

# Caltrain Grade Separation Feasibility Study

Railroad Crossing Community Meeting  
August 17, 2017



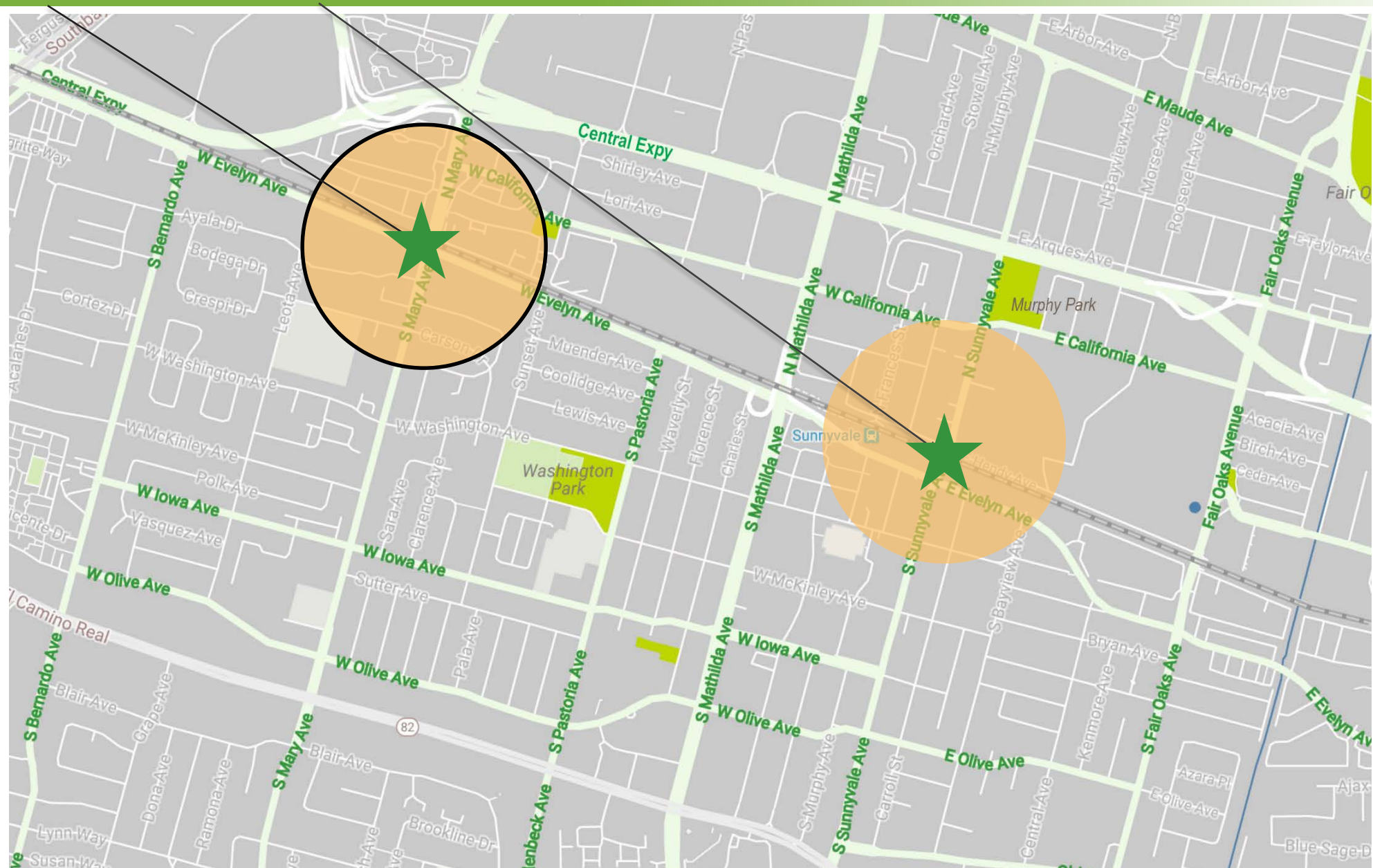
Sunnyvale

# Agenda

---

- **Presentation format**
- **Goals and context**
- **Mary Avenue options**
  - ✓ **Feedback from BPAC**
    - ❑ *How can shortlisted options work best for peds and bikes?*
- **Sunnyvale Avenue options**
  - ✓ **Feedback from BPAC**
    - ❑ *What are pros and cons of each option from a ped/bike perspective?*
    - ❑ *Which alternatives are best for peds and bikes?*
    - ❑ *Input on the ped/bike undercrossing variants.*
- **Q and A**
- **Next steps**

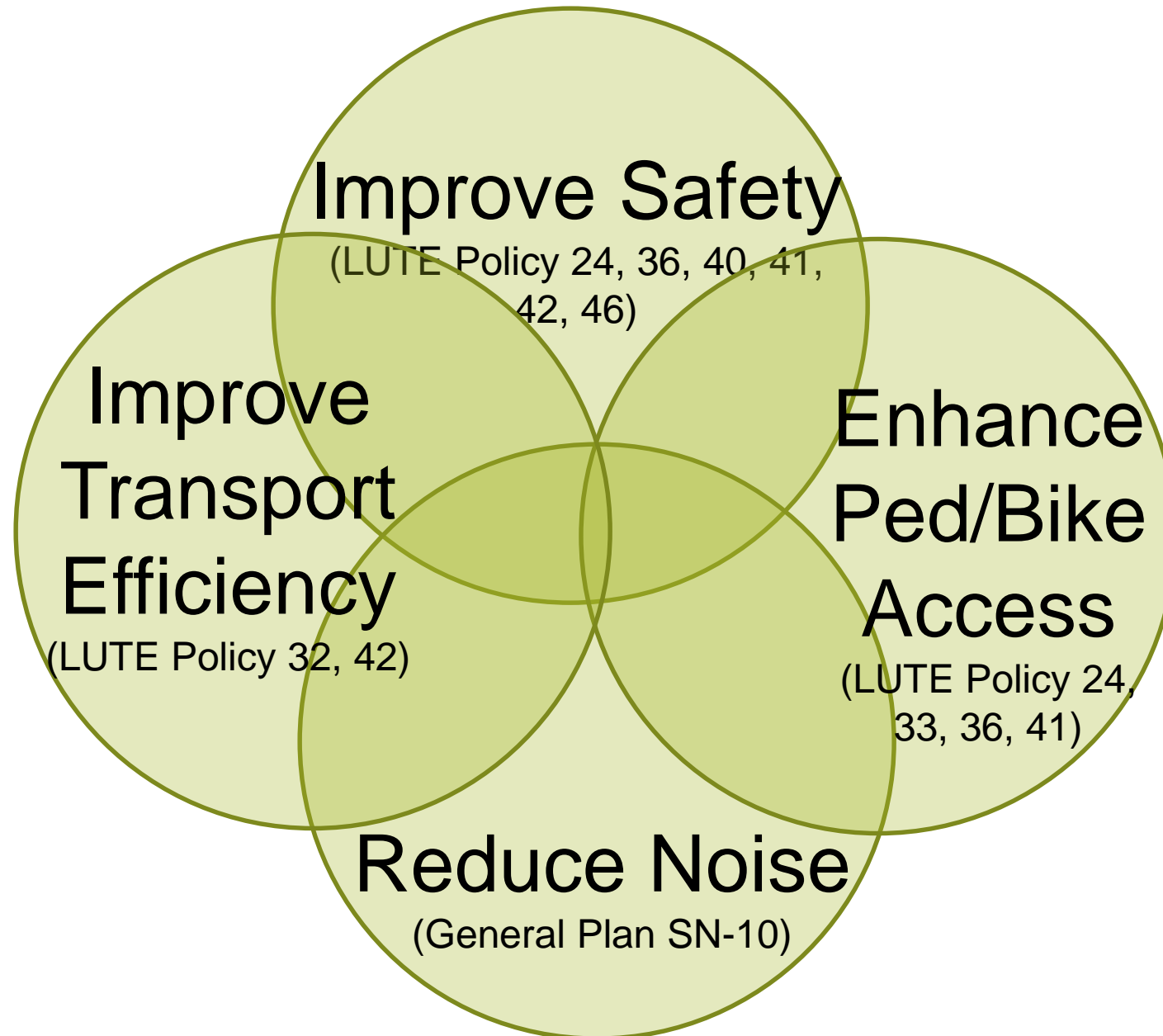
# Caltrain Grade Separations





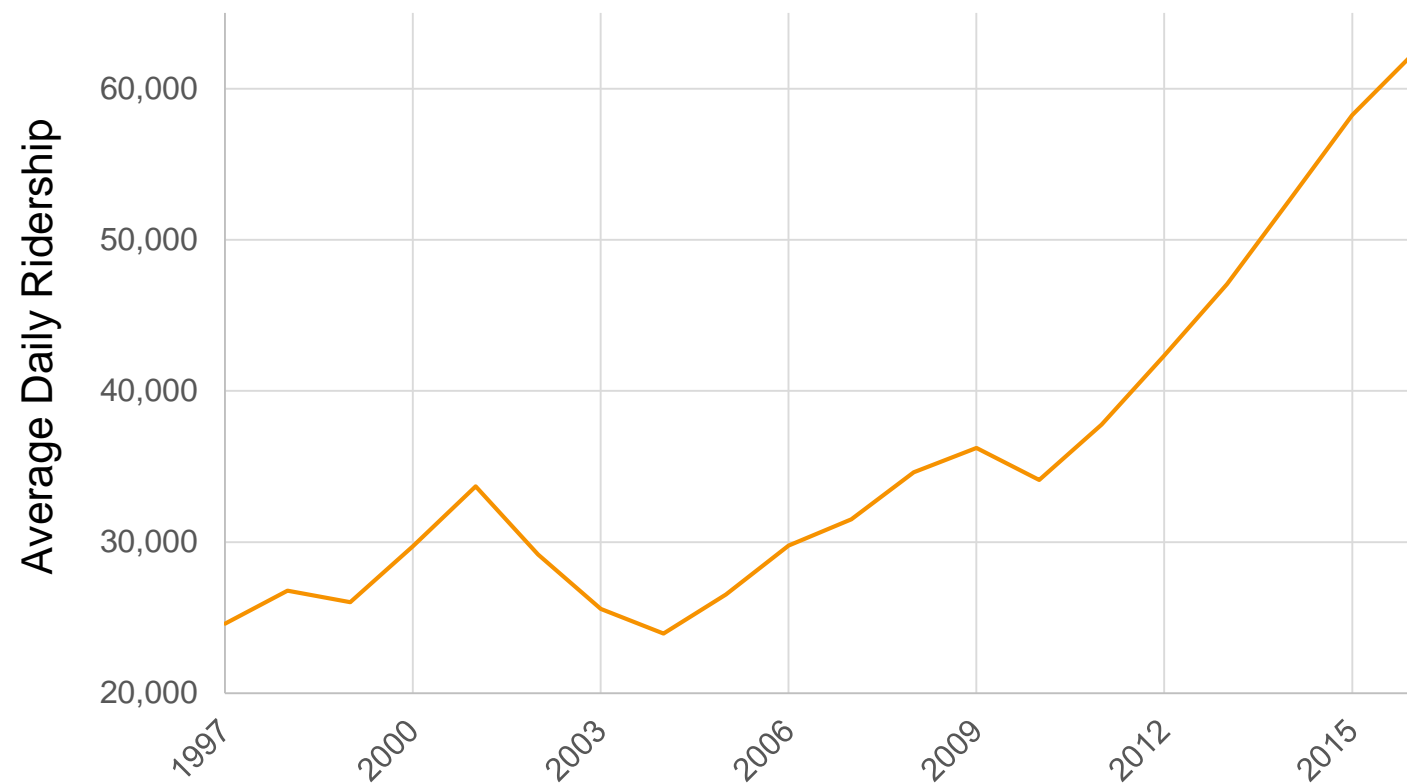
# Project Goals

---





# Project Context



76 trains  
(2003)

92 trains  
(2016)

114 trains  
+80-106 HSR  
(2040)

# Caltrain Grade Separation – VTA Program Description

- \$700 Million
- Projects in cities of:
  - Sunnyvale
  - Mountain View
  - Palo Alto
- Increase safety for
  - Drivers
  - Bicyclists
  - Pedestrians
- Reduce congestion at crossings intersections



**Sunnyvale has 2 of the 8 at grade crossings**

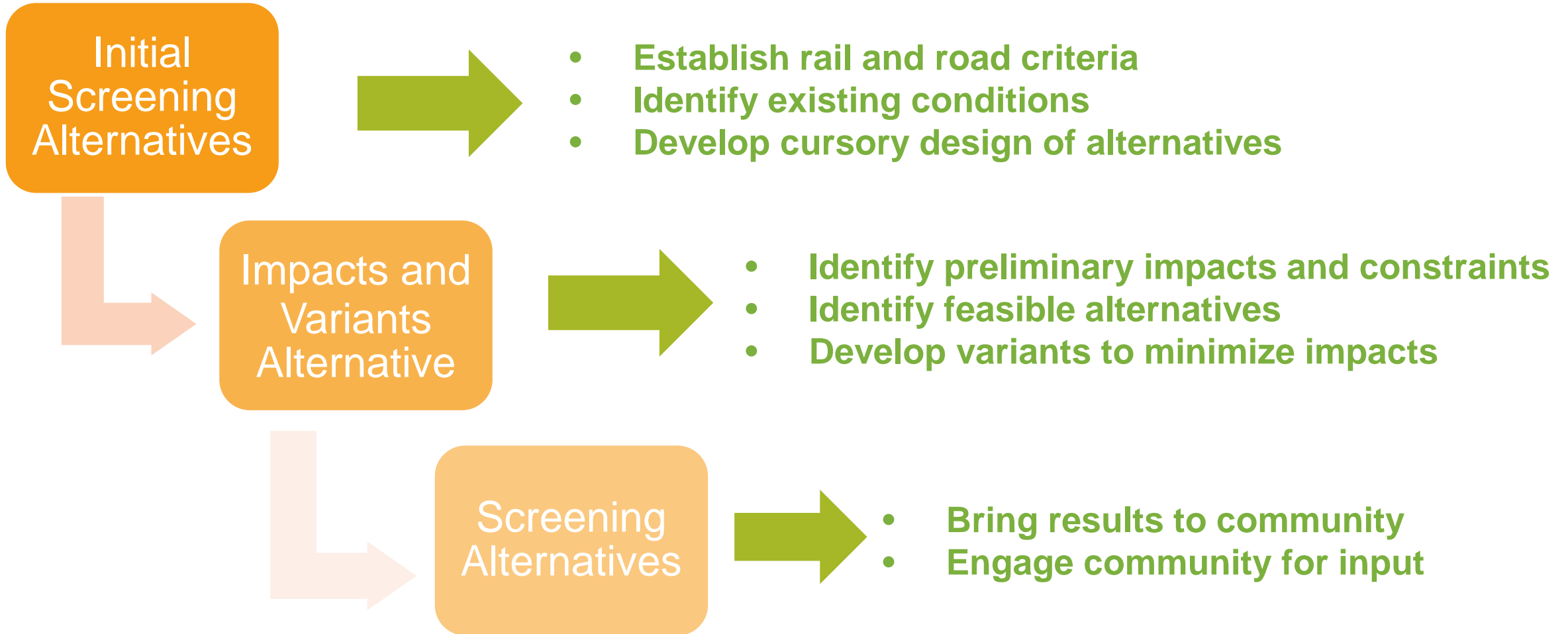
*Solutions that move you*

13

**VTA criteria include cost efficiency and Complete Streets**

# Screening Alternatives

---

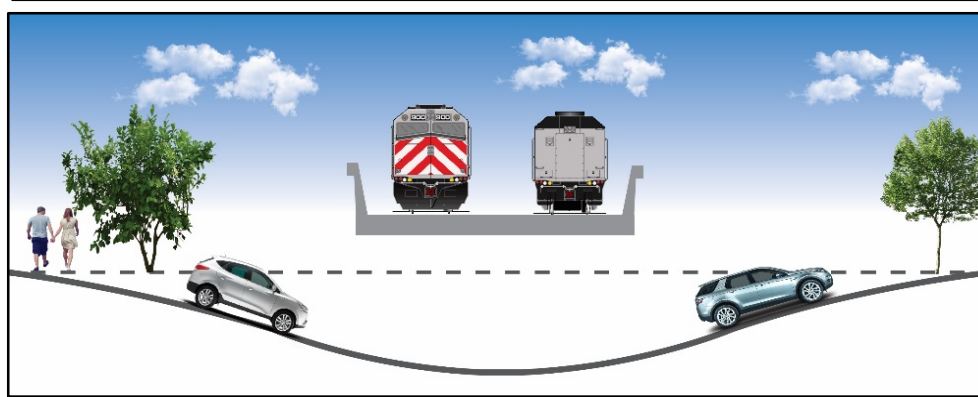
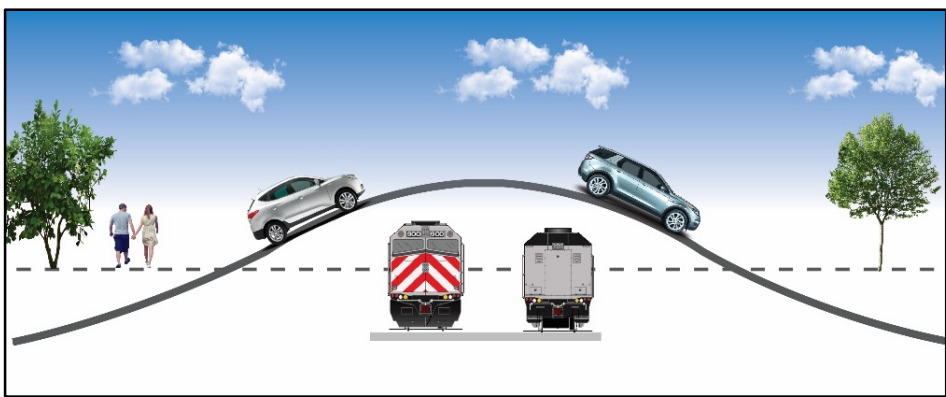
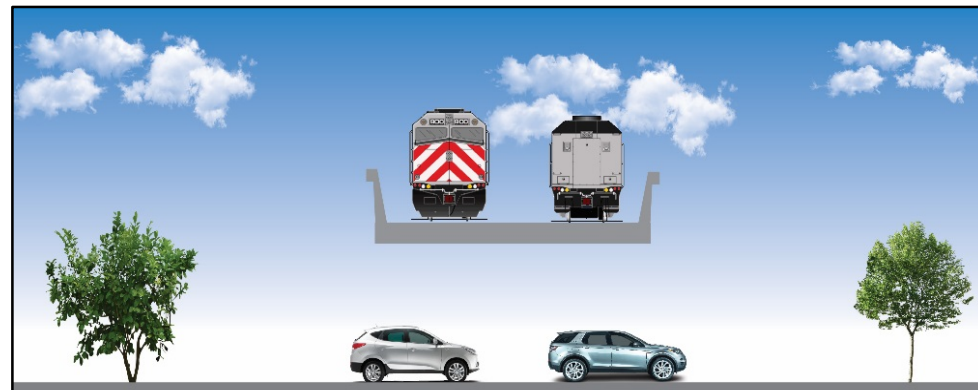
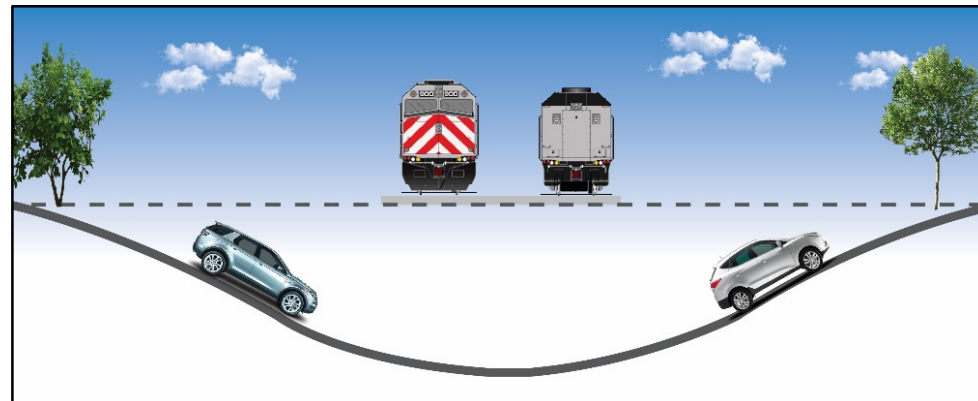
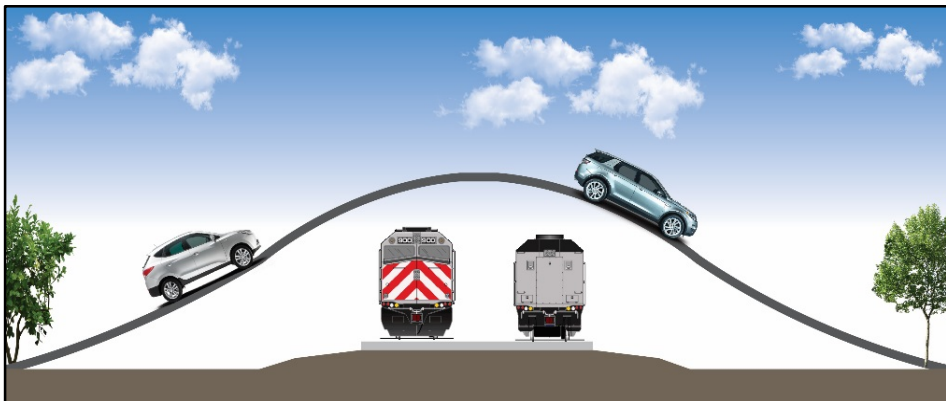




# Design Criteria

	Roadway	Railroad
Grades	4.75%	1.2% max
Design speed	30 - 45 mph  Based on posted speed plus 5 mph	79 mph for shoofly (temp rail)  110 mph for final condition
Bridge depth	5' Supporting roadway	6.75' Supporting railroad
Vertical clearance	Underpass  15.5' over roadway Roadway lowered 22'	Overpass  27' over railroad Roadway 32' above ground

# Initial Screening Alternatives



# Screening Criteria

---

<b>Screening Considerations</b>
<b>Safety</b>
<b>Multi-modal accessibility</b>
<b>Right of Way impacts</b>
<b>Utility impacts</b>
<b>Traffic circulation</b>
<b>Visual and character impacts</b>
<b>Environmental compliance (noise, air, visual)</b>
<b>Construction feasibility</b>
<b>Engineering feasibility</b>
<b>Cost</b>
<b>Fundability</b>
<b>Community support</b>



# Grade Separated Crossing - Overpass

BEFORE



AFTER



# Grade Separated Crossing - Underpass

BEFORE



AFTER



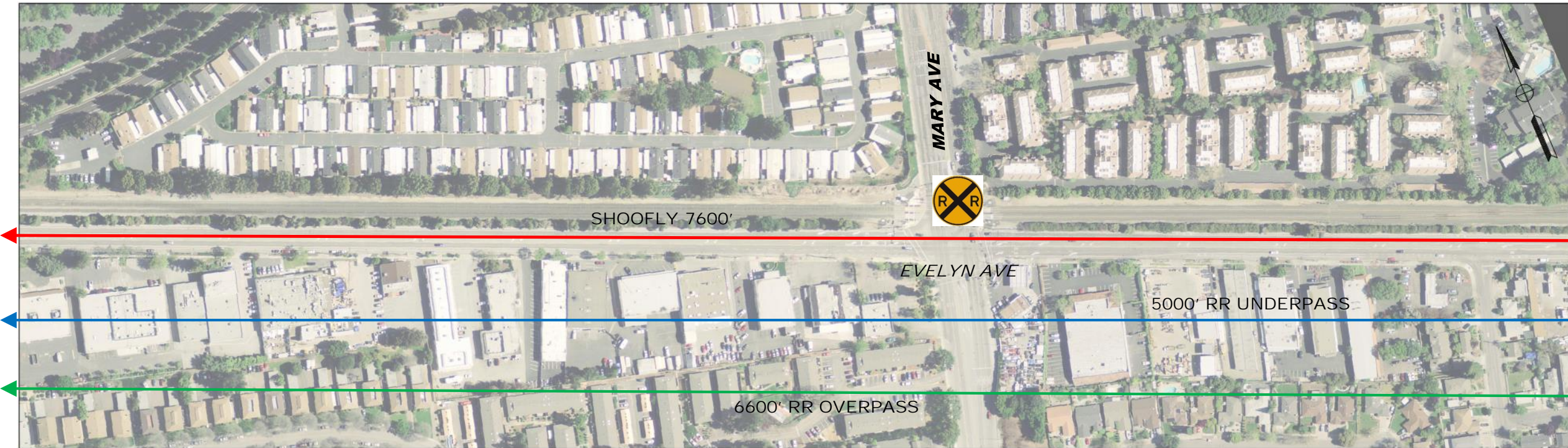


# