most important.

After accounting for both internal and external stakeholder feedback, the following adjustments were made to the Evaluation Matrix:

- **Criteria were grouped according to User Experience, Agency Impact, and Constructability Factors**
  This adjustment was made primarily to enhance the organization and legibility of the Evaluation Matrix.

- **Ease of Platform Access was split into Ease of Use and Reliability**
  As was noted by both internal and external stakeholders, elevators tend to be substantially less reliable than ramps. While functioning elevators are typically more convenient to use when covering substantial vertical distances, there is a

significant risk that the elevators would be regularly out of service due to vandalism. Elevator outages cause extreme inconveniences for individuals with mobility impairments.

- **Safety was expanded to Safety and Security**
  This expansion incorporated the feedback expressed by external stakeholders, who were primarily concerned that individuals with mobility impairments would be more vulnerable to crime.

- **Ease/Cost of Maintenance was made a separate criterion from System-wide Operational Impact**
  Internal stakeholders noted the distinction between these two criteria. System-wide Operational Impacts primarily refers to any factors which might inhibit the delivery of punctual, reliable train service. Ease/Cost of Maintenance refers to the continuous maintenance work that the agency performs to keep the corridor in working order.

- **Construction Timeline was added as a criterion**
  This was added to incorporate input from external stakeholders that the potential for a future station relocation makes alternatives that have shorter implementation schedules preferable to those that do not.

3.7 Additional Internal Stakeholder Outreach and Feedback

While the Initial Alternatives and Evaluation Matrix were being refined, a second IWG meeting was held in October 2020. This meeting included information on many of the adjustments detailed in the previous two sections and a preliminary overview of how the alternatives performed in the evaluation matrix.

After approving the adjustments that were presented, internal stakeholders had the following feedback regarding the progression of alternatives into future design phases:

- **The regulatory environment of the station needs to be carefully considered**
  In order to be considered feasible, alternatives must be carefully vetted to understand if elements of their design will trigger further regulatory requirements and their associated improvements, which could present barriers to implementation.

- **The slope and length of the ramp alternatives should not be finalized at this stage of design**
  Because the slope of the ramps is below the ADA maximum of 8.33 percent, it is possible for the ramps to be shortened in future design phases. For example, further analysis may reveal that a given ramp design must be shortened to increase platform space and improve passenger circulation.

4 FINAL CONCEPTUAL DESIGNS

4.1 Overview

After generating and refining the initial alternatives for 22nd Street Station, a final set of conceptual designs were developed. A series of cost, constructability, and implementation timeline estimates were then developed for the final conceptual designs. The final conceptual designs were also reviewed by Caltrain staff and external stakeholders, whose feedback informed the results of the evaluation process and the Study's final recommendation.

The following chapter documents the final conceptual designs (including design assumptions and development process), cost and implementation timeline estimates, constructability analysis, final outreach efforts, alternative evaluation, and funding plan.

4.2 Design Assumptions

The final conceptual designs were developed in accordance with Caltrain's Draft 2020 Design Criteria and 2010 ADA Standards for Accessible Design but do not represent advanced engineering designs. Instead they are the result of a planning level analysis and do not exceed 15 percent design. If the decision is made to implement any of the conceptual design alternatives, the design would need to be taken to 100 percent, with key design milestones along the way. This process could potentially result in both minor or significant modifications to the designs and impact their level of feasibility.

If a set of design alternatives is advanced through complete design, several assumptions related to impacts on existing and planned infrastructure components made during this Study will need to be validated. These assumptions include the following:

- The location of the contemplated improvements do not impact the structural integrity of the I-280 columns located on both station platforms and do not prevent Caltrans from performing required highway maintenance activities. Written confirmation and approval will be required from Caltrans prior to construction.
- Attachment of elevator queuing platform to the 22nd Street bridge in Conceptual Design 2 has negligible impacts to the existing structure.
- Attachment of elevator queuing platform to the Iowa Street retaining wall in Conceptual Design 5 has negligible impacts to the existing structure.
- The contemplated improvements have no impacts on the planned OCS poles. This finding is based on the OCS pole locations in the 95 percent designs

provided by PCEP. The final location of the OCS poles will need to be confirmed prior to the finalization of access improvement designs.

- The contemplated improvements have no impacts on the existing PG&E gas transmission lines, fiber optic duct bank, sump pump house or drainage ditch currently present at the station and will not require relocation of said utilities.

The Study also assumes there are no significant conflicts with the station's geotechnical features, right-of-way easements, or non-ADA design requirements (such as maximum travel distances from mode of egress established by the National Fire Protection Association). These elements will require further analysis in future design phases. If conflicts are found, the Study's cost and implementation timeline estimates (sections 4.5 and 4.7) should be reexamined and potentially adjusted.

In addition, the street-to-platform ADA access improvements are assumed to be installed after electrification of Caltrain corridor is completed. This will require all metallic structures and miscellaneous metallic items located on platforms, including those proposed in the conceptual designs, to be isolated from the static wire and connected to the platform grounding system.

4.3 Final Conceptual Designs

The following section summarizes each of the six conceptual designs, including the alterations made from the initial alternatives design phase. Larger scale drawings can be found in **Appendix E**.

As detailed in Section 3.5, each conceptual design alternative encompasses only a single platform. To achieve street-to-platform ADA access, two conceptual design alternatives (one for the northbound platform and one for the southbound platform) must be selected.

All conceptual designs include a set of "fixed improvements" which enhance elements of ADA access within the station. Fixed improvements include platform resurfacing, warning and directional tactiles, passenger assistance and communications telephones, emergency contact service, wheelchair lift storage, and wayfinding elements. Some of the fixed improvements such as warning and directional tactiles, are required by Caltrain accessibility and ADA standards. Other elements, such as enhanced wayfinding, are considered best practice for making a transit station more accessible and user friendly. These improvements are discussed in more detail in Section 4.4 below.

Finally, ADA standards require the accessible path of travel to be similar in length and proximate to the general station path of travel for non-ADA users.[27] The final conceptual designs are considered to satisfy this requirement, to the maximum extent possible, given the vertical distance to be covered and allowable ramp slopes.

Conceptual Design 1 – Southbound Platform Ramp

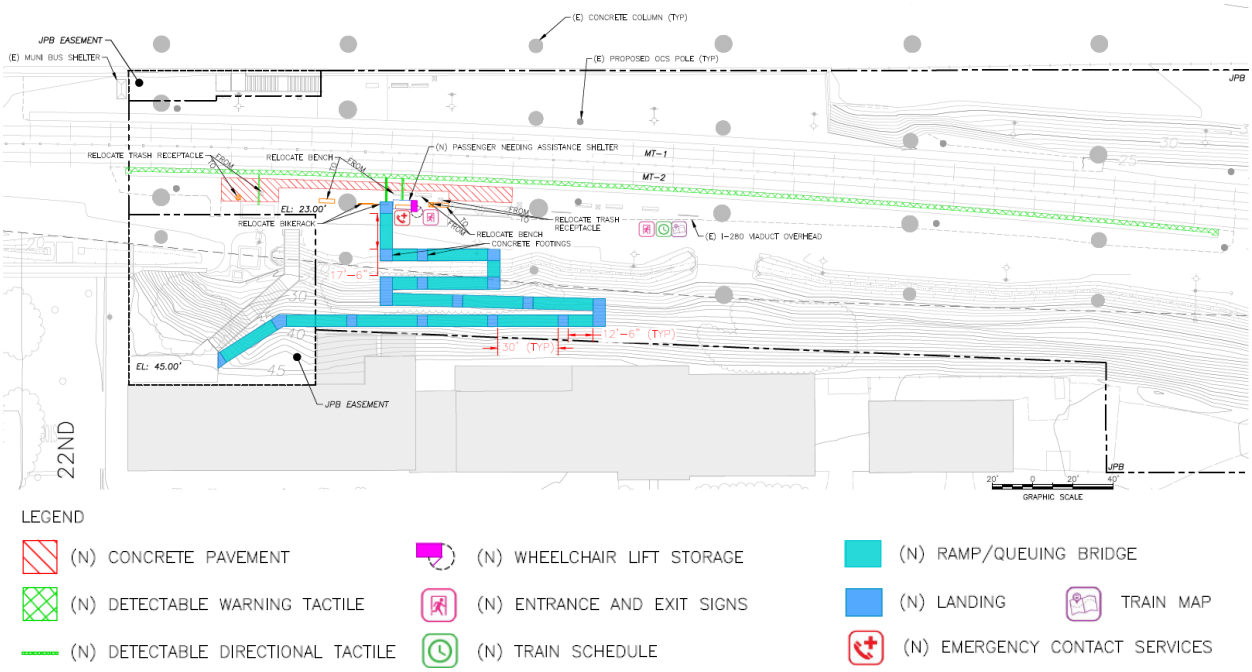

Figure 21 Final Conceptual Design 1 – Southbound Platform Ramp

The southbound platform ramp design includes an ADA-standard ramp with an overall ramp length (including landings) of approximately 465 feet and a 6.1 percent slope.[28] There is a 60-inch landing area at street level, followed by an alternating sequence of 30-foot sloped sections and intermediate landing areas until the ramp touches down at a 72-inch-long landing area on the platform. The platform level entrance to the ramp is adjacent to the BAA and the ramp has a slip resistant surface.

Similar to the existing southbound platform staircase, the ramp structure is assumed to consist of prefabricated steel elements, with small diameter pile foundations. Intermediate landings are offset from one another to avoid conflicts with the ramp structure foundations located at the landing sites. Geotechnical analysis and review will

[27] 2010 ADA Standards for Accessible Design, 206 Accessible Routes, 206.3 Location. *Accessible routes shall coincide with or be located in the same area as general circulation paths. Where circulation paths are interior, required accessible routes shall also be interior.*

[28] Note: Ramp length and slope are subject to change should this design be carried forward in the design and engineering process.

be required during final design to confirm the ramp foundation type, size, and configuration. The design assumes no modifications are required to the existing unlined ditch and culvert at the foot of the embankment.

While the 465-foot ramp is longer than what is typically used for ADA access, similarly long ramps have been used at transit stations across the state. **Appendix F** presents case studies of long ramps at California rail stations.

Alteration from Initial Alternative – Option A (Southbound Platform Ramp):
The slope of the ramp was decreased 1.2 percent, which increased the overall length of the ramp by 80 feet. An extra switchback was added and the orientation of the ramp was modified to accommodate the increased length. The construction of a new culvert over the drainage ditch (as shown in the initial alternative design phase) was found to be unnecessary once prefabricated steel structures were assumed.

Conceptual Design 2 – Southbound Platform Elevator

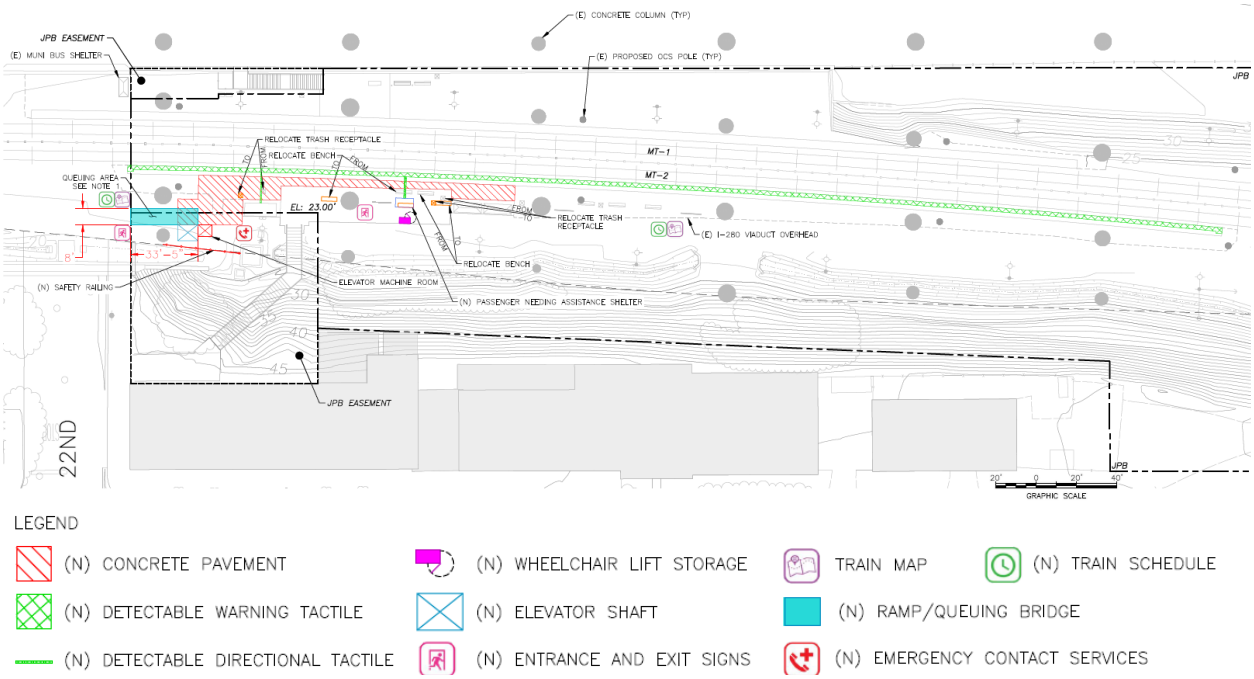

Figure 22 Final Conceptual Design 2 – Southbound Platform Elevator

The southbound platform elevator design includes an ADA-standard elevator that would provide access between 22nd Street and the southbound platform. The elevator operates in an eight-foot by ten-foot shaft, with a machine room at platform level. The elevator is accessible from 22nd Street via a queuing platform bridge, which cantilevers off the new elevator shaft and the existing bridge (with minimal impact to the existing structure). The elevator shaft is assumed to have a mat foundation with no piles. At the platform level, the queuing area is located directly underneath the queueing platform bridge. This area of the platform would require new concrete pavement, as it is currently unpaved.

The elevator placement is subject to a number of constraints, including the existing I-280 columns, gas transmission and fiber optic lines, drainage ditch, and sump pump house. As shown in **Figure 21**, the elevator is located on the northern end of the platform, away from the main waiting area for passengers, and adjacent to the 22nd Street bridge. In order to avoid conflicts with the I-280 columns and the underground utilities, the elevator location is offset to the south of the 22nd Street bridge and west of the queueing platform bridge.

Alteration from Initial Alternative – Option C (Southbound Platform Elevator):
As discussed above, the location of the elevator shaft was moved further from the existing 22nd Street overpass bridge to avoid conflicts with the I-280 columns and

underground utilities. The extension of the 22nd Street sidewalk shown in the Initial Alternative was replaced with an extended queuing bridge. An elevator machine room and concrete paving were also added to the concept.

Conceptual Design 3 – Northbound Platform Ramp A

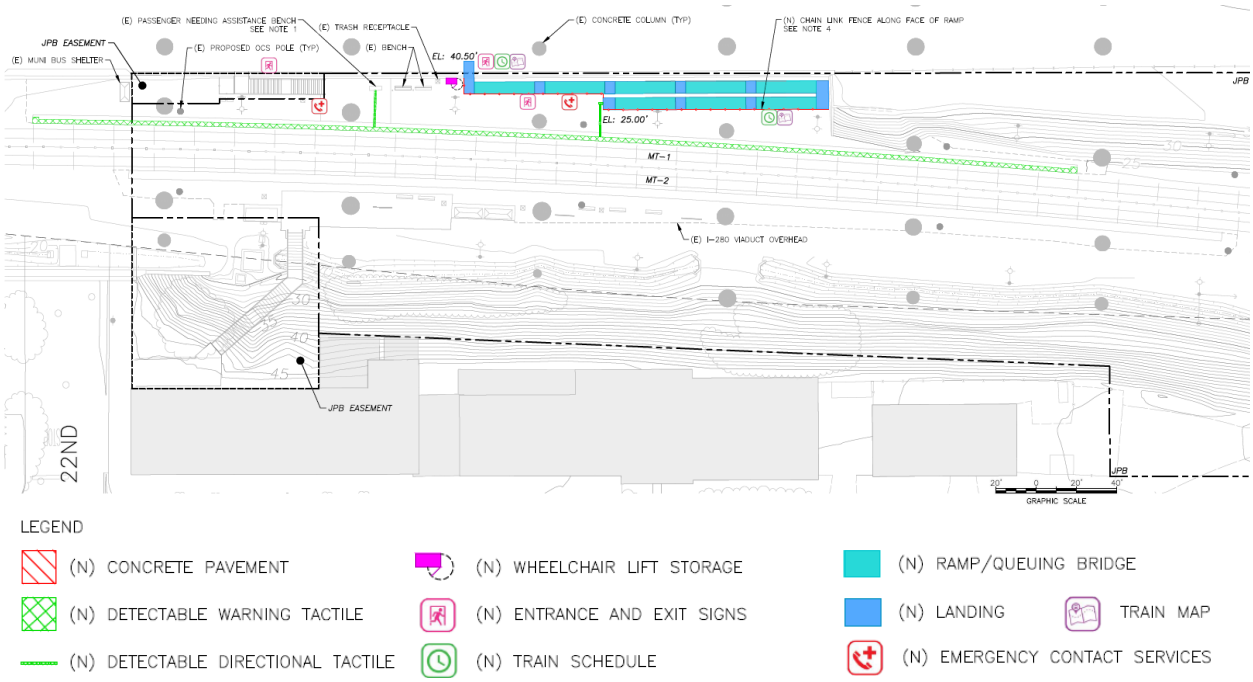

Figure 23 Final Conceptual Design 3 – Northbound Platform Ramp A

Northbound Platform Ramp A includes an ADA-standard ramp with an overall ramp length (including landings) of approximately 305 feet and a 6.5 percent slope.[29] The ramp begins at the center of the northbound platform (which is 3 feet higher than the southern end of the platform) and contains a single switchback to reach platform level. There is a 60-inch landing area at street level, followed by an alternating sequence of 30-foot sloped sections connected with straight landings and a single intermediate landing area until the ramp touches down at a 72-inch-long landing area on the platform. The platform level entrance is placed to minimize impact to platform circulation and to comply with Caltrain standards for horizontal clearance from the edge of the platform. Similar to the existing northbound staircase, the ramp structure is assumed to consist of prefabricated steel elements, with slab foundations.

The overall path of travel distance from the MUNI bus stop on 22nd Street to the boarding assistance area on the platform is approximately 590 feet.

Alteration from Initial Alternative – Option B (Northbound Platform Ramp):

[29] Note: Ramp length and slope are subject to change should this design be carried forward in the design and engineering process.

The slope of the ramp was decreased 1.9 percent, which increased the overall length of the ramp by 65 feet. The street-level ramp entrance was shifted north to maximize space between the ramp and the platform edge. Fencing was also added along the ramp structure to prohibit access to and prevent litter from accumulating in the space under the structure. If desired, the space under the structure could potentially be utilized for storage.

Conceptual Design 4 – Northbound Platform Ramp B

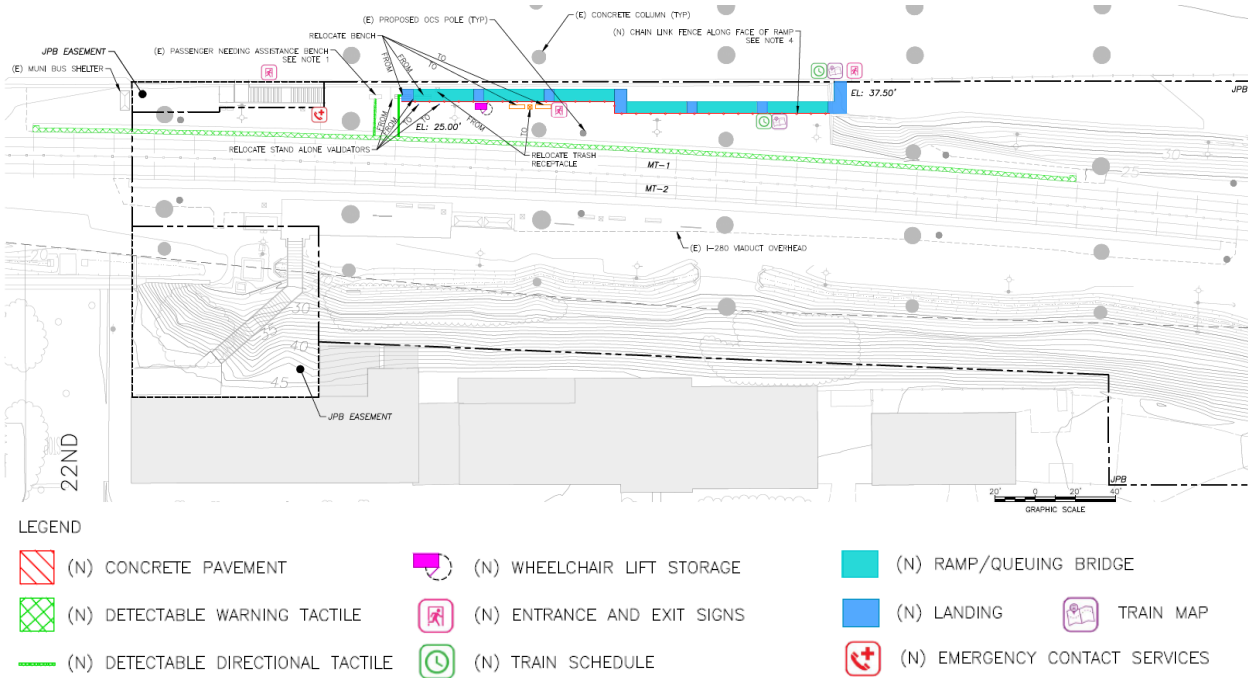

Figure 24 Final Conceptual Design 4 – Northbound Platform Ramp B

Northbound Platform Ramp B includes an ADA-standard ramp with an overall ramp length (including landings) of approximately 240 feet and a 6.9 percent slope.[30] There is a 60-inch landing area at street level, followed by alternating sequences of 30-foot sloped sections connected with straight landings and a single intermediate angled landing area until the ramp touches down at a 72-inch-long landing area on the platform. The intermediate angled landing helps mitigate safety concerns regarding loss of control of mobility devices, however, it creates a void between the retaining wall and the upper ramp section. The space between the ramp and wall will be covered to prevent unwanted entry, vandalism, and litter in the empty space. Similar to the existing staircase, the ramp structure is assumed to consist of prefabricated steel elements, with slab foundations.

The overall path of travel distance from the MUNI bus stop on 22nd Street to the boarding assistance area on the platform is approximately 615 feet (25 feet longer than Northbound Platform Ramp A).

Alteration from Initial Alternative – Option A (Northbound Platform Ramp):

[30] Note: Ramp length and slope are subject to change should this design be carried forward in the design and engineering process.

The slope of the ramp was decreased 1.9 percent, which increased the overall length of the ramp by 65 feet. As discussed above, the angled intermediate landing was added to mitigate safety concerns. Similar to Northbound Platform Ramp A, fencing was added along the ramp structure to prohibit access and prevent litter from accumulating in the space under the structure. If desired, the space under the structure could potentially be utilized for storage.

