# Receive Update on Active Grade Crossing Projects & Corridor Crossing Strategy


JPB TOPS Committee
February 26, 2025

# AGENDA

- **Corridor Crossing** Delivery Guide
- **Active Grade Crossing** Projects
- **Corridor Crossing** Strategy Update
- **Upcoming** Meetings

# Corridor Background

- **2 Corridor Owners**
  Caltrain and Union Pacific Railroad (UPRR)
  - 3 additional corridor operators
- **71 At-Grade Crossings**
  - 43 (41 vehicular/2 pedestrian) on Caltrain corridor
  - 28 vehicular on UPRR corridor
- **11 At-Grade Station Pedestrian Crossings**
- **Recently electrified railroad**

# Corridor Crossings Delivery Guide


Caltrain | Corridor Crossings STRATEGY

# Crossings Delivery Guide

## Spring 2024:

Received over 500+ comments from corridor partners

## August 2024:

Posted publicly at *www.Caltrain.com/caltrain-corridor-crossings-delivery-guide*

## Fall 2024:

Conducted Caltrain staff trainings on guide purpose and application

## Winter 2025:

Conducted trainings for corridor jurisdiction staff, industry partners, transportation authorities on guide purpose and application

# Purpose and Use of the Delivery Guide

## Purpose and Use of the Delivery Guide:

- Provide a consolidated location of standards for implementing a grade separation project.
- Define the processes, and roles/responsibilities of Caltrain and local partners to implement a grade separation or crossing closure.

### *FOR WHAT*

- Grade Separations
- Crossing Closures

### *FOR WHO*

- Jurisdictions and county transportation authorities along Caltrain corridor considering or currently implementing grade separation or crossing closure project
- Provides general guidance for projects along UPRR corridor

# Detailed Delivery Process

*City Led* — *Caltrain Led*

| PHASE 1 | PHASE 2 | PHASE 3 | PHASE 4 | PHASE 5 | PHASE 6 | PHASES 7-8 |
|---|---|---|---|---|---|---|
| **Project Initiation** | **Development** *0-15% Design* | **Development** *16-35% Design* | **Development** *36-65% Design* | **Development** *66-100% Design* | **Construction** | **Start-Up/ Turnover/ Closeout** |
| Scoping and Concept Alternative Development | Project Study Report and Locally Preferred Alternative (LPA) Selection | Design Development | Design Development and Environmental Documentation | Final Design, Permitting, and Construction Procurement | Construction Administration and Coordination | Operations and Maintenance |

# Delivery Guide Highlights

- Raised Caltrain's maximum profile grade from 1% to 2%
- Refined the 4-track segments from the Business Plan
- Summarized Horizontal/Vertical Clearances, in conjunction with updated Caltrain Design Standards
- Communicated design variance request process and forms
- Described operational considerations for construction on active, electrified railroad
- Highlighted active transportation components of grade separations

# Maximum Profile Grade Revision

| | CALTRAIN | UPRR | CHSRA | AREMA |
|---|---|---|---|---|
| Absolute Maximum Profile Grades | 2.00%* | 2.00% | 2.50% | 2.00% |

*Grade change will only occur on **Peninsula Main Line** *(MP 0.147 to MP 44.0)*

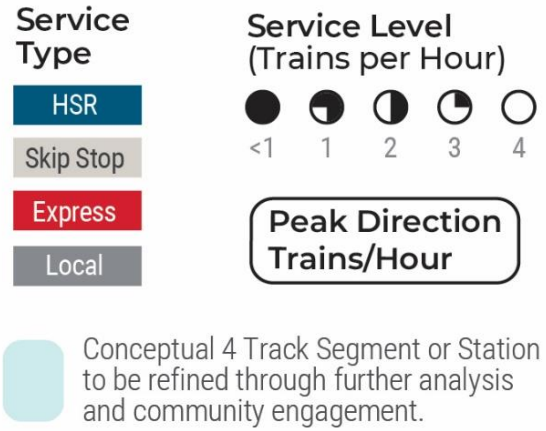
- Higher maximum profile grades allow for smaller grade separation footprints to adjacent communities and provides more flexibility in design
- Revised criteria to allow up to 2 percent grade **without a design exception**, subject to review and approval of Caltrain's Director of Engineering
- Considerations if profile is adjusted
  - Overhead Contact System (OCS)
  - Passenger and Freight Operations (Potential Shoofly Tracks)

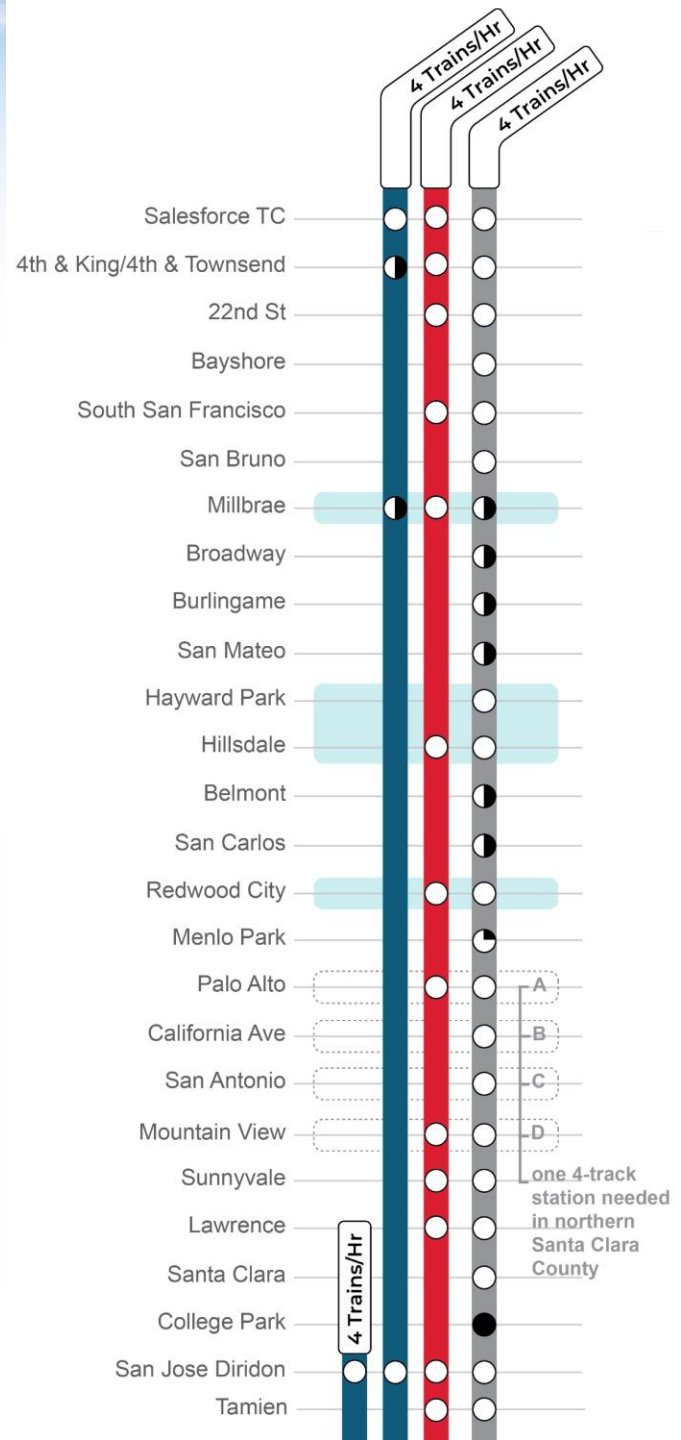
# 4-Track Refinement: Business Plan Recap

## Moderate Growth (Adopted Service Vision)

- Blended Caltrain/High-Speed Rail Service
  - 8 Caltrain trains + 4 HSR trains per hour per direction (phpd)
  - 4-track segments to be constructed at a later time, as the Adopted Service Vision (ASV) is implemented

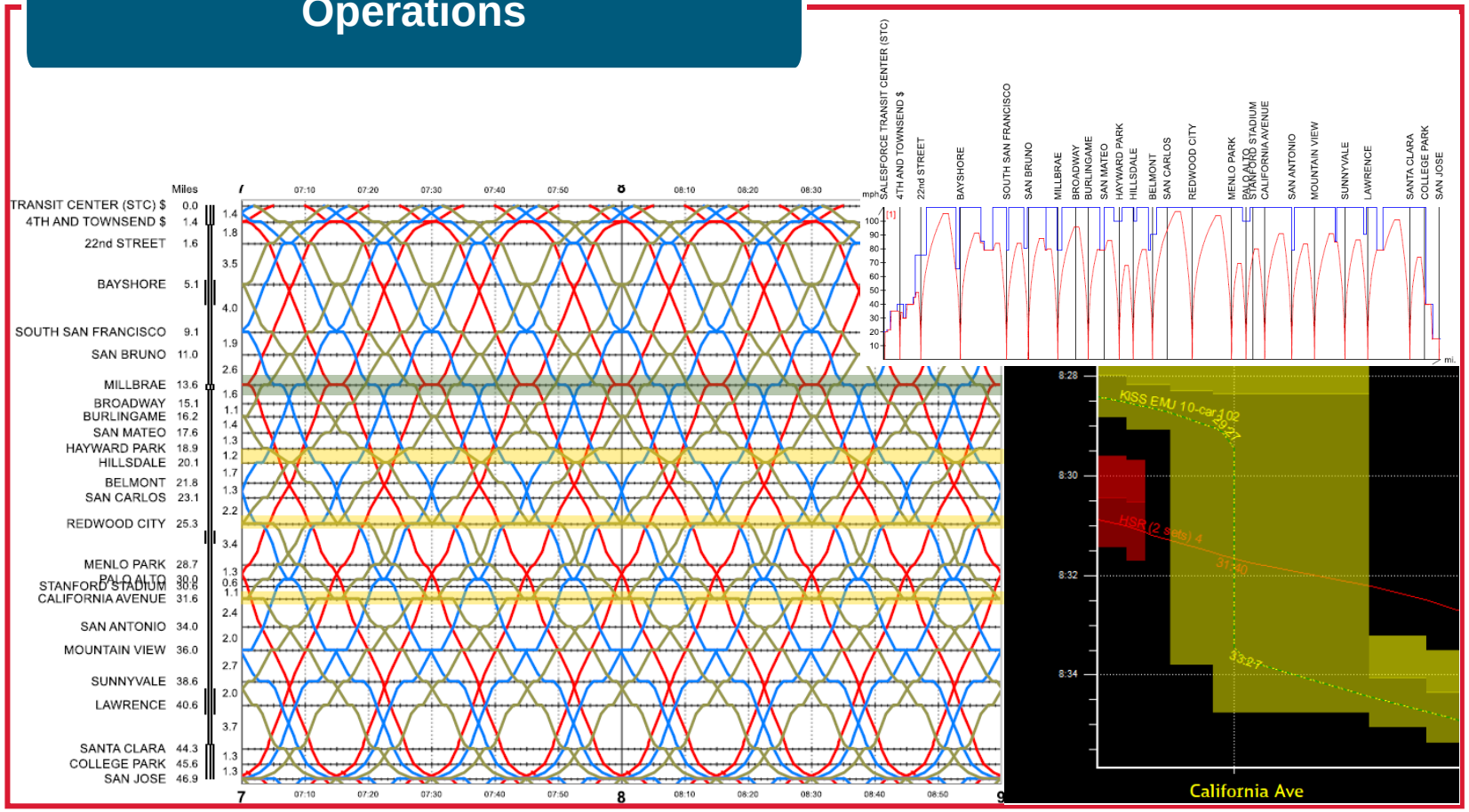
*PCJPB agrees that it **shall not take action …** that PCJPB knows or reasonably should have known at the time of the action **would effectively preclude or make materially more complicated or expensive CHSRA's future operation** in the Peninsula Rail Corridor…*
– Project Management and Funding Agreement (PMFA) Section 5.3.1



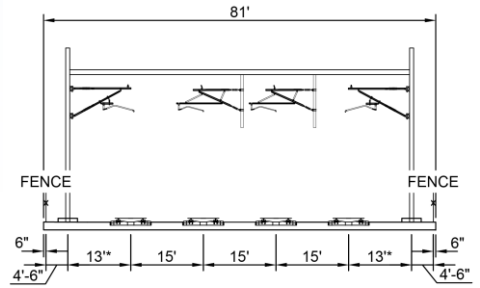



# 4-Track Refinement: Technical Analysis

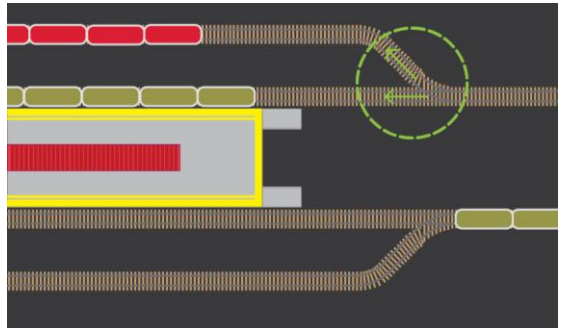
## Operations




## Cross-sections

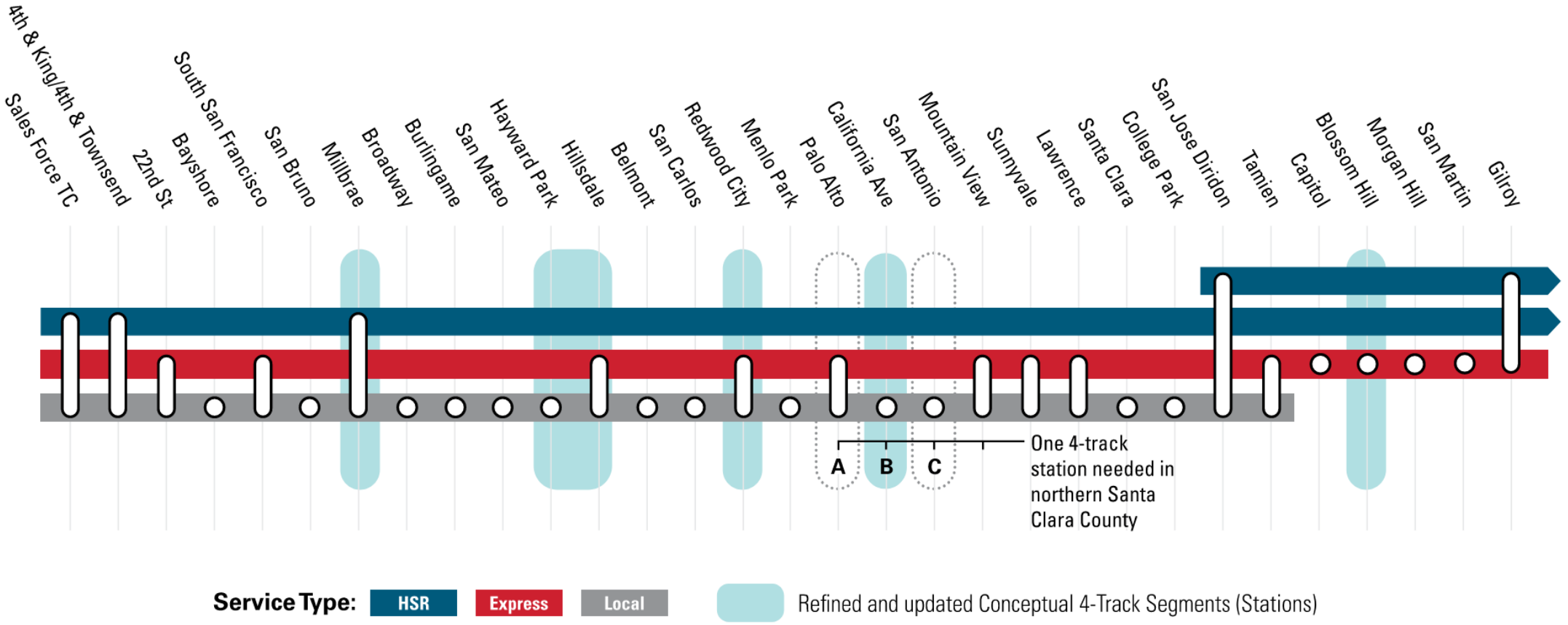



## Turnouts



## Alignment Concept

# Refined 4-Track Analysis Segments



# Active Grade Crossing Projects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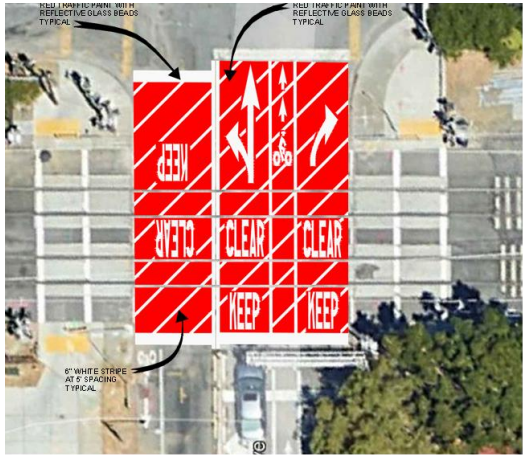
# Grade Crossing Project Types

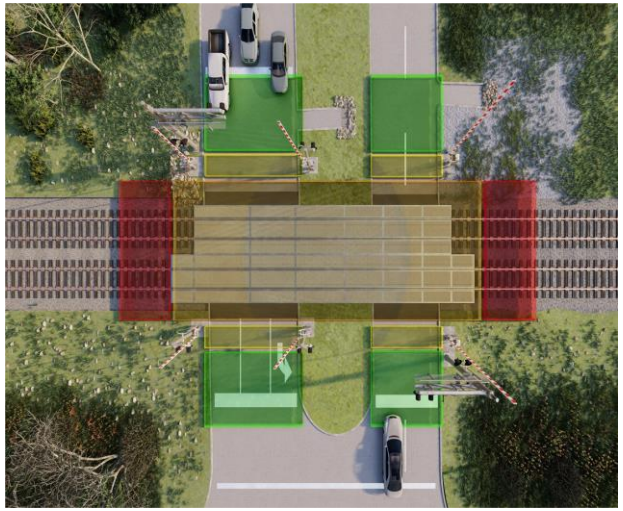
## Crossing Enhancement Projects

At-grade crossing improvements implemented at existing elevation. May include signing, striping, solar lane markers, delineators, lighting, and technology.

At Grade Crossing w/Safety Improvements







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# Grade Crossing Project Types

## Crossing Elimination Projects

Crossing improvements that remove or change the elevation and access to the crossing

