

# CALIFORNIA HIGH-SPEED RAIL NORTHERN CALIFORNIA REGION

Staff-Recommended State's Preferred Alternative

San Francisco County Transportation Authority CAC  
Wednesday, July 24, 2019



# OBJECTIVE

Share **staff-recommended State's Preferred Alternative** and process for identifying the State's Preferred Alternative.

- The staff-recommended State's Preferred Alternative is based on stakeholder input and analyses completed to date.
- All alternatives will be analyzed at an equal level of detail and described in the published Draft EIR/EIS.
- Staff will summarize the comments received during planned outreach and report to the Authority Board for consideration with the recommended State's Preferred Alternative on September 17, 2019.
- Identifying the State's Preferred Alternative does not approve or adopt a preferred alternative for final design or construction.

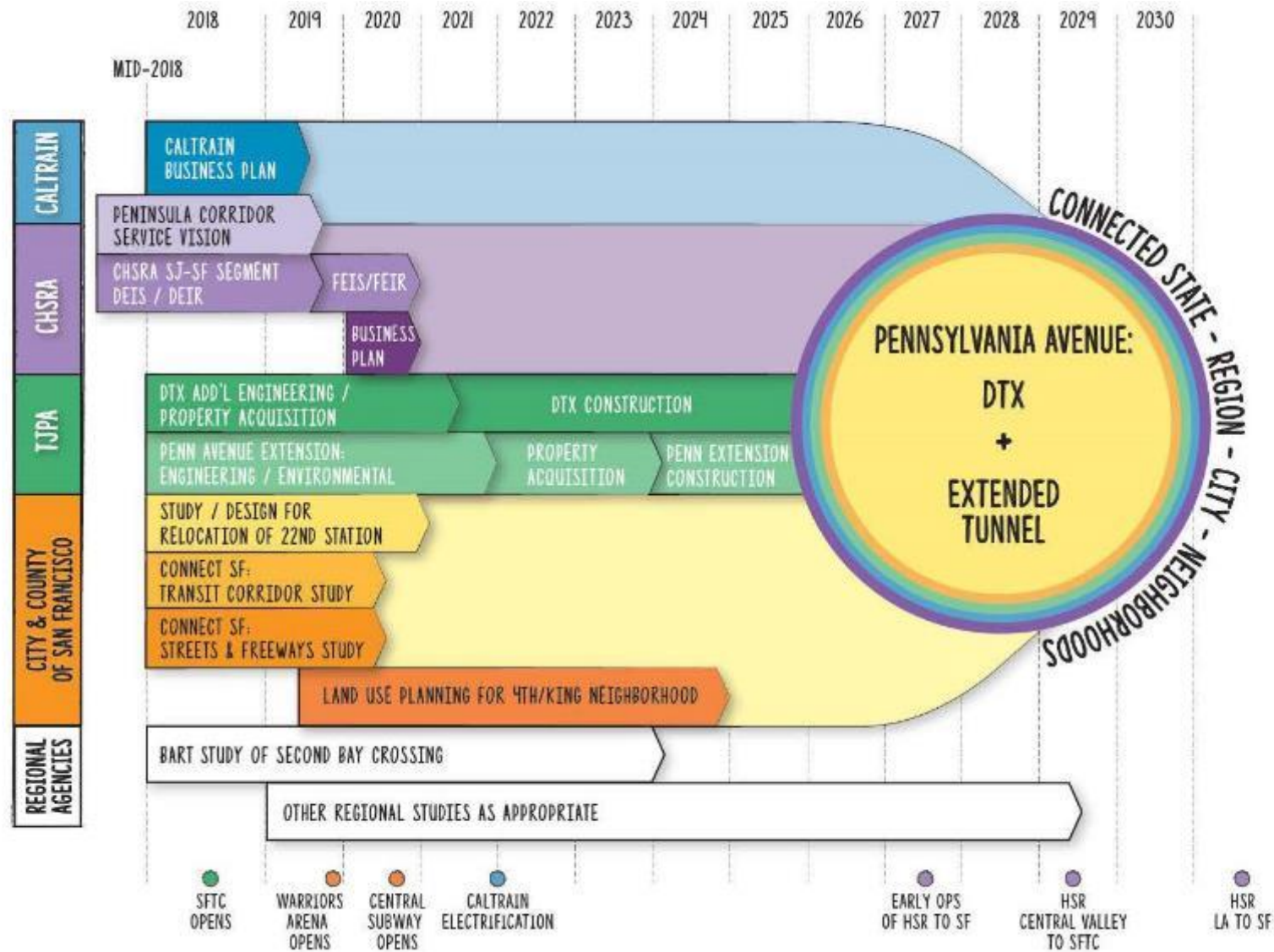


# SAN FRANCISCO TO SAN JOSE PROJECT SECTION

**REFINING THE ALTERNATIVES:**  
Collaboration with Partner Agencies,  
Stakeholders, and Members of the Public



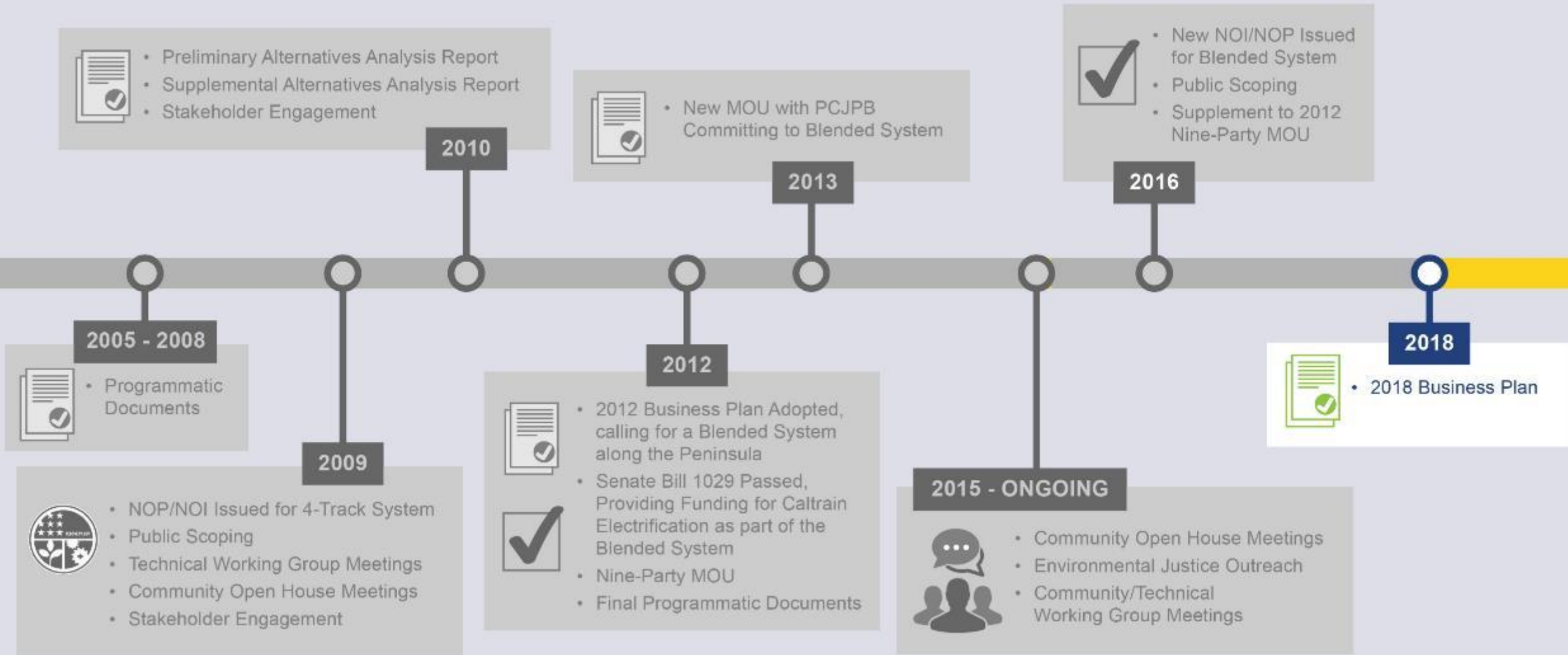
# PROGRAM DEVELOPMENT AND STATUS



Approximate schedules, subject to change








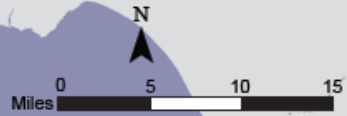
# HIGH-SPEED RAIL ALTERNATIVES DEVELOPMENT



**SAN FRANCISCO to SAN JOSE  
PROJECT SECTION**  
4th & King Station (San Francisco)  
to W. Alma Avenue (San Jose)

**SAN JOSE to CENTRAL VALLEY WYE  
PROJECT EXTENT**  
Scott Boulevard (City of Santa Clara)  
to Carlucci Road (Merced County)

-  San Francisco to San Jose Proposed Alignments
-  San Jose to Central Valley Wye Proposed Alignments
-  High-Speed Rail Stations
-  Central Valley Wye Proposed Alignments
-  San Francisco Downtown Extension



SALESFORCE  
TRANSIT CENTER  
4th St.  
SAN FRANCISCO

4TH & KING  
STATION

MILLBRAE - SFO  
STATION

SAN JOSE  
DIRIDON  
STATION

Scott Blvd.

W. Alma Ave.

EAST GILROY  
ALTERNATIVE

DOWNTOWN  
GILROY  
ALTERNATIVE

CENTRAL VALLEY WYE  
STUDY AREA

Carlucci Rd.

CONTRA COSTA  
COUNTY

ALAMEDA  
COUNTY

SAN MATEO  
COUNTY

SANTA CLARA  
COUNTY

SAN JOAQUIN  
COUNTY

STANISLAUS  
COUNTY

MERCED COUNTY

SANTA CRUZ  
COUNTY

SAN BENITO  
COUNTY

# SAN FRANCISCO TO SAN JOSE PROJECT SECTION

## ALTERNATIVES OVERVIEW





# SAN FRANCISCO – SAN JOSE PROJECT ALTERNATIVES A AND B

**San Francisco to San Jose Project Section**

**Alternative A Features**

- M** East Option Light Maintenance Facility
- No Additional Passing Tracks

**Alternative B Features**

- M** West Option Light Maintenance Facility
- Additional Passing Tracks

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**○** HSR Stations

**— — —** San Jose to Merced Alignments

**—** Downtown Extension







# SAN FRANCISCO TO SAN JOSE

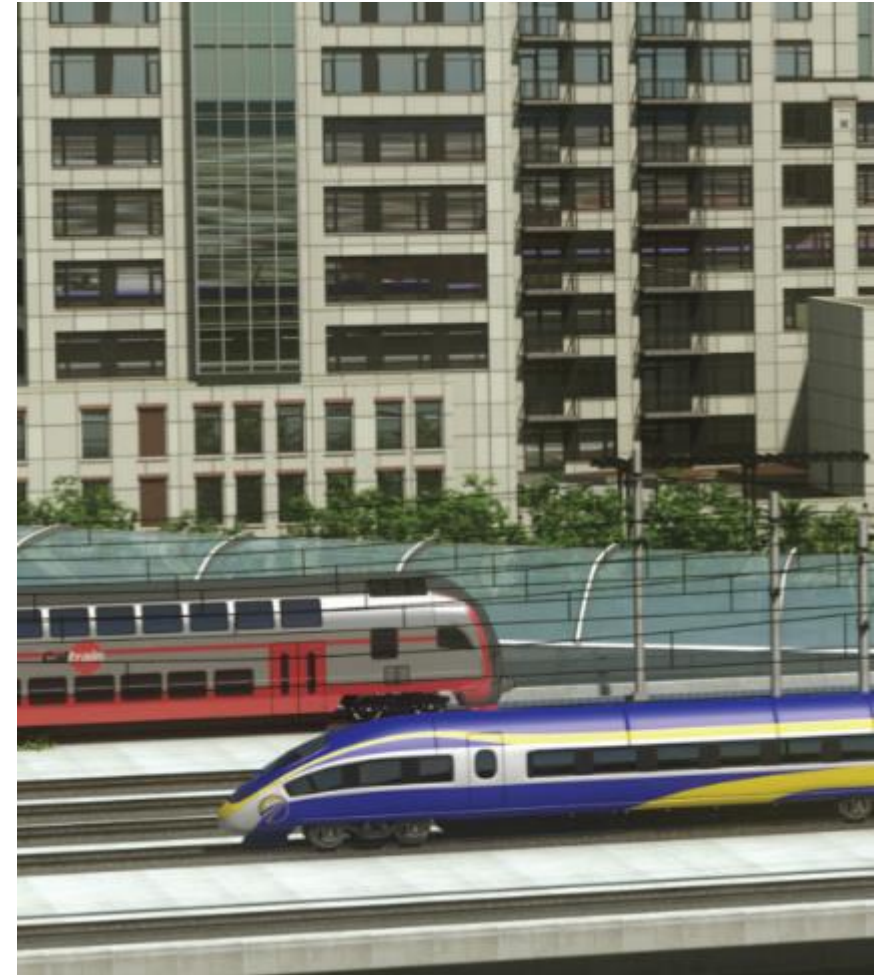
Common Project Elements – Alternatives A & B

- **High-Speed Rail stations<sup>1</sup>**
  - » San Francisco 4<sup>th</sup> and King
  - » Millbrae
- **Up to 110 mph speeds**
  - » Track modifications to support higher speeds
- **Peak operations**
  - » 4 High-Speed Rail trains and 6 Caltrain trains per hour/per direction

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<sup>1</sup> **Salesforce Transit Center** has been environmentally cleared by Transbay Joint Powers Authority and will not be part of the California High-Speed Rail Authority's environmental analysis.

**San Jose Diridon Station** is being evaluated as part of the San Jose to Merced Project Section but will be included in both project sections' environmental analysis.





# SAN FRANCISCO TO SAN JOSE

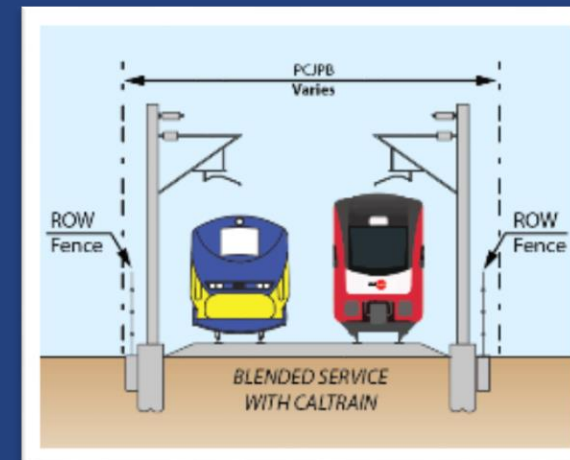
Common Project Elements – Alternatives A & B

- Remove hold-out rule at Broadway and Atherton Caltrain Stations
- Safety modifications at Caltrain-only stations and at-grade crossings
- Corridor fencing



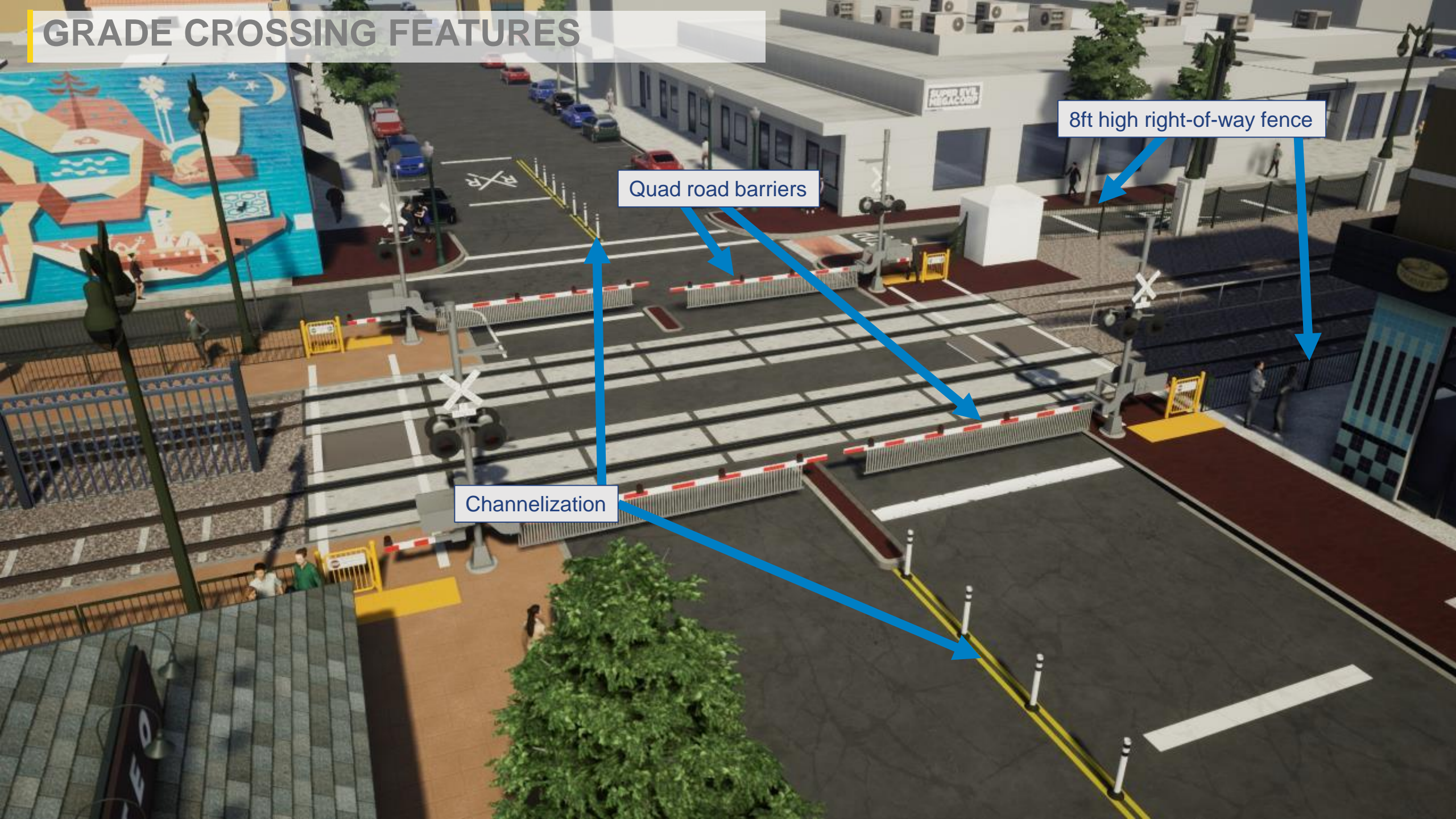
## Blended At-Grade

- Uses Caltrain electrification infrastructure and tracks
- Predominantly within the existing railroad right-of-way
- At-grade tracks with quad gates at each road crossing





# GRADE CROSSING FEATURES



Quad road barriers

8ft high right-of-way fence

Channelization

# SAN FRANCISCO TO SAN JOSE PROJECT SECTION

IDENTIFYING  
A PREFERRED ALTERNATIVE





# FACT SHEETS: TECHNICAL ANALYSIS



## ALTERNATIVES EVALUATION FOR SAN FRANCISCO TO SAN JOSE PROJECT SECTION



### WHY IS STAFF RECOMMENDING ALTERNATIVE A AS THE STATE'S PREFERRED ALTERNATIVE?

Teams of rail and environmental planners, engineers, and other specialists in the design and operation of high-speed rail services have undertaken a complex analysis of the two alternatives. The results indicate that each alternative has tradeoffs – advantages and disadvantages. Nevertheless, Alternative A was identified as the staff-recommended State's Preferred Alternative because it provides the best overall balance between system performance, community and environmental factors. The factors that differentiate the two alternatives are presented in the tables below.

### HOW WERE THE ALTERNATIVES EVALUATED?

Alternatives A & B were evaluated by comparing the alternatives across three criteria:



System Performance, Operations, and Costs. The best-performing alternative is bold.

CRITERIA	ALT A	ALT B
Alignment length (miles)	42.9	
Speed Capacity (mph)	Up to 110	
HSR Peak Hour Average Representative Travel Time San Francisco to San Jose (minutes)	47	45
Proposition 1A Service Travel Time Compliance	✓	✓
Estimated Capital Costs (2017\$)	<b>\$2.6 billion</b>	\$3.5 billion
Estimated Annual Operations and Maintenance Costs (2017\$)	\$78 million	
Caltrain Peak Hour Average Representative Travel Time (minutes)	63	65





# ALTERNATIVE A – STAFF-RECOMMENDED STATE’S PREFERRED ALTERNATIVE

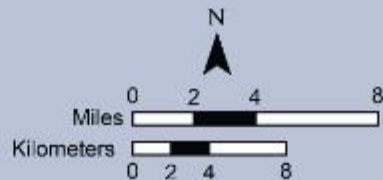
**LEGEND**

San Francisco to San Jose Alignments

- Alternative A

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- HSR Stations
- M Maintenance Facility
- San Jose to Merced Alignments



\* 4th Street and King Street  
(Interim until the Downtown Extension to the Salesforce Transit Center)



# STATE'S PREFERRED ALTERNATIVE CRITERIA

## System Performance, Operations, & Costs

- Alignment Length
- Maximum Authorized Speed
- Proximity to Transit Corridors
- Travel Time
- Capital Costs
- O&M Costs



## Environmental Factors

- Biological and Aquatic Resources

## Community Factors

- Displacements
- Aesthetics and Visual Quality
- Land Use and Development
- Transportation
- Emergency Vehicle Access/Response Time

# ALTERNATIVE A – Staff-Recommended State’s Preferred Alternative

Conclusions of Technical Analysis



Fewest major visual impacts



Fewest impacts on natural resources



Fewest displacements



Lowest capital cost



Fewest road closures



Slower HSR, faster Caltrain peak hour travel time



Fewest impacts on wetlands and habitats



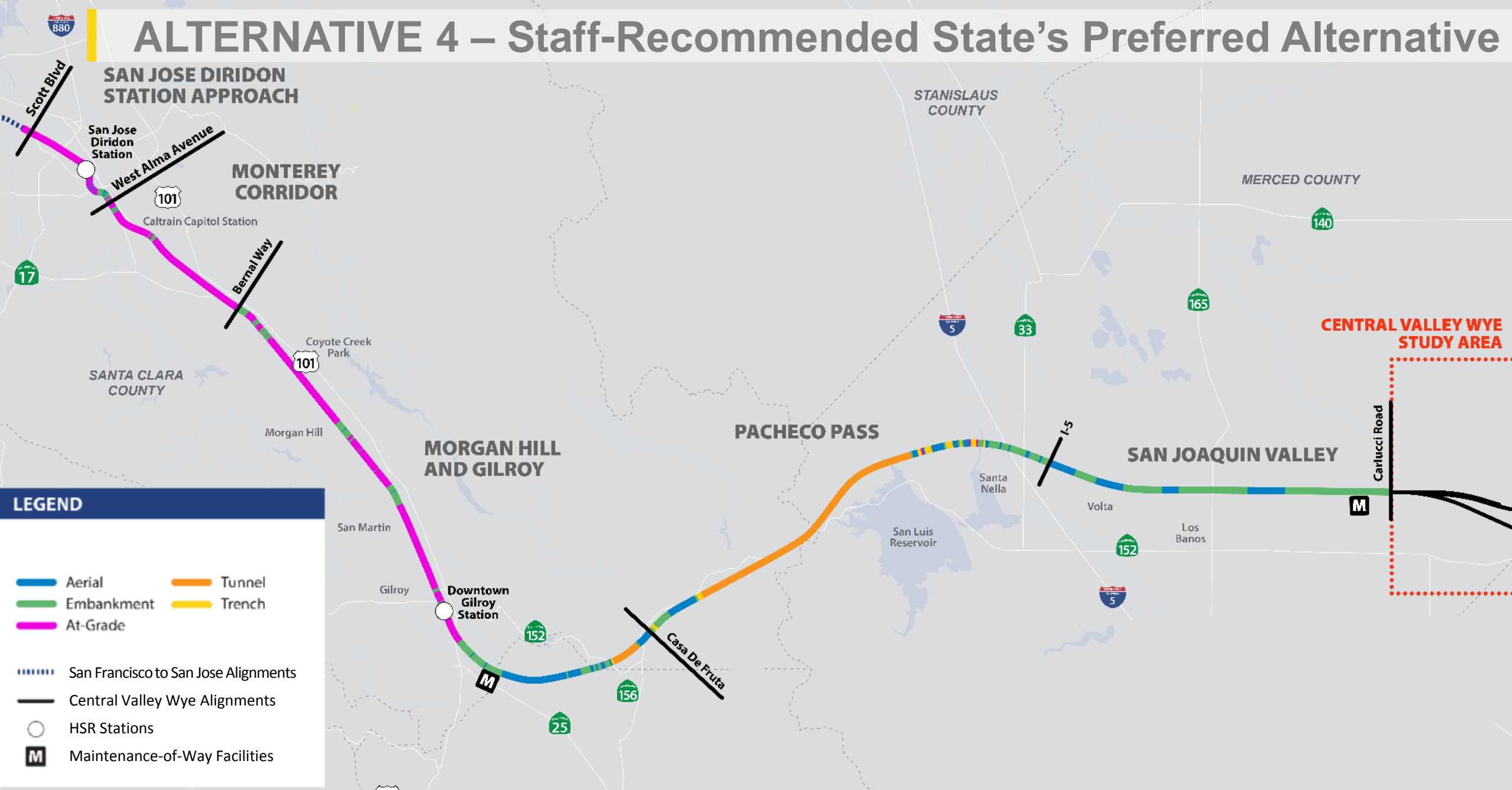
Policy-level alignment with the Caltrain Business Plan