Conceptual Design 5 – Northbound Platform Elevator

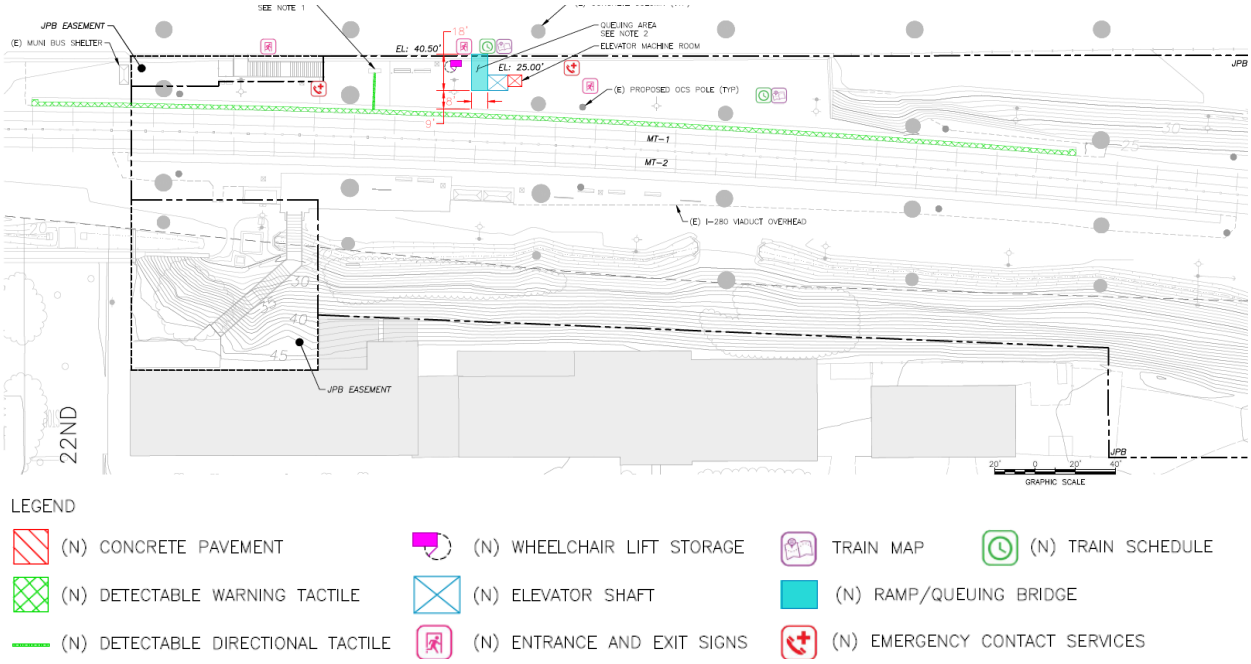

Figure 25 Final Conceptual Design 5 – Northbound Platform Elevator

The northbound platform elevator design includes an ADA-standard elevator that would provide access to the platform from Iowa St. The elevator operates in an eight-foot by ten-foot shaft, with a machine room at platform level. Similar to the southbound elevator alternative, the elevator placement is subject to a number of constraints. As a result, it is located in the middle of the platform (south of the existing staircase) to avoid conflicts with the freeway columns and reduce the path of travel distance to the boarding assistance area.

As-built drawings of the Iowa Street retaining wall were not available at the time of this concept's development. To avoid any potential impacts to the wall or its foundation, the elevator is placed approximately 7 feet west of the face of wall. The elevator location will need to be validated during final design to ensure it has the required distance from existing retaining wall and optimal clearance from edge of platform.

The elevator is accessible at street level via a queueing platform bridge. It is assumed that the platform bridge will have cantilever support from the elevator shaft structure and the connection to the retaining wall (with minimal impact to the existing structure). At the platform level, the queuing area is directly underneath the queueing platform bridge.

Alteration from Initial Alternative – Option C (Northbound Platform Elevator):

Following further engineering review, the location of the northbound platform elevator shown in the initial alternative was determined to be infeasible due to its proximity to the I-280 columns and the Iowa Street retaining wall. An elevator machine room was also added to the design.

4.4 Fixed Improvements Included in All Designs

As noted above, all of the conceptual designs include non-vertical elements that improve other accessibility aspects of the station. These elements are the same across all conceptual designs, although their precise placement may vary between each design. Specific recommendations are found below[31].

- **Install Tactile Warning and Detectable Directional Tiles**
  The conceptual designs assume tactile warning tiles are installed at the edge of each platform to warn the visually impaired that they are near the platform edge. In addition, detectable directional tiles are assumed to be installed between the platform edge and critical platform facilities such as ticket vending machines and assisted boarding shelters. Similar to the warning tiles, the detectable directional tiles provide the visually impaired with tactile directions to facilities they may need to access on a platform.

- **Consider Installing Emergency Services Telephones**
  Emergency contact services phones provide a direct channel of communications to the local police and fire department should there be an emergency situation on the platform.

- **Incorporate Wayfinding and Service Information Improvements**
  Three types of wayfinding and service information improvements are recommended across all five conceptual designs. These include entrance and exit signs, train schedules, and train maps. Entrance and exit signs are recommended to be installed at various locations along each platform, as well as at the street level, at each primary ingress/egress route to help guide passengers to ingress/egress points quickly, particularly during emergency situations. New train schedule and train map signage are proposed for the platforms (schedules are already provided at the existing street level entrances of each platform entrance).

[31] Caltrain Design Criteria and MTC Regional Transit Wayfinding Guidelines and Standards were consulted during the development of these elements

Non-Vertical Access Improvements Concept

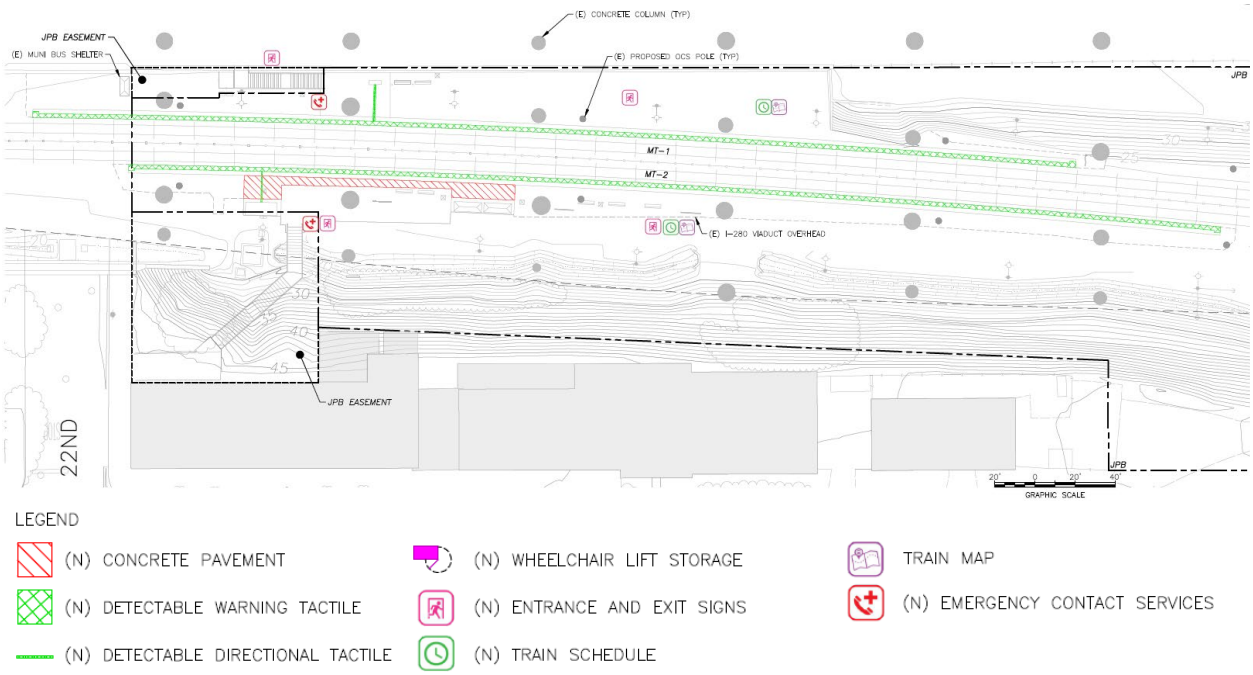

Figure 26 Non-Vertical Access Improvements Concept

As noted in Section 3.5, internal Caltrain stakeholders felt it was important to reflect a potential outcome where street-to-platform improvements are found to be infeasible. In response to this feedback, a conceptual design was developed which incorporates non-vertical access improvements at the station but does not achieve street-to-platform accessibility. While this concept does not provide full ADA accessibility, it provides improvements for riders with visual or auditory impairments through the fixed improvements listed above, as well as some repaving work along the southbound platform.

Cost estimates for this concept, as well as the five conceptual design alternatives, can be found in **Table 3**. Because the street-to-platform alternatives were found to be feasible, this concept was not assessed under the evaluation criteria and is not considered as a potential recommended alternative.

4.5 Cost Estimates

Planning level cost estimates were developed (using 2021 dollars) for each of the conceptual designs. The overall cost of ADA access improvements at the station can be

broken down into capital costs and operating and maintenance costs[32]. Estimates of these costs informed the Study's funding analysis (Section 4.10) and the design alternative evaluation process (Section 4.9).

The estimating techniques used in this Study align with the level of project definition of 15 percent design or less. If the conceptual designs were to be carried forward to more advanced levels of engineering, the Study's cost estimates would be further refined and could be subject to change.

Capital Costs

Capital cost estimates were generated by the Study's primary consultant team and verified by a separately contracted estimating team from the Jacobs Engineering Group. The capital cost estimates shown below are the product of the estimating services provided by Jacobs, who used a cost-based or "bottom-up" estimating technique. The capital cost estimates also incorporate the following "soft costs" (non-construction costs required to advance the project): environmental clearance/mitigation, engineering design work, JPB administration, construction management support, TASI support, and project contingency. Because the Study's conceptual alternatives are at the planning level of design and detailed engineering analysis has yet to be performed regarding the status of existing structures, precise location of underground utilities, and the geotechnical features of the site, a contingency factor is also assumed for each design. The Study's capital cost estimates account for only the initial implementation of the conceptual design alternatives and would not cover any eventual replacement or repair work. Further detail on the capital cost estimates (including an itemized cost breakdown, summary of soft cost assumptions, and basis of cost estimate methodology) is included in **Appendix G**.

[32]Due to the fact that there is not currently a dedicated source of funding for street-to-platform improvements at 22nd Street Station, the approximate date that such facilities could be fully implemented is unknown. There is also uncertainty regarding if and when a potential station relocation or reconstruction project could then remove the facilities. Because these unknowns make identifying the amount of time the facilities would be in service, the Study did not include a lifecycle cost analysis.

Table 3 Conceptual Design Capital Cost Estimates

CONCEPTUAL DESIGN ALTERNATIVE	CAPITAL COSTS (2021 Dollars)
Conceptual Design #1 – Southbound Platform Ramp	$7,512,000
Conceptual Design #2 – Southbound Platform Elevator	$6,671,000
Conceptual Design #3 – Northbound Platform Ramp A	$3,816,000
Conceptual Design #4 – Northbound Platform Ramp B	$3,539,000
Conceptual Design #5 – Northbound Platform Elevator	$5,037,000
Non-Vertical Access Improvements	$1,857,000

As noted in **Table 3,** the southbound platform ramp alternative has the highest estimated capital cost of $7,512,000. This alternative includes the highest amount of quantified assumptions for elements requiring additional analysis in the final design stage. These primarily include the unknown soil conditions which will dictate the foundation requirements for the ramp, potential slope stabilization measures, and erosion control during construction. The Study makes relatively conservative assumptions regarding the potential costs of these elements.

The capital cost of the southbound platform elevator is slightly less expensive at $6,671,000. Several key assumptions were made regarding this alternative that affect its' cost estimate, including the dimensions of the elevator shaft foundation, soil conditions, ability to obtain approval from Caltrans, and impacts to existing I-280 structure foundations and major utilities. If the complexity of these issues is greater than currently assumed, then the cost estimate and implementation timeline will need to be revaluated.

Because there are fewer complexities related to soil conditions, utilities impacts, and interactions with existing structures, the northbound platform alternatives are estimated to have lower costs than the southbound platform alternatives. Northbound Platform Ramp A has an estimated capital cost of $3,816,000, which is slightly more than Northbound Platform Ramp B's estimated capital cost of $3,539,000. The northbound platform elevator is significantly more expensive to implement than the two northbound platform ramp alternatives, with an estimated capital cost of $5,037,000.

If street-to-platform accessibility is found to be infeasible, the cost to implement non-vertical ADA access improvements at both platforms is estimated to be $1,857,000.

In addition to the alternative-specific cost estimates listed above, the Study assumes that an additional $500,000 would be budgeted for future public outreach, should a potential alternative be advanced to further design. Understanding the importance of

public input, this budget is assumed to cover the costs of conducting outreach in subsequent design phases with a broad public audience. While the exact scope of this outreach has yet to be defined, it would likely include additional engagement with disability advocates and local stakeholders to refine the details of the facilities (i.e. the slope of the ramps or location of the elevators) and determine if any additional accessibility or design elements are desired (see Section 4.11). The Study's capital cost estimates cover only the modifications identified in the Conceptual Design Alternatives and do not include funding for the Study or implementation of elements that may be identified in future outreach efforts.

The total estimated capital cost of achieving street-to-platform access is calculated by adding the cost of a single southbound platform alternative, a single northbound platform alternative, and the $500,000 outreach budget. As shown in **Table 4** below, the estimated range of capital costs is $10.7 million (for the cheapest combination of Concept 2 and Concept 4) to $13.0 million (for the most expensive combination of Concept 1 and Concept 5).

Table 4 Full Station Improvement Capital Cost Estimates

COST ITEM	MINIMUM	MAXIMUM
Southbound Platform Facilities	$6,671,000 (Elevator)	$7,512,000 (Ramp)
Northbound Platform Facilities	$3,539,000 (Ramp B)	$5,037,000 (Elevator)
Outreach	$500,000	$500,000
TOTAL	$10,710,000	$13,049,000

Operating and Maintenance Costs

In addition to capital costs, the Study analyzed the likely ongoing operating and maintenance costs of each alternative.

In general, the operating and maintenance costs associated with installing a ramp at 22nd Street Station are assumed to be negligible. Most of the required cleaning and upkeep work would be done under the existing station maintenance regimen without significant increases to the current workload of staff. The only exception to this assumption is Conceptual Design 4, which includes a gap between the ramp and the Iowa Street retaining wall to mitigate safety concerns associated with long, straight ramps. Additional staff time would likely be required to clear debris and litter from this area, however, reliable estimates for the annual cost of such work are unavailable.

Unlike ramps, the installation of elevators would add significant operating and maintenance costs. As described in further detail below, the Study estimates that elevators at 22nd Street Station would cost a minimum of $85,000 each year in electrical power, TASI staff time, monthly maintenance contracts, and additional repair work.

To remain operational, elevators must be supplied with consistent electrical power and be locked and unlocked by TASI staff each day. If one or more elevators were installed at 22nd Street Station, annual operating costs would minimally include an estimated $2,000 per elevator for electricity[33] and $55,000 of staff time for locking/unlocking.

Unlike ramps, routine maintenance of elevators cannot be performed by the station's current janitorial staff and would have to be contracted out to a third-party service. Each of the existing elevators in the Caltrain corridor includes a monthly contract for routine cleaning, maintenance, and minor repairs (e.g. elevator panel light and switch replacement or elevator car lubrication). The annual cost of a similar contract at 22nd Street Station would be approximately $8,500-12,000, per elevator.

Elevators at 22nd Street Station would also inevitably require repair work which is not covered by the monthly maintenance contract. Historically, responding to unplanned maintenance and repair requests (i.e. tripped smoke alarms or stuck elevator car units) has cost Caltrain approximately $1,500-3,000 per incident[34]. The annual costs that this additional unplanned maintenance work accrues would ultimately depend on the frequency and severity of such incidents. Given the fact that 22nd Street Station is an unstaffed public facility in a relatively low visibility area with little activity outside of commute hours, the risk of vandalism and unsanitary behavior is particularly high, which in turn increases the likelihood of unplanned repair work. While Caltrain typically budgets $20,000 per year to cover the total maintenance needs of each elevator, the annual cost of maintaining and repairing elevators at 22nd Street Station would likely be even higher.

In addition to the upfront costs of responding to frequent misuse of elevators, the cumulative effects of such activities can cause significant damage to critical elevator components. The elevator at Tamien Station is one example of this, where human urine corroded the inside of the elevator to the point that the entire elevator car was replaced

[33] Assuming $0.24/kW, energy use calculated using https://www.thyssenkruppelevator.com/Tools/energy-calculator

[34] The cost estimates of routine and unplanned maintenance activities are based on a review of the available maintenance invoices from the Bayshore, San Bruno, and Tamien Caltrain stations.

at a cost of approximately $250,000. Major repairs of a similar magnitude would very likely be required if elevators were installed at 22nd Street Station.

4.6 Constructability Analysis

In addition to the cost estimates, a constructability analysis of the final conceptual designs was conducted to confirm the feasibility of all final alternatives, inform the project implementation estimates (Section 4.7), and complete the final alternative evaluation process. The following is a summary of the key challenges, opportunities, and considerations identified in the constructability review. The complete analysis can be found in **Appendix H**. Despite the constraints presented by 22nd Street Station and the surrounding area, none were determined to present insurmountable barriers to the construction of the final conceptual design alternatives. This analysis does not represent advanced engineering examination of the constructability for the conceptual designs.

Construction Site Access

As previously noted, 22nd Street Station is constrained by several factors that limit construction site access and may present challenges in delivering materials and/or equipment to the site. Site access for the southbound platform can be achieved from 22nd Street via an access road off Pennsylvania Avenue, near 23rd Street (see Figure 9). The northbound platform, however, does not have an access road, which limits construction site access to Iowa Street. If necessary, equipment and/or materials may be transported to either platform via a train car, in coordination with Caltrain operations. The type and size of material capable of delivery via train car would be limited by the existing width of tunnels along the Caltrain corridor near 22nd Street Station and will need to be fully considered as the designs progress.

Detailed planning and coordination will be crucial prior to and during construction of the street-to-platform access improvements. This includes coordination with SFMTA and Caltrans to ensure all facilities remain operational and accessible while providing site access for the contractor.

Caltrain System Electrification

As noted in Section 4.2, all design alternatives assumed implementation would occur after PCEP is complete. As such, construction will need to comply with the appropriate requirements and regulations for working within an electrified rail environment. For example, work hours and available equipment may be limited, due to the need to power down the system for certain activities. Construction of the conceptual designs must

conform to applicable Caltrain work requirements (to be developed as a part of the electrification implementation process) and would require extensive work planning during project design.

Structures

The two types of structures proposed, elevators and ramps, each present their own implementation challenges. For the elevator designs, the steel queuing platform structure can be fully prefabricated and transported to the site, while the reinforced concrete elevator shaft structure can be constructed on site using typical concrete building construction methods.

The proposed ramp options consist of prefabricated steel elements that can be assembled on site. The southbound platform ramp alternative assumes pile foundations due to its location on an existing slope (similar to the existing staircase) and would require pile drilling. Installation of small diameter piles for the southbound ramp conceptual design can be done using typical pile drilling machines from the platform level. The noise and vibration impact to the buildings due to the pile drilling will need to be evaluated in further design phases.

Platform Improvements

As noted in Section 4.3, all design alternatives include proposed platform improvements such as surface paving, tactile installation, and signage installation. These improvements have the potential to impact customers and Caltrain operations due to their location on the station platforms. As such, implementation of these elements will need to be conducted in a manner that avoids or mitigates impacts to platform availability and train operations. Additionally, such improvements might trigger level boarding requirements, absent concurrence from the FTA and FRA that level boarding is not feasible.

Construction Staging Areas

Several potential staging areas are available near the construction site. Potential areas to consider include the gravel pathway directly adjacent to the southbound platform, a portion of Iowa Street, and a portion of 22nd Street directly adjacent to the station. The Caltrans lot across 22nd Street may be an additional viable staging area, if not in use by a tenant at the time of construction. Staging and construction activities on JPB property will need to comply with Caltrain's policies and procedures. Similarly, staging outside of Caltrain's property will require coordination with the appropriate property owner and/or governing body and will be subject to their policies and procedures. Such policies and procedures may include permitting and fee requirements.

Regulatory Compliance and Third-Party Coordination

All construction activities must comply with local, state, and federal noise and vibration requirements. Per an easement for the segment of the I-280 structure within the Caltrain right-of-way, Caltrans approval is required for construction of new permanent structures proximate to the support columns. Construction activity should also be coordinated with SFMTA to minimize impacts to traffic and bus operations on nearby streets. Third-party review agreements should be set up with the City and County of San Francisco and any other relevant stakeholders to ensure that construction activities comply with all local policies and standards.

4.7 Implementation Timeline

Implementation timelines were estimated[35] for the final conceptual designs to provide additional information for the evaluation of the alternatives. The estimated implementation timeline for each design alternative is summarized in **Table 5** below with further detail of the timeline phases and assumptions in **Appendix I.**

Table 5 Implementation Time Estimates (Weeks)

CONCEPTUAL DESIGN	DESIGN/ ENV. CL.	PRE-CONSTRUCTION	CONSTRUCTION	PROJECT CLOSE	TOTAL
1) SB Platform Ramp	76	19	16	6	117
2) SB Platform Elevator	76	21	18	6	121
3) NB Platform Ramp A	76	19	8	6	109
4) NB Platform Ramp B	76	19	8	6	109
5) NB Platform Elevator	76	21	14	6	117

The implementation time includes the estimated duration to complete all activities from the point in which a pair of conceptual designs are selected and funding is secured.[36] This includes design and environmental clearance, pre-construction, construction, and project close. All conceptual designs have estimated design and environmental

[35] Estimated timeline is commensurate with planning-level analysis (less than 15 percent design). This timeline assumes that advanced engineering analysis regarding the status of existing structures, location of underground utilities, and the site's geotechnical features will not add significant additional work. As a preferred alternative is advanced through design, the timeline will be updated and refined.

[36] Estimated timelines are dependent upon securing full funding for each phase and are subject to change.

clearance phases of 76 weeks and project close phases of 6 weeks. The estimated pre-construction and construction phases vary between the conceptual design alternatives.

The southbound platform elevator is estimated to take the longest amount of time to implement at 121 weeks followed by the southbound platform ramp and northbound platform elevator alternatives at 117 weeks. The longer durations of the southbound platform ramp and two elevator alternatives are primarily due to site constraints, procurement time for needed materials, and the construction methodology required to install elevators and ramp foundations. In contrast the northbound platform ramp options would require the least amount of time (~109 weeks) to implement due to their relatively simple construction methods and lack of physical constraints.