Closed Crossing

Grade Separated Crossing

Bike/Pedestrian Crossing



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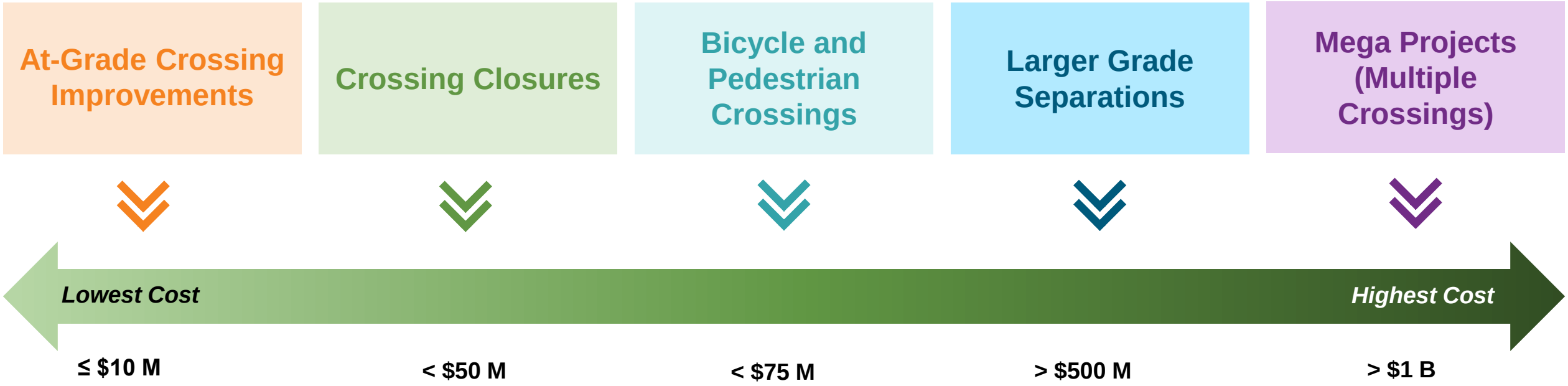
# Spectrum of Costs




*Note: Costs include the design and construction of the improvement in current $*



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# Active Grade Crossing Projects

**8**

***Crossing Enhancement Projects***

*(13 crossings)*

**17**

***Crossing Elimination Projects***

*(30 vehicular and 5 bike/pedestrian crossings)*

# Active Enhancement Projects

| Project Name | Crossing | CPUC Ranking* | Description | Status |
|---|---|---|---|---|
| **Corridor-Wide Navigation** | Multiple | - | Coordination with navigation applications to improve instructions around tracks | On-going |
| **Broadway Safety Improvements** | Broadway | 1 | Install intrusion technology, markers, striping, signage, and reflective delineators. | Technology and markers are completed. Other items in design. |
| **Watkins Avenue Grade Crossing Safety Improvements** | Watkins Ave | - | Install quad gates, pedestrian gates, pavement markers and markings, lighting, and sidewalk improvements | Completed |
| **San Mateo Grade Crossing Improvements** | 4th Ave<br>5th Ave | - | Install quad gates | Under construction |

**California Public Utilities Commission (CPUC) – California Grade Separation Program Priority List for Fiscal Year 2024-2025*

# Active Enhancement Projects

| Project Name | Crossing | CPUC Ranking* | Description | Status |
|---|---|---|---|---|
| **Churchill Avenue/Alma Street Crossing Safety Improvements (Section 130)** | Churchill Ave | 9 | New pre-signal and traffic signals with timing modifications and pedestrian/bicyclist improvements | Under construction |
| **Churchill Avenue Grade Crossing Improvements** | Churchill Ave | 9 | Install intrusion technology, markers, striping, signage, and reflective delineators. | In design; advancing to 100% in 2025. |
| **Palo Alto Security Enhancements** | Churchill Ave to Palo Alto Station | 9 | New fencing | Under construction |

**California Public Utilities Commission (CPUC) – California Grade Separation Program Priority List for Fiscal Year 2024-2025*

# Active Enhancement Projects

| Project Name | Crossing | CPUC Ranking* | Description | Status |
|---|---|---|---|---|
| **Grade Crossing Improvement Program** | Mission Bay Dr<br>16th St<br>Sunnyvale Ave<br>3rd Ave<br>Chestnut Ave<br>E Meadow Dr<br>Whipple Ave<br>Ravenswood Ave | 12 (Meadow)<br>23 (Sunnyvale) | Install solar markers, delineators, and signage | On-going |

**California Public Utilities Commission (CPUC) – California Grade Separation Program Priority List for Fiscal Year 2024-2025*

# Active Elimination *Design* Projects
## *San Mateo County*

| Project Name | CPUC Ranking* | City | Phase | Status |
|---|---|---|---|---|
| **South Linden and Scott Grade Separation** | 6 | SSF/ San Bruno | **Phase 3** 16 - 35% | Cities to decide on Value Engineering option. |
| **Broadway Burlingame Grade Separation** | 1 | Burlingame | **Phase 5:** 66 - 100% | Reviewing Value Engineering options. CM/GC procured. |
| **Middle Avenue Bike/Pedestrian Undercrossing** | - | Menlo Park | **Phase 4** 36 - 65% | Preparing advanced Preliminary Engineering and Environmental Review. Procuring CM/GC with April Board approval. |

**California Public Utilities Commission (CPUC) – California Grade Separation Program Priority List for Fiscal Year 2024-2025*
*CM/GC = Construction Manager/General Contractor*

# Active Elimination *Design* Projects
## *Santa Clara County*

| Project Name | CPUC Ranking* | City | Phase | Status |
|---|---|---|---|---|
| **Connecting Palo Alto: Churchill, Meadow, and Charleston** | 9 (Chur)<br>12 (Mead)<br>13 (Char) | Palo Alto | **Phase 3**<br>16 - 35% | Advancing Preliminary Engineering and Environmental Review. |
| **Rengstorff Grade Separation** | 7 | Mountain View | **Phase 4**<br>36 - 65% | In design; CM/GC procured. |
| **Mountain View Transit Center (Castro Street)** | 20 | Mountain View | **Phase 4**<br>36 - 65% | On hold; City prioritizing Rengstorff. CM/GC procured. |
| **Bernardo Avenue Bike/Pedestrian Undercrossing** | - | Sunnyvale | **Phase 3**<br>16 - 35% | Reviewing Environmental Documentation prepared by City. |

**California Public Utilities Commission (CPUC) – California Grade Separation Program Priority List for Fiscal Year 2024-2025*
*CM/GC = Construction Manager/General Contractor*



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# Active Elimination *Planning* Projects
## *San Francisco and San Mateo County*

| Project Name | Crossings | CPUC Ranking* | City | Phase |
|---|---|---|---|---|
| **Pennsylvania Avenue Extension** | Mission Bay Dr<br>16th St | - | San Francisco | **Phase 2**<br>0 – 15% |
| **Redwood City Grade Separation Study** | Whipple Ave<br>Brewster Ave<br>Broadway<br>Maple St<br>Main St<br>Chestnut St | - | Redwood City | **Phase 2**<br>0 – 15% |
| **Menlo Park Grade Separation** | Encinal Ave<br>Glenwood Ave<br>Oak Grove Ave<br>Ravenswood Ave | - | Menlo Park | **Phase 2**<br>0 – 15% |

**California Public Utilities Commission (CPUC) – California Grade Separation Program Priority List for Fiscal Year 2024-2025*

# Active Elimination *Planning* Projects
## *Santa Clara County*

| Project Name | Crossings | CPUC Ranking* | City | Phase |
|---|---|---|---|---|
| **Connecting Palo Alto** | Palo Alto Ave | | Palo Alto | **Phase 1** Initiation |
| **South Palo Alto Bike/Ped Connectivity** | TBD | - | Palo Alto | **Phase 1** Initiation |
| **Mary Avenue Grade Separation** | Mary Ave | 14 | Sunnyvale | **Phase 2** 0 – 15% |
| **Sunnyvale Avenue Grade Separation** | Sunnyvale Ave | 23 | Sunnyvale | **Phase 2** 0 – 15% |

**California Public Utilities Commission (CPUC) – California Grade Separation Program Priority List for Fiscal Year 2024-2025*

# Active Elimination *Planning* Projects
## *Santa Clara County*

| Project Name | Crossings | CPUC Ranking* | City | Phase |
|---|---|---|---|---|
| **Diridon Area Projects** | Auzerais Ave<br>W. Virginia St | 10 | San Jose | **Phase 1**<br>Initiation |
| **Southern San Jose Grade Separations** | Skyway Dr<br>Branham Ln<br>Chynoweth Ave | 16 | San Jose | **Phase 1**<br>Initiation |
| **Morgan Hill Grade Separations** | Dunne Ave<br>Tennant Ave | - | Morgan Hill | **Phase 1**<br>Initiation |

**California Public Utilities Commission (CPUC) – California Grade Separation Program Priority List for Fiscal Year 2024-2025*

# Integrated Delivery Approach

## Managing risk, scope, schedule, and cost

- **Integrated City and Caltrain** project teams for transparency and accountability
- Develop and regularly update **Project Management Plan**
- Implement and regularly update **Project Risk Register**
- **Obtain commercial pricing** at key project milestones (e.g., 35% and 65%) to inform next steps
- Develop and regularly update **Funding Plan**
- **Incremental design progress** supported by strategic outreach activities

# Use of Independent Cost Estimates

**Caltrain's emerging understanding of the market has led to onboarding industry professionals to develop contractor-style costs, construction schedules, and constructability reviews based on current commercial market conditions to assist in determining the reasonableness or validation of a project budget.**

- Validate project budget based on current market costs
- Apply contractor level estimates at milestones
- Ensure project aligns with the schedule
- Reduce risk and identify potential issues at milestones

# Corridor Crossings Strategy Update


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# Purpose

As an outcome of the **Business Plan**, the Corridor Crossings Strategy is an effort to **define a systematic corridor-wide approach** to crossings.

The strategy aims to **align stakeholder ambitions into balance with an implementable program,** addressing:

- Funding
- Organization
- Program Delivery

***Note: Active grade separation projects will continue in parallel as the program gets developed***

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# Corridor Crossings Program

**With the increase in project costs nationwide coupled with limited and competitive funding, Caltrain is focusing its energy on organizing resources on the following over the next decade:**

- **Identify and prioritize crossing enhancement projects**
- **Prioritize and facilitate delivery of crossing elimination projects**



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# Corridor Crossings Investment Program

The DRAFT Corridor Crossings Investment Program:

- Documents **prioritization methodology**,
- Lists **Grade Crossing Enhancement** and **Elimination** projects in funding tiers,
- Identifies **Project** and **Program** Funding Strategy,
- Describes additional initial **Caltrain Activities** to enhance delivery, and
- Outlines **future Program updates.**

- Will be presented at the future TOPS/AMP meetings

# Program Schedule

**March 26, 2025**

**TOPS/AMP Committee:** Present DRAFT Corridor Crossings Investment Program methodology (Informational)

**April 3, 2025**

**JPB:** Present DRAFT Corridor Crossings Investment Program methodology (Informational)

**April 23, 2025**

**TOPS/AMP Committee:** Present DRAFT Corridor Crossings Investment Program including list of projects (Informational)

**May 1, 2025**

**JPB:** Present DRAFT Corridor Crossings Investment Program including list of projects (Informational)

**May 28, 2025**

**TOPS/AMP Committee:** Present FINAL Corridor Crossings Investment Program (Endorsement)

**June 5, 2025**

**JPB:** Present FINAL Corridor Crossings Investment Program (Endorsement)

# Reference Information

**Program Website:**
**https://www.caltrain.com/CCS**

**Contact Email:**
**railplanning@caltrain.com**

# References

*Additional slides to supplement information provided above and for reference*


Caltrain | Corridor Crossings STRATEGY

# Active Grade Separation Projects

| COUNTY | PROJECT NAME | CROSSING STREET | PROJECT STAGE | | | |
|---|---|---|---|---|---|---|
| | | | PLANNING | ENVIRONMENTAL | DESIGN | CONSTRUCTION |
| San Francisco | Pennsylvania Avenue Extension | • Mission Bay Dr<br>• 16th St At 7th | ✓ | | | |
| San Mateo | South Linden Avenue and Scott Street Grade Separation | • S Linden Ave<br>• Scott St | | | ✓ | |
| | Burlingame Broadway Grade Separation | • Broadway | | | ✓ | |
| | Redwood City Grade Separation Study | • Whipple Ave<br>• Brewster Ave<br>• Broadway<br>• Maple St<br>• Main St<br>• Chestnut St | ✓ | | | |
| | Menlo Park Grade Separation Project | • Encinal Ave<br>• Glenwood Ave<br>• Oak Grove Ave<br>• Ravenswood Ave | | ✓ | | |
| | Middle Avenue Undercrossing** | • Middle Ave | | | ✓ | |
| Santa Clara | Connecting Palo Alto | • Palo Alto Ave | ✓ | | | |
| | Churchill, Meadow, and Charleston Grade Separation Project | • Churchill Ave<br>• Meadow Dr<br>• Charleston Rd | | ✓ | | |
| | South Palo Alto Bike/Ped Connectivity** | • Two crossings south of Oregon Expressway | ✓ | | | |
| | Rengstorff Grade Separation | • Rengstorff Ave | | | ✓ | |
| | Mountain View Transit Center and Grade Separation* | • Castro St | | | ✓ | |
| | Bernardo Avenue Undercrossing** | • Bernardo Ave | | ✓ | | |
| | Mary Avenue Grade Separation | • N Mary Ave | ✓ | | | |
| | Sunnyvale Avenue Grade Separation | • N Sunnyvale Ave | ✓ | | | |
| | Diridon Area Projects | • Auzerais Ave<br>• West Virgina St | ✓ | | | |
| | Southern San José Grade Separations Project (Union Pacific Rail Road) | • Skyway Dr<br>• Branham Ln<br>• Chynoweth Ave | ✓ | | | |
| | Morgan Hill Grade Separations Project | • Morgan Hill Station Pedestrian Crossing<br>• Dunne Ave<br>• Tennant Ave | ✓ | | | |

Notes: Information as of January 2025.
*Crossing Closure and Construct Bike/Pedestrian Only Crossings **Bike/Pedestrian Only Crossings

# Maximum Profile Grade Revision

| | CALTRAIN | UPRR | CHSRA | AREMA |
|---|---|---|---|---|
| Absolute Maximum Profile Grades | 2.00%* | 2.00% | 2.50% | 2.00% |

*Grade change will only occur on **Peninsula Main Line** *(MP 0.147 to MP 44.0)*

- Higher maximum profile grades allow for smaller grade separation footprints to adjacent communities and provides more flexibility in design
- Revised criteria to allow up to 2 percent grade **without a design exception**, subject to review and approval of Caltrain's Director of Engineering
- Considerations if profile is adjusted
  - Overhead Contact System (OCS)
  - Passenger and Freight Operations (Potential Shoofly Tracks)

# Refined 4-Track Segments

**Adopted Service Vision (Moderate Growth Scenario)**
Blended Service: **8** Caltrain Trains + **4** HSR Trains

Refined 4-track segments at **Millbrae, Hayward-Hillsdale, Redwood City, and northern Santa Clara County** with length and mile post limits

- Analyses validated the passing track locations to enable the future blended service pattern for both Caltrain and HSR and fulfills Caltrain's obligations to HSR for a blended service system
- Segments **located at stations** to allow for passing trains and increased operational flexibility between trains
- Consistent with past and current planning efforts have shown that Millbrae, Hayward-Hillsdale, and Redwood City can accommodate future 4-track

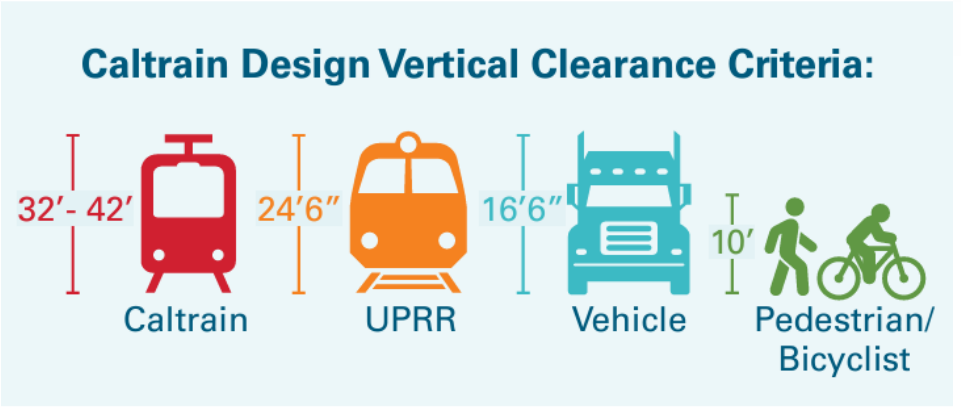
# Refined 4-Track Segments (Cont.)

## North Santa Clara County 4-Track Segment

- 4-Track segments at **Palo Alto, California Avenue,** and **San Antonio** stations were analyzed as part of this work
- Flexibility in service operations, impacts to existing community assets and infrastructure, available right-of-way, and engineering criteria were reviewed to evaluate the trade-offs with each options
- As a result of the Analysis, **California Avenue** is the North Santa Clara County 4-Track segment to support the Adopted Service Vision and reflect the PMFA

# Summary of Horizontal and Vertical Clearances

- **Vertical Clearances for Overpasses:** The height of a new overpass over the Caltrain ROW will be governed by the height of the OCS equipment, which varies throughout the corridor
- **Vertical Clearances for Underpasses:** Depth of cover is heavily dependent on construction methods, subsurface factors, and the railroad infrastructure at the crossing
- **Horizontal Clearances**: Horizontal clearances from tracks, equipment, and structures will often dictate the overall width of a grade separation




| From Nearest Track Center to | Caltrain | Reference | UPRR | Reference |
|---|---|---|---|---|
| Adjacent Tangent Track | 15′-0″ | CDC 2.C.3.1 | 15′-0″<br>20′-0″<br>(Preferred) | UPRR STD DWG 0002 |
| Adjacent Tangent Track with Center Fencing | 18′-0″ | CDC 3.D1.1.f | | |
| Standard Clearance Envelope (Tangent and Curved Track)* | 12′-6″ | CSD SD-2002 | 9′-0″ | UPRR STD DWG 0038 |
| Underground Utilities | 12′-0″ | CSD SD-2002 | 15′-0″ | UPRR/BNSF Guidelines for Temporary Shoring Figure 1 |
| Pole (non-electrical) | 10′-0″ | CSD SD-9000 | 15′-0″ | UPRR STD DWG 0038 |

# Design Variance Process

*Partner Cities have requested variance from the Caltrain Design Criteria involving clearances, construction methods, and other factors on grade separation projects*

**Clarified the Design Variance Request Process and Forms**

- Project elements must be developed to at least 35% completion, including horizontal geometry, vertical alignment, and profile, to discuss variances
- Variance requests should be submitted using the standard Variance Request form found in Appendix 2 of the Delivery Guide
- Request must be supported by fact-based and cost-benefit analysis
- OCS modifications require a documented, robust analysis separate from a variance request and must consider construction impacts on transit service and future maintenance costs

# Operational Impacts for Construction

**General guidance on the Site-Specific Work Plan (SSWP) process and its key components**

- Work scheduling process
- Work protection zones and activities that necessitate worker protection
- Considerations for track closures
  - **Shoofly tracks –** Must consider OCS system, double track operations, available right-of-way (ROW), post-construction demolition, and significant impacts on the project budget
  - **Single-track closures** - Caltrain would **only consider** single-track closures during off-peak and weekend hours

***"Freight rail access must be maintained during closures, as codified in the Trackage Rights Agreement with UPRR"***

# Active Transportation Considerations

**Highlighted active transportation components of grade separations**

**Facilities are identified and prioritized in the early planning stages of a project**

- Elements include accessible sidewalks, bicycle lanes, multi-use trails, and crosswalks
- Separate facilities when possible (separate vehicle, bike and pedestrian facilities)
- Bike facility type should be selected using NACTO's guidelines
- Design guidelines are provided for pedestrian facility design, shared use path design, and alternatives to bikes dismount signs
- Designs should comply to the updated **Station Access Policy**