# **SAN JOSE TO MERCED PROJECT SECTION**

## **IDENTIFYING A PREFERRED ALTERNATIVE**



# ALTERNATIVE 4 – Staff-Recommended State’s Preferred Alternative



**LEGEND**

- Aerial
- Embankment
- At-Grade
- Tunnel
- Trench
- San Francisco to San Jose Alignments
- Central Valley Wye Alignments
- HSR Stations
- M Maintenance-of-Way Facilities

# STATE'S PREFERRED ALTERNATIVE CRITERIA

## System Performance, Operations, & Costs

- Alignment Length
- Operational Speed
- Proximity to Transit Corridors
- Travel Time
- Capital Costs
- Operations & Maintenance Costs



## Environmental Factors

- Biological Resources and Wetlands and Other Waters of the U.S.
- Parks and Recreation Areas
- Built Environment Historic Resources

## Community Factors

- Displacements
- Agricultural Lands
- Aesthetics and Visual Quality
- Land Use and Development
- Noise
- Traffic
- Emergency Vehicle Access/Response Time



# ALTERNATIVE 4 – Staff-Recommended State’s Preferred Alternative

## Conclusions of Technical Analysis



Fewest displacements



Fewest road closures



Fewest impacts on wetlands and habitats



Good access to transit systems and services



Fewest impacts on natural resources



Fewest visual impacts



Marginal increase in system travel time



More noise (if no quiet zones)



Lowest capital cost

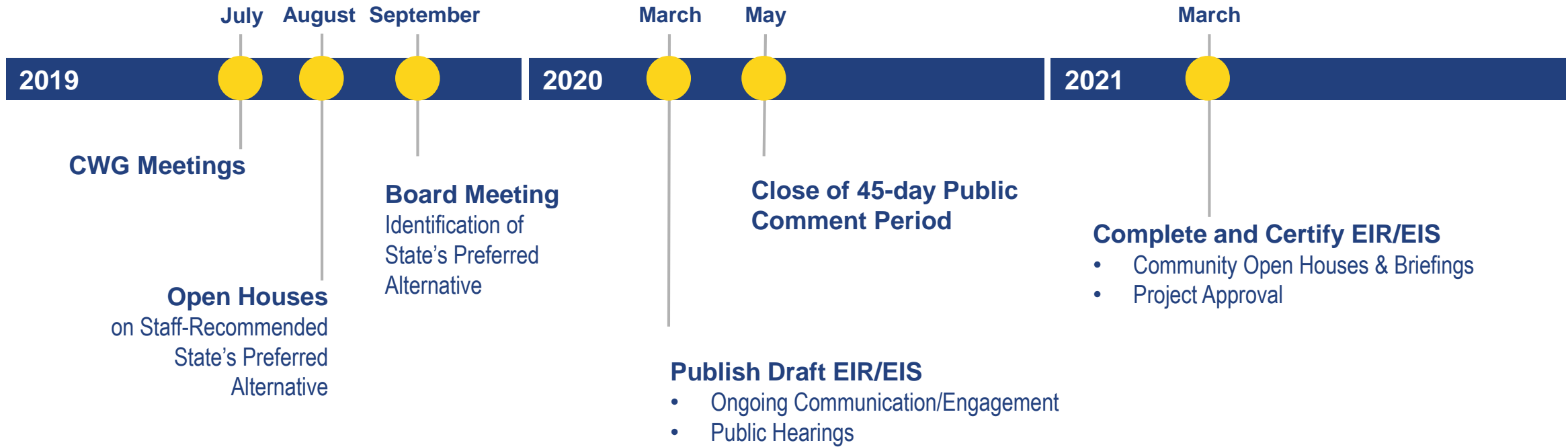


Allows for extension of electrified Caltrain service to Gilroy

# NEXT STEPS



# NEXT STEPS



# UPCOMING MEETINGS

## Community Working Groups

### Morgan Hill-Gilroy CWG

July 10, 6:00 – 8:00 pm

Morgan Hill Community and Cultural Center

Morgan Hill, CA

### San Jose CWG

July 16, 6:00 – 8:00 pm

Leininger Center

San Jose, CA

### San Francisco CWG

July 22, 6:00 – 8:00 pm

Bay Area Metro Center

San Francisco, CA

### San Mateo County CWG

July 24, 6:00 – 8:00 pm

Burlingame Library

Burlingame, CA

## Open Houses

### South Peninsula Open House

August 6, 5:00 to 8:00 p.m.

Adrian Wilcox High School

Santa Clara, CA

### San Francisco Open House

August 12, 5:00 to 8:00 p.m.

Bay Area Metro Center

San Francisco, CA

### San Mateo Open House

August 19, 5:00 to 8:00 p.m.

Sequoia High School

Redwood City, CA

### Gilroy Open House

August 8, 5:00 to 8:00 p.m.

Gilroy Portuguese Hall

Gilroy, CA

### San Jose Open House

August 15, 5:00 to 8:00 p.m.

City Hall Council Chambers

San Jose, CA

*\*Hosted by Sen. Beall*

### Los Banos Open House

August 21, 5:00 to 8:00 p.m.

Los Banos Community Center

Los Banos, CA



# REQUEST FOR COMMUNITY FEEDBACK

CALIFORNIA HIGH-SPEED RAIL

*Please share the information presented today with your communities and give us your feedback.*

- Comments will be accepted through **August 22, 2019** to be included in the staff report to the Authority Board.
- Comments can be submitted via email to [San.Francisco\\_San.Jose@hsr.ca.gov](mailto:San.Francisco_San.Jose@hsr.ca.gov) or via mail to: Northern California Regional Office  
California High-Speed Rail Authority  
100 Paseo De San Antonio, Suite 300  
San Jose, CA 95113

OR

- Share feedback in person at an upcoming Open House or at the **Authority Board meeting on September 17 in San Jose, CA.**

# THANK YOU



## Headquarters

California High-Speed Rail Authority

770 L Street, Suite 620

Sacramento, CA 95814

[www.hsr.ca.gov](http://www.hsr.ca.gov)



## Northern California Regional Office

California High-Speed Rail Authority

100 Paseo De San Antonio, Suite 300

San Jose, CA 95113



# APPENDIX A – TECHNICAL ANALYSIS

## SAN FRANCISCO TO SAN JOSE PROJECT SECTION



# SYSTEM PERFORMANCE, OPERATIONS AND COSTS<sup>1</sup>



**Bold text** in tables indicates best-performing alternative(s).

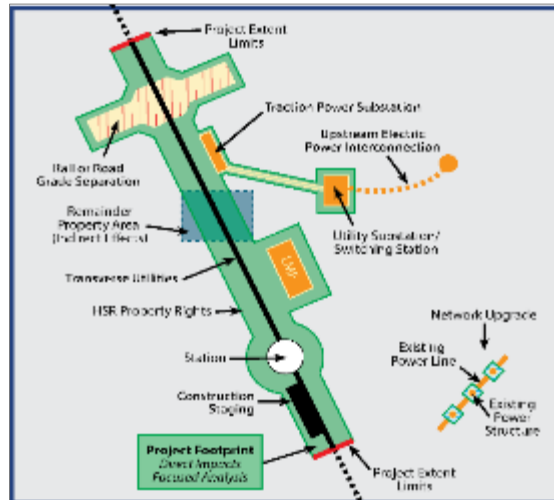
CRITERIA	ALT A	ALT B
Alignment length (miles)	42.9	
Maximum Operating Speed (mph)	Up to 110	
HSR Peak Hour Average Representative Travel Time San Francisco to San Jose (minutes)	47	<b>45</b>
Proposition 1A Service Travel Time Compliance	✓	✓
Estimated Capital Costs (2017\$)	<b>\$2.6 billion</b>	\$3.5 billion
Estimated Annual Operations and Maintenance Costs (2017\$)	\$78 million	
Caltrain Peak Hour Average Representative Travel Time (minutes)	<b>63</b>	65