Once an alternative for each platform is selected, the design and environmental clearance phase and pre-construction phase of both platforms can proceed simultaneously. All additional outreach work is assumed to occur during the design and environmental clearance phase. To ensure that at least one platform is open and operational during the implementation of the alternatives, the construction and project close phases of each platform are assumed to be staggered. The estimated implementation of the fastest station street-to-platform improvement project (Concept 1 and Concept 3/4) is 2.5 years. The estimated implementation of the longest station street-to-platform improvement project (Concept 2 and Concept 5) is 2.7 years.

4.8 Community Stakeholder Engagement

After the constructability analysis, cost estimates, and timeline estimates were completed, a final round of stakeholder engagement was conducted to inform the finalization of the conceptual design alternatives and evaluation matrix. Stakeholder engagement included meetings with each of the following groups:

- Study Community Stakeholder Group
- Caltrain Accessibility Advisory Committee
- SFMTA Multimodal Accessibility Advisory Committee (MAAC)
- LightHouse for the Blind and Visually Impaired
- Senior & Disability Action

The key takeaways from each of the stakeholder engagement meetings is summarized in the sections below.

Study Community Stakeholder Group

Once the conceptual designs were finalized, the Study Community Stakeholder Group (as listed in Section 3.4) was reconvened in April 2021. Community stakeholders were briefed on the Study's progress and were given the opportunity to provide feedback on the conceptual designs and evaluation criteria. Key takeaways from this meeting were as follows:

- **Ramp configurations require further consideration in future design phases**
  Community stakeholders noted that the southbound platform ramp alternative constricts an area currently used for passenger circulation. Given the flexibility in the ramp's slope and length, this conflict can be resolved in future phases of design.

- **Final designs should consider impacts to the surrounding community**
  Some community stakeholders felt that additional considerations should be taken on how the alternatives can be better integrated with the surrounding area. Stakeholders felt that the decision to use steel structures (rather than concrete) is important for maximizing station visibility and encouraged similar design choices as the project proceeds. One community stakeholder also noted that the southbound platform ramp alternative passes through a currently remote, low-visibility area behind the residential buildings on Pennsylvania Avenue and could potentially encourage undesirable activity.

- **Major station upgrades should continue to be considered**
  While the Study Community Stakeholder Group agreed that any of the feasible street-to-platform ADA access improvement alternatives would be an improvement to the existing 22nd Street Station, many did not see the alternatives as suitable long-term access solutions. Stakeholders encouraged Caltrain to continue working with SFCTA and SF Planning as the SERSS and PAX efforts progress.

Caltrain Accessibility Advisory Committee

Project material was presented to the Caltrain Accessibility Advisory Committee (CAAC) in April 2021. The presentation included a review of the project context, draft final conceptual designs, and draft evaluation matrix. Key takeaways from the meeting were:

- **Improvements Should Consider Accessibility Concerns of Broader ADA Community (Not Just Mobility Impairment)**

Members of the CAAC noted that riders with visual and/or auditory impairments can benefit from the installation of ramps or elevators at 22nd Street Station but may have a unique set of needs. CAAC members noted that measures like sharing information with wayfinding apps for the visually impaired can significantly improve and broaden the station's accessibility.

- **Improvements Should Address Additional Safety and Security Concerns**
  CAAC members stressed the importance of addressing potential safety and security concerns. Some recommended that emergency alert phones and signs discouraging misuse (i.e. bicycle and skateboard riding) be added to the ramp alternatives.

- **Project Team Needs Should Consider Additional Outreach to Other Communities Affected by Access Challenges**
  To ensure that a wide range of voices from the accessibility community are heard, CAAC members advised that additional outreach be conducted with groups, such as the SFMTA MAAC, LightHouse for the Blind and Visually Impaired, and Senior and Disability Action.

Additional External Stakeholder Feedback

Following advice from the CAAC, presentations of the project overview, draft final conceptual designs, and draft evaluation matrix were given to the SFMTA MAAC, Lighthouse for the Blind and Visually Impaired, and Senior and Disability Action in April and June of 2021. The major takeaways from these additional stakeholder engagement efforts were:

- **Common Safety and Security Concerns Raised**
  Representatives from the expanded stakeholder group mentioned many of the same safety and security concerns that were raised in previous outreach meetings. Namely, there is a concern that seniors and individuals with disabilities may be more vulnerable to physical assault or robberies. One stakeholder recommended the use of cameras and security systems to mitigate this risk.

- **Improvements Should Incorporate Additional Accessibility Resources**
  As was originally raised in the Caltrain CAAC meeting, a representative from the Lighthouse for the Blind mentioned that several steps can be taken beyond the design and installation of ramps/elevators to make the station more accessible to individuals with visual impairments. For example, the Lighthouse for the Blind

offers walk through trainings at transit stations and partners with agencies to create tactile braille maps of stations.

- **Ramps Can Present Challenges for Visually Impaired Riders**
  Stakeholders raised several challenges that visually impaired individuals can face when using ramps. For example, long ramps with several switch backs can often be disorienting and outdoor hand railings will get dirty if not cleaned regularly.

- **Consider Undertaking Broader Station Improvements**
  Some stakeholders stressed the importance of pursuing more significant improvements at 22nd Street Station, like center boarding platforms and level boarding. While not included in the scope of this Study, many of these topics will be explored in the SERS Study.

4.9 Evaluation Matrix

After finalizing the conceptual designs and receiving input in the final round of community stakeholder engagement, the design alternatives were evaluated using a set of criteria based on the goals of the Study and early stakeholder input. As discussed in Section 3.2, the evaluation criteria were developed as a way to identify important accessibility design elements and challenges, evaluate the conceptual design alternatives against each other, and identify a single preferred alternative.

The Final Evaluation Matrix (shown **Table 6** below) uses a color-coded qualitative scoring system and is comprised of three overarching categories with a set of corresponding criteria to rate each alternative. The three categories and their corresponding criteria are discussed below.

User Experience

- ***Ease of Use***: The degree to which an alternative is easy for riders with visual, auditory, or mobility impairments to navigate, in terms of both intuitiveness and required physical exertion.

- ***Safety and Security***: The anticipated level of perceived risk that riders would feel when using the alternative.[37]

[37] Conceptual designs assume that all relevant structural and safety requirements are met.

- ***Reliability***: The frequency in which an alternative's facilities are functioning and available to riders.

Agency Impacts

- ***Ease of Maintenance***: The estimated added work required to maintain an alternative's facilities.

- ***Operational Impacts***: The anticipated impacts to rail operations at the station and throughout the system (i.e. disruptions to passenger flow or impacts to train on-time performance).

Constructability

- ***Capital Cost***: The cost of fully implementing an alternative, including soft costs- as detailed in **Table 3**.

- ***Implementation Time***: The estimated time required to bring an alternative from preliminary engineering and environmental clearance to full implementation.[38]

- ***Constructability***: The anticipated ease and efficiency of constructing an alternative.

Each alternative was carefully evaluated against the criteria and assigned a color ranking to reflect its performance. The most optimal ratings were scored as Green, least optimal as Red, and Yellow and Orange were in-between.

[38] The implementation time assumes that an engineering and/or contractor has already been hired, funding is secured, and a final concept has been chosen.

Table 6 Final Evaluation Matrix

Evaluation Criteria	User Experience			Agency Impact		Constructability Factors		
	Ease of Use	Safety and Security	Reliability	Ease and Cost of Maintenance	Operational Impact	Capital Cost	Implementation Time	Constructability
Conceptual Design 1: Southbound Platform Ramp	Ramp length is much greater than typical transit station access ramps and switchbacks can be challenging for individuals with visual impairments. However, reduced slope decreases physical exertion and convenient points of access (at both street and platform level) improves intuitiveness.	Steel structure increases visibility and improves user security. However, users may feel isolated on longer sections of ramp. Long sections may also allow mobility devices to gain momentum, however, landings mitigate this risk.	Since it does not have any mechanical components, the ramp would be expected to be fully accessible with very few exceptions.	Ramp maintenance would be covered by the existing station cleaning and upkeep regimen. Detailed inspection should be performed 10-15 years after implementation.	No operational impacts identified. The platform-level point of access is located near the BAA, which simplifies the boarding procedure and minimizes service delays.	$7,512,000 Need for foundations (due to location on sloped hillside) and length of ramp increase expense. Assumptions around slope protection measures are highly conservative.	117 weeks Longer timeline due to foundation needs	Ramp construction will occur away from the platform, with minimal impacts to rail operations. Constructing on the slope may present challenges.
Conceptual Design 2: Southbound Platform Elevator	When in service, the elevator requires minimal physical effort to navigate and is conveniently located on both the street and platform level. Patrons may have to wait to use the elevator, as it would only have room for a single mobility device.	Because the station is unstaffed and located in a relatively low-activity area, unsafe and unsanitary behavior would very likely occur in the elevator. Sight lines to the elevator are obscured by the I-280 columns, potentially increasing perceived risk.	High rates of vandalism and misuse (often used as restrooms which causes corrosive damage) lead to frequent service issues and causing facilities to be out of service for several days or weeks at a time for repairs.	Staff need to lock and unlock elevators each day. Mechanical components require frequent inspection and regular replacement. Frequent vandalism and misuse necessitate additional maintenance work and leave lasting damage. Elevator would likely require major renovations prior to end of useful life.	Conductors must warn patrons during elevator outages, however, there may be operational delays if riders are unable to properly prepare and require additional assistance at the station.	$6,671,000 Increased complexity due to proximity to columns and utilities and the cost of elevator installation increase expense.	121 weeks Longest timeline of all concepts due to need for elevator procurement and testing, as well as platform level improvements.	Requires significant monitoring of adjacent structures during construction and has the highest potential utility impact. Challenges to delivery of equipment and material are manageable.

KEY FOR COLOR CODING

Less Optimal **More Optimal**

Evaluation Criteria	User Experience			Agency Impact		Constructability Factors		
	Ease of Use	Safety and Security	Reliability	Ease and Cost of Maintenance	Operational Impact	Capital Cost	Implementation Time	Constructability
Conceptual Design 3: Northbound Platform Ramp A	Platform entrances are not immediately proximate to the 22nd St./Iowa St. intersection or the BAA. This makes the accessible path of travel slightly circuitous, which may present challenges for patrons with visual impairments. Ramp length is not abnormal.	Steel structure increases visibility and improves user security. Switchback and intermediate landings mitigate risk of "runaway devices."	Since it does not have any mechanical components, the ramp would be expected to be fully accessible with very few exceptions.	Ramp maintenance would be covered by the existing station cleaning and upkeep regimen. Detailed inspection should be performed 10-15 years after implementation.	The platform level ramp entrance is not immediately proximate to the BAA, which may cause some very minor passenger circulation conflicts. No substantial operational impacts were identified.	$3,816,000 Lower cost relative to other concepts due to fewer site constraints and lower cost of ramps	109 weeks Shortest timeline of all concepts due to fewer site constraints	Challenges to delivery of equipment and material are manageable, however space on the platform for construction/ storage is limited.
Conceptual Design 4: Northbound Platform Ramp B	The location of the platform level entrance may constrict passenger circulation. Additionally, street level entrance is on south end of platform, far from the 22nd St. Muni stop. However, the total travel distance from the platform BAA to the 22nd St./Iowa St. intersection is comparable to Concept 3.	The steel structure of the ramp increases visibility and improves user security, however, the street level entrance is located in an area with little activity and insufficient lighting.	Since it does not have any mechanical components, the ramp would be expected to be fully accessible with very few exceptions. This ramp is located under the viaduct and protected from the rain.	While the ramp itself would be covered until the existing station maintenance regimen, the space between the ramp and the retaining wall would require significant additional cleaning work. Detailed inspection should be performed 10-15 years after implementation.	Restriction of platform space created by ramp entrance at platform may constrain passenger flow and delay passengers needing assistance (PNA) and bike car egress	$3,539,000 Lower cost relative to other concepts due to fewer site constraints and lower cost of ramps	109 weeks Shortest timeline of all concepts due to fewer site constraints	Challenges to delivery of equipment and material are manageable, however space on the platform for construction/ storage is limited.
Conceptual Design 5: Northbound Platform Elevator	When in service, the elevator requires minimal physical effort to navigate and is conveniently located on both the street and platform level. Patrons may have to wait to use the elevator, as it would only have room for a single mobility device.	Because the station is unstaffed and located in a relatively low-activity area, unsafe and unsanitary behavior would very likely occur in the elevator. Sight lines to the elevator are obscured by the I-280 columns, potentially increasing perceived risk.	High rates of vandalism and misuse (often used as restrooms which causes corrosive damage) lead to frequent service issues and causing facilities to be out of service for several days or weeks at a time for repairs.	Staff need to lock and unlock elevators each day. Mechanical components require frequent inspection and regular replacement. Frequent vandalism and misuse necessitate additional maintenance work and leave lasting damage. Elevator would likely require major renovations prior to end of useful life.	Conductors must warn patrons during elevator outages, however, there may be operational delays if riders are unable to properly prepare. Elevator shaft and machine room may also restrict passenger circulation.	$5,037,000 Cost of elevator installation increases expense.	117 weeks Long timeline relative to ramp concepts due to need for elevator procurement and testing.	Manageable challenges to delivery of equipment and material; limited space on platform for construction/ storage. Further from Caltrans columns, utilities than the SB elevator.

KEY FOR COLOR CODING

Less Optimal — **More Optimal**

Summary of Key Evaluation Results

Elevators perform well under Ease of Use but score poorly in all other criteria

While elevators would theoretically be the most physically convenient mode for navigating the 15–22-foot vertical distances between the 22nd Street Station platforms and the surrounding streets, their viability is complicated by the realities of vandalism, maintenance issues, and unreliable performance. Elevators at Bay Area transit stations often suffer from severe reliability issues, stemming primarily from frequent vandalism and maintenance needs. Because 22nd Street Station is located in a low-visibility area, with little activity outside of commute hours, elevators at the station would have a particularly high risk of experiencing a similar pattern of unreliability.

Ramps score well, with the exception of Ease of Use

The vertical distances between the station's platforms and the surrounding streets necessitate that the ramp alternatives be longer than what is typically built at transit stations. Long ramps could potentially be physically challenging for individuals who use manual wheelchairs or walkers and disorienting for individuals with visual impairments. However, the Study Community Stakeholder Group made it clear that ease of use may be sacrificed (to a reasonable extent) to maintain reliable street-to-platform access.

The southbound platform ramp alternative is particularly long. However, the vast majority of 22nd Street Station boardings occur on southbound trains, meaning that most riders would be traveling *down* this ramp, which would generally be easier than travelling up it.

Northbound Platform Ramp A outperforms Northbound Platform Ramp B

Between the two northbound platform ramp alternatives, the switchback ramp has an equal or better score in each evaluation criterion than the straight ramp. While the straight ramp has a smaller vertical distance to cover (12.5 feet versus 15.5 feet), it creates more platform circulation and maintenance issues than the switchback ramp.

Construction would be challenging for all alternatives

Due to the uniquely constrained nature of 22nd Street Station and its surrounding area, no alternatives were given a "green" constructability score. There are some anticipated challenges related to the delivery of materials and equipment to both the southbound and northbound platform, given the station's location below street level. Constructing on the southbound platform is expected to be particularly challenging, given the ramp

alternative's use of the sloped embankment and the elevator alternatives' proximity to underground utilities and the I-280 support columns.

4.10 Recommended Alternative

After analyzing the results of the evaluation matrix, the Study is recommending that Concept 1 (Southbound Platform Ramp) and Concept 3 (Northbound Platform Ramp A) be advanced to further engineering analysis and design.

While the recommended ramps are longer than what is typically constructed at transit stations, they are expected to yield the best overall customer experience for riders who would rely on ADA accessibility improvements to reach the 22nd Street Station platforms. The Study's elevator alternatives are expected to be susceptible to frequent outages due to their particularly high risk of vandalism and the substantial maintenance work they would require. These reliability issues would create a *substantial* burden for individuals who require full ADA accessibility, as they may be required to travel to different station if an elevator unexpectedly goes out of service. No such issues are anticipated for the recommended ramp alternatives.

4.11 Funding Plan

The 22nd Street ADA Feasibility Study final conceptual designs do not currently have an identified source of funding. Below is a discussion of how the implementation of ADA access improvements can be funded and an analysis of potential funding sources.

Summary of Needs

While the costs associated with operating and maintaining the Recommended Alternative is assumed to be covered by the Caltrain Operating Budget, funding has not yet been dedicated to the design and implementation these facilities. The estimated cost of bringing the Recommended Alternative from the initiation of the next phases of engineering analysis through full implementation is $11.8 million[39] (see Section 4.5 for full estimates).

Funding Considerations

Historically, funding for station-specific improvements has been the responsibility of the city or county in which a given Caltrain stop or station is located. Recent station

[39] Includes $500,000 outreach budget

improvement projects at South San Francisco, Hillsdale, Burlingame, and Palo Alto stations were funded by their respective cities and county transportation authorities. Project funds also included a mix of state and federal grants that were secured by those jurisdictions. Caltrain member funding contributions have historically been reserved for corridor-wide capital projects or improvements at terminal stations which contribute to system-wide operational needs.

In many cases, grant funding has been leveraged to help pay for station improvement projects. Details on potential grant funding sources are provided in **Table 8**. Grant funding for 22nd Street Station ADA access improvements could be secured as a stand-alone project or in a package with other capital improvements to create a program. None of the currently planned capital projects would be suitable for bundling with ADA access improvements at 22nd Street Station, however, an opportunity could potentially arise to pair ADA access improvements with an external entity's grant application. For example, the Affordable Housing and Sustainable Communities Program (AHSC), administered by the Strategic Growth Council, allows private-sector applicants to partner with nearby transit services to fund capital projects at stations.

With the passage of Measure RR in November 2020, Caltrain received its first dedicated source of revenue. Receipt of revenue began in the fall of 2021. Measure RR explicitly prioritizes funding the ongoing operations of the system above other potential expenditures. Operations funding will be of particular importance in the near-term, as farebox revenues recover from the impacts of the COVID-19 pandemic.

Finally, funding opportunities for ADA access improvements at 22nd Street Station could depend on the outcomes of the next phases of SFCTA's Pennsylvania Avenue Realignment work and San Francisco Planning's Southeast San Francisco Rail Station Study. If these efforts find that the station must be relocated or substantially reconfigured, the timing of such a project may limit the types of funding available for ADA access improvements at the existing station. For example, a nearer-term station relocation plan could preclude or complicate the use of funding sources for ADA access improvements at the current station, since many granting agencies prefer projects that are more lasting and permanent. Furthermore, the potential relocation plans could advantage a lower-cost interim ADA access solution over a permanent infrastructure solution. It should be noted that the final cost of the project will ultimately impact its competitiveness in many of the relevant grant programs.

Potential Funding Sources

As noted above, most station specific Caltrain capital projects are funded by outside agencies through grant funds the agencies have sought. The majority of the potential funding sources detailed below can be pursued by public agencies beyond Caltrain.

There are several potential sources of funds for ADA accessibility improvements at 22nd Street Station. Most of the sources included in this funding plan are competitive, but select regional and local formula and programmatic sources could be leveraged as well. **Table 7**, below, assesses how closely aligned the potential ADA access improvements at 22nd Street Station are with each source's funding guidelines and award history. **Table 7** does not necessarily reflect the chances of funds being secured through each source; that will depend on the overall application pool in each cycle as well as to-be-announced sponsoring agency priorities.

Lastly, the Bipartisan Infrastructure Law, enacted as the Infrastructure Investment and Jobs Act (2021), established the All Stations Accessibility Program (ASAP) to provide federal competitive grants to assist eligible entities in financing capital projects to upgrade the accessibility of legacy rail fixed guideway public transportation systems for people with disabilities, including those who use wheelchairs, and increase the number of existing stations or facilities for passenger use that meet or exceed the standards for new construction under Title II of the Americans with Disabilities Act of 1990. As shown in **Table 7**, the proposed access improvements are highly aligned with the ASAP funding guidelines, however, it should be noted that federal funds must be reimbursed if a facility is removed or modified before the end of its useful life. This will need to be taken into consideration should 22nd St Station be significantly modified or relocated in the future.

Table 7 Project Alignment with Funding Guidelines

FUNDING SOURCE	PROJECT ALIGNMENT WITH FUNDING GUIDELINES
All Stations Accessibility Program (ASAP)	Highest
Proposition AA	Highest
Proposition L	Highest
Active Transportation Program- Statewide	Medium
Local Partnership Program- Formula	Medium
One Bay Area Grant Program- San Francisco County	Medium
San Francisco Lifeline Transportation Program	Medium
State Rail Assistance Program- Formula	Medium
Active Transportation Program- Regional	Lowest
Affordable Housing and Sustainable Communities	Lowest
Low Carbon Transit Operations Program	Lowest
One Bay Area Grant Program- Regional	Lowest
Solutions for Congested Corridors Program	Lowest
Transit and Intercity Rail Capital Program	Lowest
Transportation Fund for Clean Air Program- Regional	Lowest
Transportation Fund for Clean Air- San Francisco County	Lowest

More detailed descriptions of each funding source are in **Table 8** (all dollar amounts in the table are listed in millions). As noted in **Table 8**, many funding sources are already oversubscribed.

Table 8 Potential Funding Sources (dollar amounts in millions)

Source And Award Type	Administering Agency	Eligible Recipients	Eligible Projects and Phases	Funding Cycle (dollars in millions)	Timely Use of Funds	Most Recent Award Amounts	Key Evaluation Metrics	Project Alignment with Funding Guidelines
All Stations Accessibility Program (ASAP) ***Competitive***	Federal Transportation Administration (FTA), Department of Transportation (DOT)	Public agencies that operate or financially support legacy rail fixed guideway public transportation systems and corresponding legacy stations/facilities	Capital projects to upgrade the accessibility of legacy rail fixed guideway public transportation systems for persons with disabilities, including those who use wheelchairs. **Phases:** Construction or planning	**Frequency:** 1-year cycles **Next Cycle:** FY24 **Funding Available:** ~$350 **Min/Max Request:** None **Match Required:** 20%	Funds are available for obligation for three fiscal years after the fiscal year in which the competitive awards are announced	**Cycle:** FY22 and FY 23 **Announced/Requested/ Awarded:** $343/$905/$686 **Min/Max Allowed Request:** None/None **Lowest/Highest/Average Award:** $1.4/$254/$45	• Need • Benefits • Local/Regional Prioritization • Local Financial Commitment • Project Implementation Strategy • Technical, Legal, & Financial Capacity	**Highest** The All Stations Accessibility Program is intended to provide federal competitive grants to assist eligible entities in financing capital projects to upgrade the accessibility of legacy rail fixed guideway public transportation systems for people with disabilities, including those who use wheelchairs. The 22nd Steet Station and the potential ADA access improvements are well aligned with this grant program.
Proposition (Prop) AA ***Competitive***	San Francisco County Transportation Authority (SFCTA)	Public agencies	Repairs to local streets; pedestrian and bicycle safety improvements; transit improvements **Phases:** Final design and construction	**Frequency:** 5-year cycles, sometimes with intermittent calls **Next Cycle:** 2027/28 - 2031/32 **Funding Available:** ~$25 **Min/Max Request:** None **Match Required:** None	Begin project within a year of allocation	**Cycle:** 2022/23-2026/27 **Announced/Requested/ Awarded:** $23/$31.5/23 **Min/Max Allowed Request:** None/None **Lowest/Highest/Average Award:** $0.3/$3.4/$1.5	• Readiness • Time sensitivity • Community support • Communities of Concern benefit • Fund leveraging • Geographic distribution	**Highest** 22nd Street Station ADA access improvements could be eligible under any of the three Prop AA categories- Street Repair and Reconstruction, Pedestrian Safety, and Transit Reliability and Mobility Improvements. Caltrain did not apply for Prop AA funds in the current cycle, and the program accounts for project sponsor diversity (SFCTA is intentional about awarding funds to multiple applicants).
Proposition (Prop) L (most likely expenditure plan items) ***Programmatic***	San Francisco County Transportation Authority (SFCTA)	PCJBP	Caltrain Maintenance, Rehabilitation, and Replacement; Transit Enhancements; Bicycle Circulation/Safety **Phases:** Planning, Environmental, Design, & Construction	**Frequency:** 5-year cycles **Next Cycle:** 2023/24-2027/28 **Funding Available:** Dependent on expenditure plan line **Min/Max Request:** None **Match Required:** None	Begin project within a year of allocation	**Potentially available funds to Caltrain in current cycle (2019/20-2023/24):** • EP7: $0.44: SF Station and Terminal Planning • EP20P: $0.4: Stations State of Good Repair • EP39: $0.67: Caltrain Wayside Bike Parking	• Not applicable	**Highest** If Caltrain has not planned to apply these funds to other projects already, it has broad discretion for their use. Another potential Prop L source is the Neighborhood Transportation Program. Supervisor Walton may have up to $0.6 available to allocate to capital projects in District 10.
Active Transportation Program (ATP)	Caltrans and California	Public agencies	A majority of funds are used for infrastructure projects that improve	**Frequency:** Biennial calls	**Complete project within 3 years**	**Cycle: 2021/22-2024/25** **Announced/Requested/Awarded:**	• Need • Safety	**Medium**

– Statewide ***Competitive***	Transportation Commission (CTC)		walking and biking conditions **Phases:** Planning, environmental, design, ROW, construction	**Next Cycle:** 2023/24-2026/27 **Funding Available:** ~$200 **Min/Max Request:** $0.25/None **Match:** None		$224/$2,258/$242 **Min/Max Allowed Request:** $0.25/None **Lowest/Highest/Average Award:** Dependent on project type	• Disadvantaged communities • Public participation • Scope and plan consistency	22nd Street Station ADA access improvements fit well with the program guidelines and qualify for the less intensive 'small' project application. ATP is very oversubscribed though, so competition will be high
Local Partnership Program (LPP) ***Formula***	California Transportation Commission (CTC)	Jurisdictions with voter approved transportation taxes, tolls, and fees	Transportation improvements **Phases:** Planning, environmental, design, ROW, construction	**Frequency:** Biennial calls **Next Cycle:** 2023/24-2024/25 **Funding Available:** ~$216, split among eligible jurisdictions by formula **Min/Max Request:** None/None Match: 100% (dollar for dollar match)	Complete project within 3 years	**Current Formula Funds Available (2023/24-2024/25):** San Francisco County Transportation Authority: $3.44 unprogrammed	• Funding match • Cost effectiveness • Deliverability • Greenhouse gas emissions (GHG) reductions • VMT reduction • Regional and community support • Safety • System preservation	**Medium** Caltrain can consider coordinating with the San Francisco agencies to use their unprogrammed funds.
One Bay Area Grant Program (OBAG) – County Program ***Competitive***	San Francisco County Transportation Authority (SFCTA), Metropolitan Transportation Commission (MTC)	Public agencies	Transportation projects **Phases:** Planning, environmental, design, ROW, construction	**Frequency:** 5-year cycles, sometimes with intermittent calls **Next Cycle:** 2027/28-2030/31 **Funding Available:** TBD **Min/Max Request:** TBD **Match:** 11.47%	None	**Cycle:** 2022/23-2026/27 **Announced/Requested/ Awarded:** $52.8/$71/$52.8 **Min/Max Allowed Request:** $0.25/None **Lowest/Highest/Average Award:** $.5/$13/$7	• Located in a priority community • Readiness • Multi-modal benefits • Coordination with non-OBAG projects • Community support	**Medium** 22nd Street Station ADA access improvements will likely align well with the program guidelines, but this is smaller work than SFCTA has funded in the past. Caltrain may be able to bundle this with projects in the area that are led by external agencies, such as affordable housing developments or street improvements.
San Francisco Lifeline Transportation Program (LTP) *Competitive*	San Francisco County Transportation Authority (SFCTA)	Transit operators	New or enhanced transit service, station area enhancement, transit-related aspect of bicycling, shuttle service, vehicles, and mobility management	**Frequency:** 2-year cycles **Next Cycle:** TBD **Funding Available:** TBD **Min/Max Request:** None **Match Required:** 10% ***Note:*** *LTP funding comes from a State Transportation Assistance Block Grant. 40% of that grant goes to paratransit, but SFCTA can adjust that distribution*	None	**Cycle:** 2018/19-2019/20 **Announced/Requested/ Awarded:** $4/$4/4 **Min/Max Allowed Request:** None/None **Lowest/Highest/Average Award:** $0.1/$3/$2	• Transit services benefiting Communities of Concern • Community identification of project • Project need • Implementation timeline • Fiscal sustainability • Cost effectiveness • Higher match	**Medium** SFCTA emphasizes using LTP funds on transit service itself, but the 22nd Street Station ADA access improvements meet the other criteria. The most recent cycle was not oversubscribed.

State Rail Assistance (SRA) *Formula*	California State Transportation Agency (CalSTA)	Intercity and commuter rail operators	Rail network improvements to existing or aspiring corridors **Phases:** Planning, environmental, design, ROW, construction, operations, maintenance	**Frequency:** Intermittent calls **Next Cycle:** 2025/6-2029/30 **Funding Available:** Likely more than $6/year **Min/Max Request:** None/None **Minimum Request:** None **Match:** None	• Start project within 6 months • Complete project within 4 years	**Projected Amounts in Current Cycle (2020/21-2024/25):** • **20/21: $5.7** • **21/22: $5.8** • **22/23: $5.9** • **23/24: $6.1** • **24/25: $6.3**	• TBD	**Medium** CalSTA will release calls for projects at to be determined times during the five-year cycle. Since funds can cover operating costs, competition will likely be high as operators seek to replace lost farebox revenue.
Active Transportation Program (ATP) – Regional Program *Competitive*	Metropolitan Transportation Commission	Public agencies	A majority of funds are used for infrastructure projects that improve walking and biking conditions **Phases:** Planning, environmental, design, ROW, construction	**Frequency:** Biennial calls **Next Cycle:** 2023/24-2026/27 **Funding Available:** TBD **Min/Max Request:** TBD **Match:** 11.47%	Complete project within 3 years	**Cycle: 2019/20-2022/23** **Announced/Requested/ Awarded:** $37/$339/$37 **Min/Max Allowed Request:** None/None **Lowest/Highest/Average Award:** $0.4/$13/$6.5 Note: MTC will be recommending awards for the 2021/22-2024/25 cycle in March. That cycle is for $37, and $356 have been requested.	• Need • Safety • Disadvantaged communities • Public participation • Scope and plan consistency • Consistency with regional priorities	**Low** In past awards, MTC has heavily prioritized projects that are in Disadvantaged Communities (DACs) and serve as Safe Routes to School improvements.
Affordable Housing and Sustainable Communities (AHSC) *Competitive*	California Department of Housing and Community Development	Public agencies and real estate developers; private sector applicants may partner with transit agencies to fund station capital projects	Transit and housing improvements that support infill development **Phases:** Construction; 50% of funds for affordable housing; operations and maintenance may by covered if there is expanded service	**Frequency:** Annual calls **Next App Due:** March 2023 (Round 7) **Funding Available:** ~ 750 **Min/Max Request:** $1/$30 **Match:** Determined from AHSC formula	None	**Cycle**: Round 6 (2019-2020) **Announced/Requested/ Awarded:** $785/$1140/$808 **Min/Max Allowed Request:** $1/$20 **Lowest/Highest/Average Award:** $1/$30/$21	• Greenhouse gas (GHG) reduction	**Low** AHSC funds can be used to support station improvements near affordable housing, but 22nd Street Station ADA access improvements do not provide enough GHG benefit to be competitive on its own.

Low Carbon Transit Operations Program (LCTOP) ***Formula***	Caltrans	Transportation planning agencies / regional entities and transit operators	Transit-related greenhouse gas emissions reductions that also improve mobility **Phases:** Construction, operations, maintenance	**Frequency:** Annual calls **Next App Due:** ~April 2022 **Funding Available:** TBD **Min/Max Request:** None/None Match: 50%	Start project within 6 months	**Formula Funds Available (19-20 amounts):** Caltrain: $2; MTC: $53 **Min/Max Allowed Request:** NA **Lowest/Highest/Average Award:** NA	• GHG reductions • Disadvantaged community (DAC) benefits per AB 1550	**Lowest** The project area is not in a DAC and, there are not significant anticipated emissions reductions.
One Bay Area Grant Program (OBAG) – Regional Program ***Competitive/ Programmatic***	Metropolitan Transportation Commission	Public agencies	Improvements to Bay Area transportation **Phases:** Dependent on subprogram within OBAG, but not operations and maintenance	**Frequency:** Calls every 5 years **Next Cycle:** 2022/23-2026/27 **Funding Available:** TBD **Min/Max Request:** Dependent on subprogram **Match:** Dependent on subprogram	Dependent on subprogram	**Cycle:** 2017/18-2021/22 **Amount Available:** $530 **Min/Max Allowed Request:** Dependent on subprogram **Lowest/Highest/Average Award:** Dependent on subprogram	• Dependent on subprogram	**Lowest** The regional portion of OBAG tends to be dedicated to larger initiatives and bigger projects. Priorities for the next round have not yet been identified, but the county program will likely be a better source.
Solutions for Congested Corridors Program (SCCP) ***Competitive***	California Transportation Commission (CTC)	Regional Transportation Planning Agencies and Caltrans	Congestion management projects in highly traveled/congested corridors that are included in an approved Comprehensive Multimodal Corridor Plan **Phases:** Construction	**Frequency:** Biennial calls **Next Cycle:** 2022/23-2024/25 **Funding Available:** ~$500 **Min/Max Request:** None/None Match: None	• Start construction within 2 years of funding award • Complete project according to the submitted schedule	**Cycle:** 2020/21-2022/23 **Announced/Requested/ Awarded**: $494/$1,300/$500 **Min/Max Allowed Request:** None **Lowest/Highest/Average Award:** $25/$150/$71	• Safety • Congestion • Accessibility • Economic development • GHG reductions • Land use • Matching funds • Readiness	**Lowest** SCCP tends to fund much larger projects. It will fund programs of projects though, like the Placer-Sacramento Gateway project- so Caltrain could look to 22nd Street Station ADA access improvements with other work.
Transit and Intercity Rail Capital Program (TIRCP) ***Competitive***	California State Transportation Agency (CalSTA), California Transportation Commission (CTC) and Caltrans	Transit operators	Rail and transit improvements that decrease GHG emissions by increasing capacity and ridership while integrating transit systems and improving transit safety **Phases:** Planning, environmental, design, ROW, construction, operations, maintenance	**Frequency:** Biennial calls **Next Cycle:** 2022/23-2026/27 **Funding Available:** ~$500 **Min/Max Request:** None **Match:** None	• Complete preconstruction within 2 years • Complete construction according to the project schedule	**Cycle:** 2020/21-2024/25 Announced/Requested/ **Awarded:** $450-500/$2,446/$500 **Min/Max Allowed Request:** None **Lowest/Highest/Average Award:** $1/$107/$29	• GHG reduction • Ridership • Service integration • Safety	**Lowest** 22nd Street Station ADA access improvements do not perform well against any of the main metrics in TIRCP. Even if part of a larger program of projects, CalSTA might still eliminate the lowest performing components.

Transportation Fund for Clean Air – Regional Program ***Competitive***	Bay Area Air Quality Management District (BAAQMD)	Public agencies and non-public entities	Projects that result in the reduction of motor vehicle emissions **Phases:** Planning, environmental, design, ROW, construction	**Frequency:** Annual calls **App Due:** Likely summer 2021 **Funding Available:** ~$13 **Min/Max Request:** $10K/$5.5 per year for public **Match:** 10% from non-Air District funding sources	**Complete project within 2 years**	**Information not available from BAAQMD site**	• Surplus emission reductions • Benefit Priority Development Areas, Highly Impacted Communities, or Episodic Areas as defined in the Air District CARE Program and other communities identified through AB 617	**Lowest** 22nd Street Station ADA access improvements will likely not demonstrate substantial surplus emissions reductions. It also does not fit well with any of the project types outlined by the BAAQMD.
Transportation Fund for Clean Air (TFCA) – County Program ***Competitive***	San Francisco County Transportation Authority (SFCTA)	Public agencies Non-public entities	Projects that result in the reduction of motor vehicle emissions **Phases:** Planning, environmental, design, ROW, construction	**Frequency:** Annual calls **Next Cycle:** 2023/24 **Funding Available:** ~$750K **Min/Max Request:** N/A **Match:** N/A	Complete project within 2 years	**Cycle:** 2022/23 **Amount Available: $0.8** **Announced/Requested/ Awarded:** $0.9/$.4/$0.9 **Min/Max Allowed Request:** N/A **Lowest/Highest/Average Award:** $0.08/$0.8/$0.4	• Surplus emission reductions • Located in Priority Development Area, Highly Impacted Communities or Episodic Areas as defined in the Air District CARE Program	**Lowest** Access improvements at the 22nd Street station will likely not generate substantial surplus emissions reductions, but SFCTA has funded active transportation improvements like bicycle racks in the past.
Note: The 22nd Street ADA Project is ineligible for some other funding sources including: • Access and Mobility Partnership Grants: Program is for non-infrastructure projects • Rebuilding American Infrastructure with Sustainability and Equity (RAISE): Project size too small • Infrastructure for Rebuilding America (INFRA): Project size too small; not a freight-related project • Consolidated Rail Infrastructure and Safety Improvements Program (CRISI): Only available to intercity and freight rail projects • Local Partnership Program- Competitive: Project size too small • Trade Corridor Enhancement Program (TCEP): Not a freight project							

4.12 Additional Elements for Consideration

Given the uncertain nature of 22nd Street Station's future relocation/reconstruction plans, the scope of this Study is focused on determining the feasibility of street-to-platform access improvements. As described in Chapter 2, EXISTING CONDITIONS ANALYSIS, the station's uniquely constrained layout presents a number of accessibility challenges beyond street-to-platform movements. While analysis of the following items was beyond this Study's scope, they can provide significant accessibility improvements.

ADA Access Improvements Outside JPB Right of Way

While this Study's conceptual designs were limited to improvements within JPB right of way, other accessibility improvements for the surrounding City-controlled property should be considered if the designs advance. These include but are not limited to:

- Installation of ADA Parking on 22nd Street and/or Iowa Street
- Flatten excessive slopes on the 22nd Street/Iowa Street intersection
- Address the narrow clearance between the 22nd Street MUNI bus stop and the edge of the sidewalk

Redundant ADA Access Modes

As depicted by the results of the evaluation matrix, none of the five conceptual designs presented in this Study are entirely optimal from the standpoint of user experience. However, many of the shortcomings of a given conceptual design are addressed by its alternative. For example, the southbound platform elevator is relatively easy to use but has significant reliability issues, whereas the southbound ramp alternative can be difficult to use (given its length) but has no reliability issues. Although not investigated as part of this Study, the final conceptual designs do not necessarily preclude a combination of ramp and elevator options for one platform. Further analysis would be required to determine the most appropriate configurations and confirm feasibility.

Non-Traditional Wayfinding

If ADA access improvements are implemented at 22nd Street Station, additional wayfinding resources like brail tactile maps or auditory maps for the visually impaired can be developed in coordination with local accessibility advocacy groups.

Mini-High Ramps

While not specifically mandated by the ADA, some Caltrain stations include mini-high platforms to assist boarding at accessible cars. Given the fact that the 22nd Street platforms are already highly constrained, the Study assumes that platform to train

accessibility would be achieved via mechanical lifts, which occupy significantly less space than mini-highs. If mini-highs are desired at 22nd Street Station, further analysis will be required in order to determine whether they can fit on the platforms without limiting circulation. Installation of mini-highs are not included in the capital cost and implementation timeline estimates for this Study.

5 CONCLUSION AND NEXT STEPS

As described in previous chapters, the Study involved a thorough review of station area existing conditions and relevant planning studies, along with multiple rounds of outreach to both internal and external stakeholders. The process resulted in five final conceptual designs for providing street-to-platform ADA access within the existing configuration of the station and one non-vertical access improvement option should the street-to-platform concepts be deemed infeasible. Cost estimates and a constructability assessment were conducted for all the conceptual designs. Lastly, the five final conceptual designs were assessed in an evaluation matrix.

The Study concluded that each of the five vertical access conceptual designs presented are feasible at a planning level. Based on the results of the evaluation criteria matrix, the Study recommends that Final Conceptual Design 1 (Southbound Platform Ramp) and Final Conceptual Design 3 (Northbound Platform Ramp A) be considered for further analysis and design. The implementation of these two alternatives is estimated to cost approximately $11.8 million over 2.5 years, including additional outreach efforts.

While these alternatives include relatively long access ramps, installing elevators at the station would raise considerable reliability and maintenance issues. Furthermore, the ramp alternatives have significantly lower operating and maintenance costs and can be implemented within a shorter timeframe. Comparing the two northbound platform ramp alternatives, Conceptual Design 3 (Switchback Ramp) received equal or higher scores on each evaluation criteria than Conceptual Design 4 (Straight Ramp).

The work performed under this Study did not exceed the planning level, meaning that there are several more steps to be taken before street-to-platform access improvements can be made at 22nd Street Station. The following items have been identified as crucial next steps for advancing the preferred alternative:

Identify and Secure Funding

Identifying and securing funding is a critical next step in advancing the project through construction. Building upon the funding information contained in this Study, the next phase of work should include the development of a detailed funding and implementation plan including agency roles and responsibilities.

Confirm Outcomes of the Ongoing Planning Work

As mentioned previously in this report, this Study was a consideration in the analysis of the Southeast Rail Station Study (SERSS) and the Pennsylvania Avenue Extension (PAX). However, the recommendations from those two efforts may also influence how and when street-to-platform improvements are implemented at the existing 22nd Street Station. For example, if these efforts find that 22nd Street Station should remain in its existing configuration for the foreseeable future, a more comprehensive and permanent set of access improvements could be bundled with the Study's recommended alternatives (i.e. a combination of elevators and ramps on each platform). Care should be taken by decision makers to understand the broader context of the station area and the potential for relocation or reconstruction of the station. The outcome and timing of the SERSS and PAX efforts should be considered before advancing this Study's recommended alternatives.

Confirm Caltrain Electrification Plans

It is assumed that ADA access improvements would be installed after the Caltrain corridor has been electrified. Caltrain requirements for station elements and working within the electrified system are still in development. Future stages of this project will need to verify the final location of the OCS poles and ensure all considerations and requirements regarding electrification can be met.

Conduct Additional Outreach with Accessibility Advocacy Groups

In response to feedback from the Study Community Stakeholder Group, the slope of the ramps in the two recommended alternatives was lowered below the ADA mandated maximum of 8.33 percent. As the alternatives are advanced to more detailed design phases, additional outreach should be conducted with accessibility advocacy groups to confirm the slope and length which optimizes user experience. Riders who currently use the station should also be included in future outreach efforts to ensure that impacts to passenger circulation are properly addressed.

Confirm Platform Repaving Design

The conceptual designs for the southbound platform include new platform surfacing and resurfacing between the entrance/egress point of the street-to-platform facilities, the station's ticket vending machines, and the platform's boarding assistance area. This is to provide an accessible route to the accessible facilities on the platform, in accordance with ADA standards. As the design alternatives are advanced through the next engineering design phases, additional analysis should be performed to confirm the

extent of repaving efforts that would be required by ADA standards. If additional analysis finds that repaving is required beyond what is shown by the Study's conceptual designs, additional capital funds may be required.

Conduct Lighting Analysis

One of the most consistent pieces of feedback this Study received from during its outreach efforts was concerns around safety and security. Because much of 22nd Street Station's sight lines are obscured by the I-280 support columns, lighting improvements can greatly enhance the station's visibility and improve comfort levels for all riders. A detailed analysis of potential lighting improvements should be conducted in future design phases.

Conduct Auditory Messaging Analysis

During the site visit performed as part of the Existing Conditions Analysis (see Section 2.4), the volume of the auditory messaging system appeared to be inaudible to some patrons. A technical evaluation of the existing auditory system should be performed to determine whether or not the system meets current standards and to identify potential improvements.

Advance Designs

This Study's final conceptual designs represent planning level analysis (less than 15 percent design) and do not represent advanced engineering design. The proposed designs will need to be confirmed with more detailed engineering analysis and application of other regulatory requirements (such as maximum travel distances from mode of egress established by the National Fire Protection Association). General stages of engineering design include further structure design, existing utility potholing, geotechnical analysis, third party coordination and approval, final design, and construction document preparation.

Obtain Right of Way and Easement Agreements

Installation of the proposed conceptual designs will require activities and elements outside of the Caltrain right of way. Coordination and agreements with adjacent property owners and other agencies will be needed. These agreements include but are not limited to:

- Confirmation that proposed elements within Caltrain easement areas are acceptable (e.g., upper section of southbound ramp immediately adjacent to street level plaza.

- Construction activity impacts, such as staging areas and temporary traffic control within the City's streets.

Follow Third Party Coordination Process

Implementation of ADA access improvements will require coordination with several other parties or agencies. Mainly, SFMTA and Caltrans will need to provide approval of certain elements within close proximity to their structures. It is important that future stages of this project take a proactive role in third party coordination to avoid any late-stage design changes or schedule impacts.

Incorporate Study Findings into updated ADA Self-Evaluation and Transition Plan

Caltrain is currently in the initial stages of updating its ADA Self-Evaluation and Transition Plan by evaluating its current services, policies and practices to identify barriers to access, identifying the methods that will be used to make the facilities more accessible, and specify the schedule for taking the steps necessary to make the improvements. Caltrain will engage in a robust outreach and public comment process and the results of this Study will be taken into account in this broader system wide effort.

6 APPENDICES

Appendix A
Summary of Existing Plans and Studies

Appendix B
Initial Design Alternatives

Appendix C
Questions for External Stakeholder Outreach

Appendix D
Summary of Initial Alternatives Considered

Appendix E
Final Conceptual Designs

Appendix F
Ramp Case Studies

Appendix G
Cost Estimates

Appendix H
Constructability Analysis

Appendix I
Implementation Timeline