# DISPLACEMENTS



**Bold text** in tables indicates best-performing alternative(s).

CRITERIA	ALT A	ALT B
Residential displacements (number of units)	<b>10</b>	19
Commercial and industrial displacements (# of businesses)	<b>29</b>	108
(square feet)	<b>211,261</b>	466,084
Community and public facilities displacement (number of units)	<b>2</b>	4



HSR Temporary and permanent footprint

Example: overlay of footprint in urban area



# AESTHETICS AND VISUAL QUALITY



**Bold text** in tables indicates best-performing alternative(s).

CRITERION	ALT A	ALT B
Number of key viewpoints with decreased visual quality	<b>3</b>	5












# LAND USE AND DEVELOPMENT



- Both alternatives potentially reduce available land for development at Brisbane Baylands
- Alternative B would convert 8 acres of land at Icehouse Hill and area containing endangered butterfly habitat that is designated for open space conservation

## LEGEND

	Permanent Project Footprint		
<b>Land Use</b>			
	Residential		Heavy Commercial
	Commercial		Public Facilities
	Mixed Use		Planned Development



**Alternative A** **M** East

Impacts 93 acres planned commercial and 2 acres planned mixed use (with residential permitted)



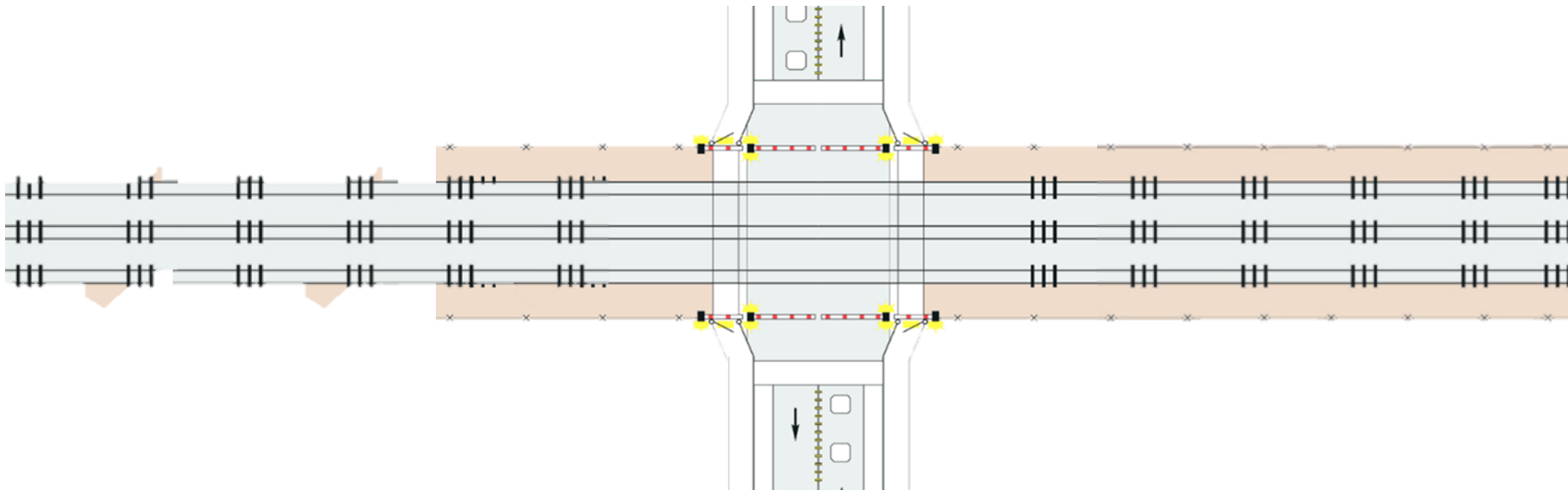
**Alternative B** **M** West

Impacts 90 acres planned commercial and 21 acres planned mixed use (with residential permitted)



**Bold text** in tables indicates best-performing alternative(s).

CRITERIA	ALT A	ALT B
Temporary interference with local vehicle circulation	<b>No Change</b>	Along El Camino Real during passing track construction
Pedestrian Access from Downtown San Carlos to Caltrain Station	<b>No Change</b>	Reduced pedestrian access due to the relocation of the station 2,260 feet south of current location





# EMERGENCY VEHICLE ACCESS/RESPONSE TIME



**Bold text** in tables indicates best-performing alternative.

CRITERION	ALT A	ALT B
Temporary increases in emergency vehicle access/response time in south San Mateo, Belmont, San Carlos, and northern Redwood City due to short-term road closures and construction traffic associated with passing track construction	<b>None</b>	Yes

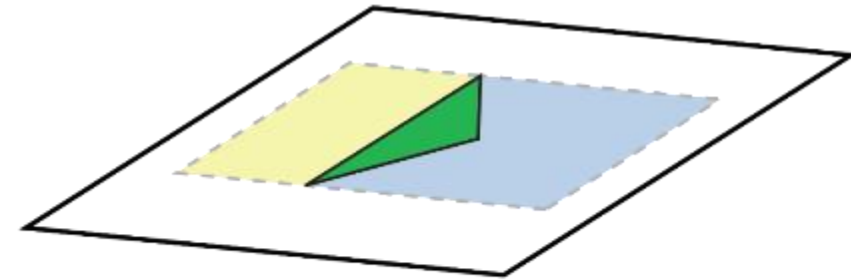


# ENVIRONMENTAL JUSTICE

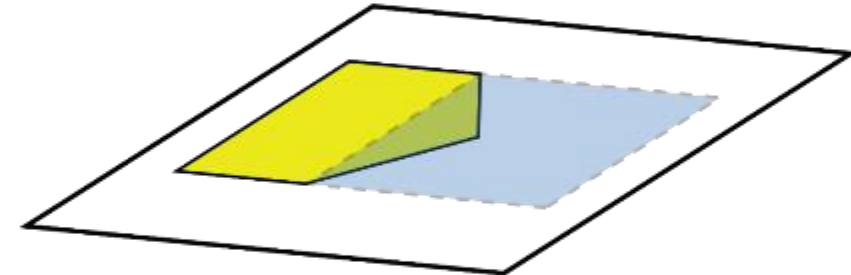


**Bold text** in tables indicates best-performing alternative(s).

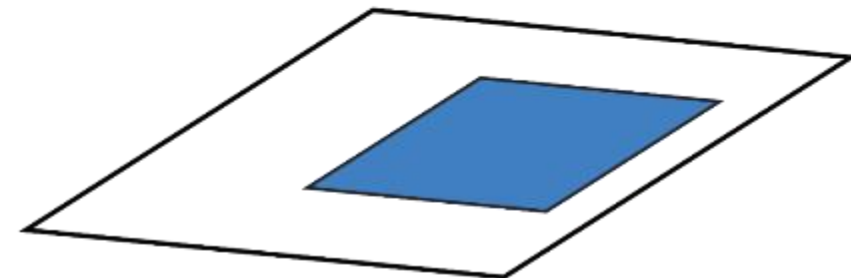
CRITERIA	ALT A	ALT B
Construction-related disruption to Caltrain Service	<b>Less than Alt. B due to no passing track construction</b>	More than Alt. A due to passing track construction
Permanent Effect on Planned Mixed Use Development (residential uses allowed) in Brisbane (acres)	<b>2</b>	21



EJ Populations + Impacts



EJ Populations



Adverse & Beneficial Impacts

# BIOLOGICAL AND AQUATIC RESOURCES

**Bold text** in tables indicates best-performing alternative(s).

CRITERIA	ALT A	ALT B
Total permanent impacts on wetlands and other waters of the U.S. (acres)	<b>8.8</b>	12.8
Permanent Impacts on endangered callippe silverspot butterfly habitat (acres)	<b>0.0</b>	8.0



# SUMMARY OF ALTERNATIVES EVALUATION – SYSTEM PERFORMANCE, OPERATIONS, AND COST FACTORS

CRITERIA	ALT A	ALT B
Alignment length (miles)	No Difference	
Maximum Operating Speed (mph)	No Difference	
HSR Peak Hour Average Representative Travel Time San Francisco to San Jose (minutes)		●
Proposition 1A Service Travel Time Compliance	✓	✓
Estimated Capital Costs (2017\$)	●	
Estimated Annual Operations and Maintenance Costs (2017\$)	No Difference	
Caltrain Peak Hour Average Representative Travel Time (minutes)	●	

● = Best-performing alternative



# SUMMARY OF ALTERNATIVES EVALUATION – COMMUNITY FACTORS

CRITERIA	ALT A	ALT B
Residential displacements	●	
Commercial and industrial displacements	●	
Community and public facilities displacement	●	
Number of key viewpoints with decreased visual quality	●	
Temporary interference with local vehicle circulation	●	
Pedestrian Access from Downtown San Carlos to Caltrain Station	●	
Temporary increases emergency response time in south San Mateo, Belmont, San Carlos, and northern Redwood City due to short-term road closures	●	
Environmental Justice: Construction-related disruption to Caltrain Service	●	
Environmental Justice: Permanent Effect on Planned Mixed Use Development (residential uses allowed) in Brisbane	●	

● = Best-performing alternative (fewest/least community impacts)

# SUMMARY OF ALTERNATIVES EVALUATION – ENVIRONMENTAL FACTORS

CRITERIA	ALT A	ALT B
Total permanent impacts on wetlands and other waters of the U.S.	●	
Permanent Impacts on endangered callippe silverspot butterfly habitat	●	



● = Best-performing alternative (fewest environmental impacts)

# CALTRAIN BUSINESS PLAN

2040 Baseline Growth Scenario

## 2040 Baseline Growth Scenario (6 Caltrain + 4 HSR)



### Features

- Blended service with up to 10 TPH north of Tamien (6 Caltrain + 4 HSR) and up to 10 TPH south of Tamien (2 Caltrain + 8 HSR)
- Three skip stop patterns with 2 TPH – most stations are served by 2 or 4 TPH, with a few receiving 6 TPH
- Some origin-destination pairs are not served at all

### Passing Track Needs

- Less than 1 mile of new passing tracks at Millbrae associated with HSR station plus use of existing passing tracks at Bayshore and Lawrence

### Options & Considerations

- Service approach is consistent with PCEP and HSR EIRs
- Opportunity to consider alternative service approaches later in Business Plan process



DRAFT



# Appendix B – Supplemental

## SAN FRANCISCO TO SAN JOSE PROJECT SECTION





# INTERFACING WITH NORTHERN CALIFORNIA AGENCIES

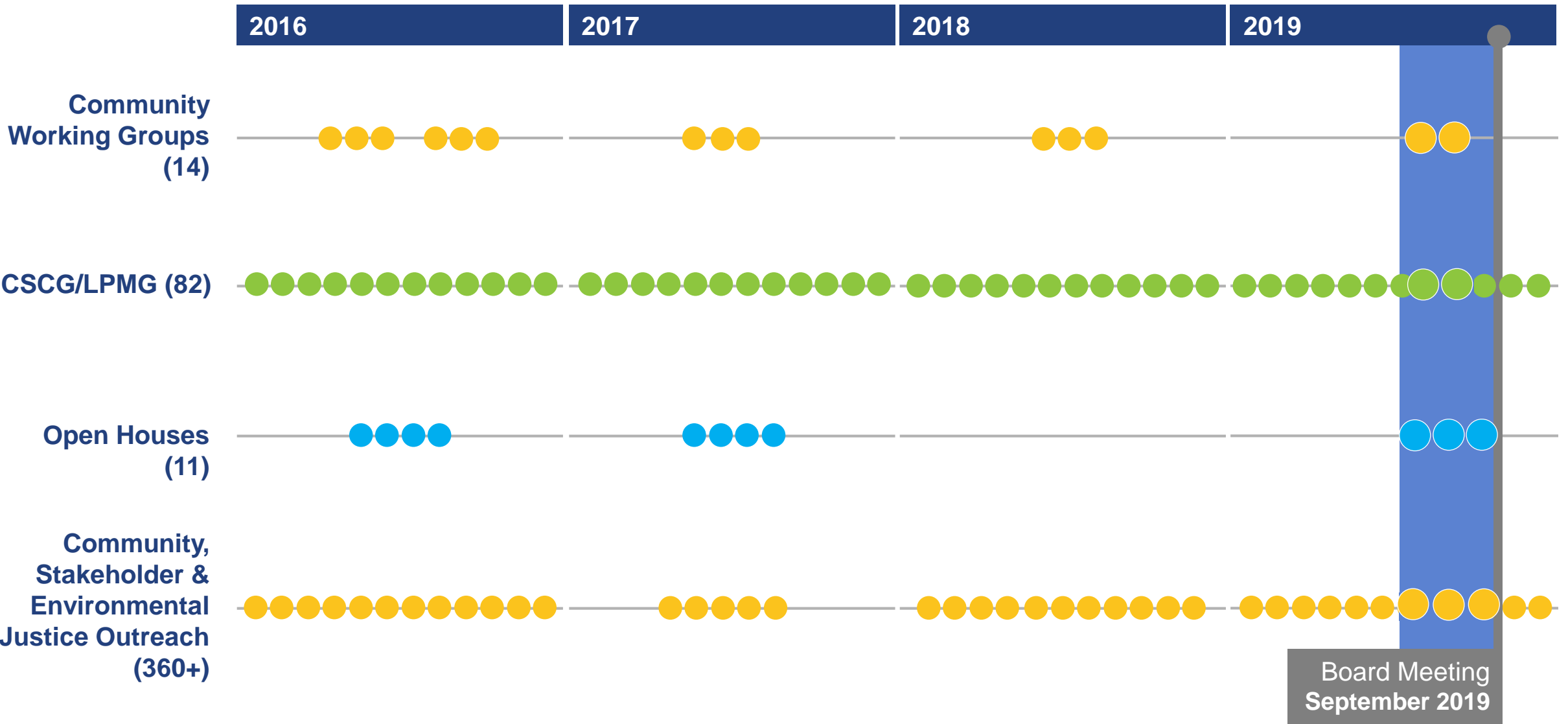
Topics covered in 2018 - 2019

	ALIGNMENTS	WATER MANAGEMENT	TRANSPORTATION/ ROADS	ENGINEERING/ DESIGN	LAND USE	JOINT OUTREACH	2018 BUSINESS PLAN
Bay Area Rapid Transit	●		●	●			●
California Strategic Growth Council	●			●	●		●
Caltrain	●			●		●	●
Caltrans District 4	●		●				●
City and County Staff (throughout corridor)	●	●	●	●	●	●	●
Floodplain Administrators and Managers	●	●		●			●
Metropolitan Transportation Commission	●				●		●
Mineta San Jose International Airport	●		●				●
San Francisco Bay Conservation and Development Commission	●				●		●
San Francisco International Airport	●			●	●		●
Santa Clara Valley Transportation Authority	●				●	●	●
Transbay Joint Powers Authority	●		●	●			●



# SAN FRANCISCO TO SAN JOSE COMMUNITY OUTREACH

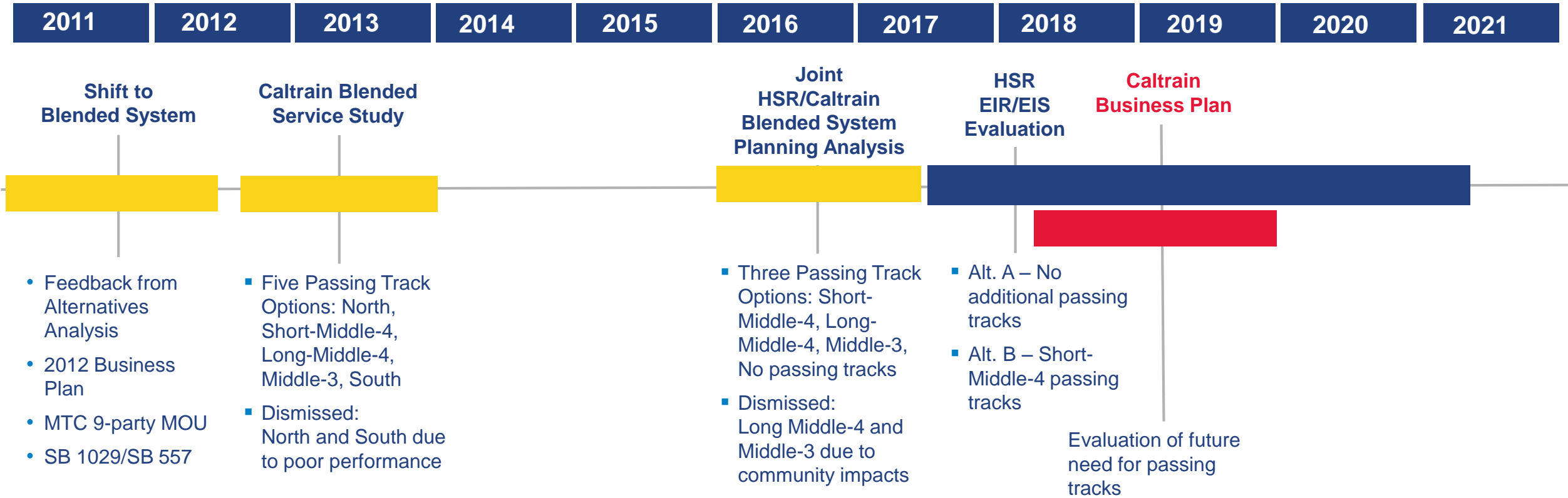
2016 – 2019



Board Meeting  
September 2019



# PASSING TRACKS EVALUATION TIMELINE



# PASSING TRACKS

## Alternatives Eliminated

- **Long Middle 3-Track Passing Track Option (16 miles)**

- » San Mateo to Palo Alto
- » Greatest community impacts and costs
- » Impacts 16 at-grade crossings
- » Adjacent to 8.3 miles of residential uses

- **Long Middle 4-Track Passing Track Option (8 miles)**

- » San Mateo to Southern Redwood City
- » Moderate community impacts and costs
- » Impacts 6 at-grade crossings
- » Adjacent to 2.3 miles of residential uses

*Note: "Middle" means middle of the corridor*





# PASSING TRACKS

## Alternatives Carried Forward

- **Alternative A: No Additional Passing Track Option**
- **Alternative B: Short-Middle 4-Track Passing Track Option (6 miles)**
  - » San Mateo to Redwood City
  - » Adjacent to 1.8 miles of residential uses
  - » Relocates San Carlos Caltrain station



*Note: "Middle" means middle of the corridor*



# LIGHT MAINTENANCE FACILITY

## Alternatives Eliminated

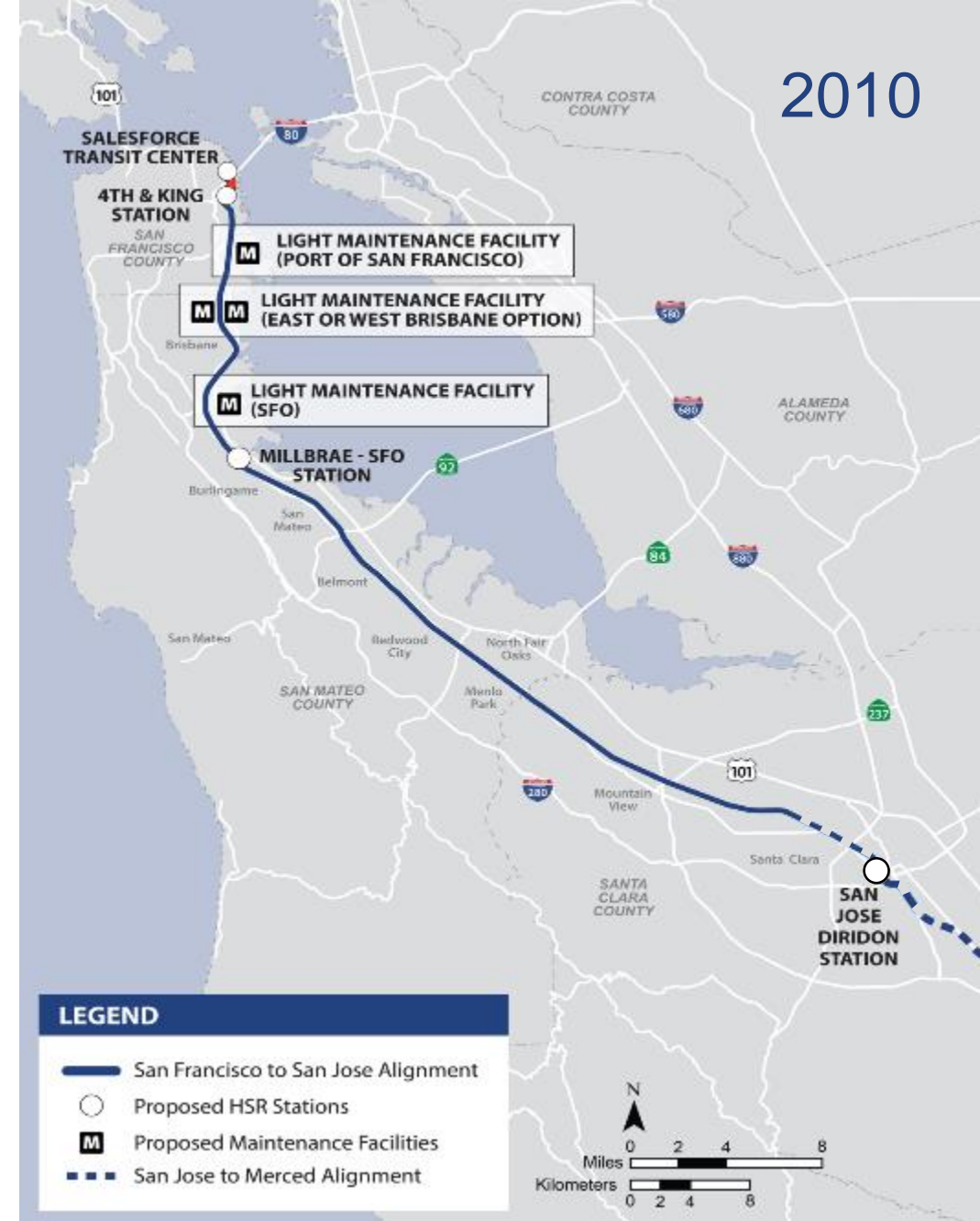
- **Port of San Francisco**

- » Regionally and locally important infrastructure
- » Permanent disruption to major circulation elements
- » Displaces Marine Eco-Industrial Center planned uses
- » More wetland/water impacts than Brisbane East LMF
- » Substantially higher costs than Brisbane LMF options

- **San Francisco International Airport**

- » Regionally important facility
- » Displaces airport operational land uses
- » Airport constrained from expansion by San Francisco Resolution 69.08
- » More wetland/water impacts than Brisbane East LMF
- » Substantially higher costs than Brisbane LMF options

2010



# Appendix C – TECHNICAL ANALYSIS

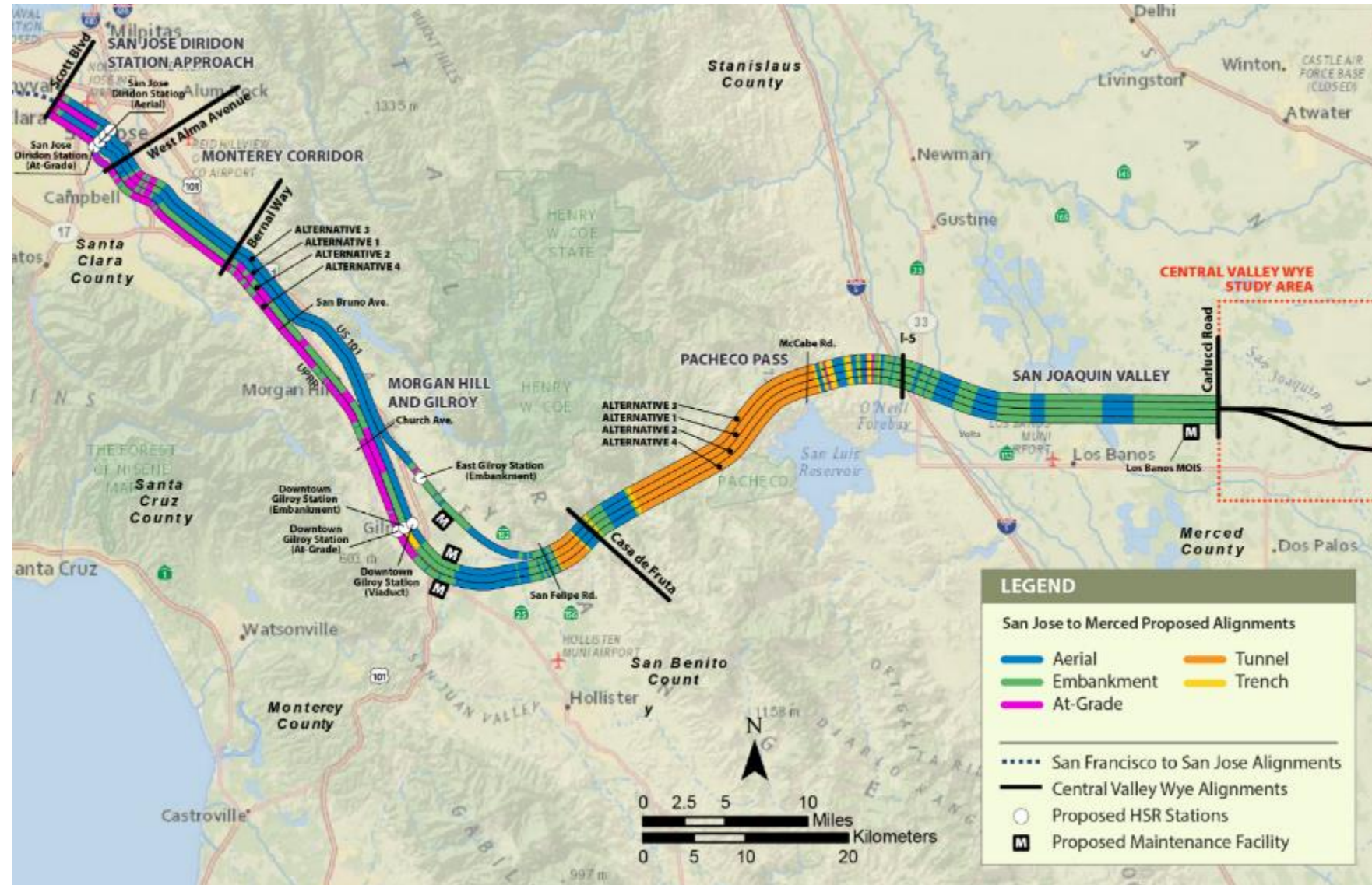
## SAN JOSE TO MERCED PROJECT SECTION





# SAN JOSE TO MERCED RANGE OF ALTERNATIVES

- San Jose to Merced Project Section
- 4 end-to-end alternatives
- Some alternatives are the same for a part of the route



# SUMMARY OF ALTERNATIVES EVALUATION – SYSTEM PERFORMANCE, OPERATIONS, & COSTS

CRITERIA	ALT 1	ALT 2	ALT 3	ALT 4
Alignment length			●	
Operational Speed — San Jose to Gilroy		●		
Operational Speed — Gilroy to Central Valley Wye	<i>No difference</i>			
Proximity to existing transit corridors		●		●
Travel time — San Jose and Gilroy			●	
Proposition 1A service travel time compliance	✓	✓	✓	✓
Estimated capital costs				●
Estimated annual operations and maintenance costs	<i>No difference</i>			

● Best-performing alternative

# SUMMARY OF ALTERNATIVES EVALUATION – COMMUNITY FACTORS



CRITERIA	ALT 1	ALT 2	ALT 3	ALT 4
Residential displacements				●
Commercial displacements (#)				●
Agricultural displacements (#)				●
Community or public facilities displacements				●
Commercial displacements (square footage)	●			
Agricultural structure displacements (square footage)	●			
Permanent conversion of important farmland				●
Visual quality effects				●
Consistency with Gilroy General Plan	●	●		●
Noise impacts with noise barrier mitigation			●	

CRITERIA	ALT 1	ALT 2	ALT 3	ALT 4
Increase in 2040 peak travel time on Monterey Road (NB — AM/PM, SB — AM/PM)				●
Permanent road closures			●	●
Amount of mitigation needed to minimize emergency vehicle delays	●	●	●	
EJ proportion of total impacts on local views		●		●
EJ proportion of total residential displacements			●	●
EJ proportion of total business displacements			●	
Amount of mitigation required to address effects on emergency vehicle response times (EJ)	●		●	
EJ proportion of total noise impacts			●	

● Best-performing alternative (fewest environmental impacts)

# SUMMARY OF ALTERNATIVES EVALUATION – ENVIRONMENTAL FACTORS

CRITERIA	ALT 1	ALT 2	ALT 3	ALT 4
Waters and wetlands				●
Habitat for listed plant species				●
Habitat for listed wildlife species (California tiger salamander)				●
Wildlife corridor impacts	●	●		●
Conservation areas	●			●
Permanent use of 4(f)/6(f) park resources				●
Permanent adverse effects on NRHP-listed/eligible resources				●
Permanent significant impacts on CEQA-only historic resources			●	●

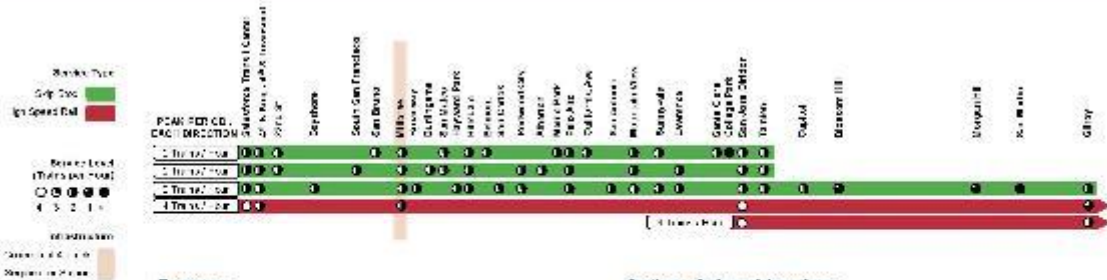
● Best-performing alternative (fewest environmental impacts)



# CALTRAIN BUSINESS PLAN

## Growth Scenarios

### 2040 Baseline Growth Scenario (6 Caltrain + 4 HSR)



#### Features

- Blended service with up to 10 TPH north of Tamien (6 Caltrain + 4 HSR) and up to 10 TPH south of Tamien (2 Caltrain + 8 HSR)
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- Some origin-destination pairs are not served at all

#### Passing Track Needs

- Less than 1 mile of new passing tracks at Milbrae associated with HSR station plus use of existing passing tracks at Bayshore and Lawrence

#### Options & Considerations

- Service approach is considered later in Business Plan

### Moderate Growth Scenario (8 Caltrain + 4 HSR)



#### Features

- A majority of stations served by 4 TPH local stop line, but Mid Peninsula stations are served with 2 TPH skip stop pattern
- Express line serving major markets – some stations receive 8 TPH
- Timed local/express transfer at Redwood City

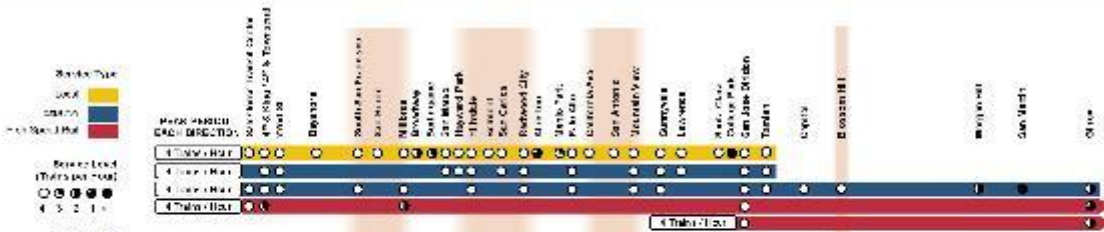
#### Passing Track Needs

- Up to 4 miles of new 4-track segments and stations: Hayward Park to Hillside, at Redwood City, and a 4-track station in northern Santa Clara county (Palo Alto, California Ave, San Antonio or

#### Options & Considerations

- To minimize passing track requirements, each local pattern can only stop twice between San Bruno and Hillside
- Each local pattern can only stop once between Hillside and Redwood City
- Atherton, College Park, and San Martin served on an hourly or exception basis

### High Growth Scenarios (12 Caltrain + 4 HSR)



#### Features

- Nearly complete local stop service – a majority of stations receiving at least 4 TPH
- Two express lines serving major markets – many stations receive 0 or 12 TPH

#### Passing Track Needs

- Requires up to 15 miles of new 4-track segments: South San Francisco to Millbrae; Hayward Park to Redwood City; and northern Santa Clara County between Palo Alto and Mountain View stations (shown: California Avenue to north of Mountain View)

#### Options & Considerations

- SFP Millbrae passing track enables second express line; this line cannot stop north of Burlingame
- Tradeoff between infrastructure and service along Mid Peninsula – some flexibility in length of passing tracks versus number and location of stops
- Flexible 5-mile passing track segment somewhere between Palo Alto and Mountain View
- Atherton, College Park, and San Martin served on an hourly or exception basis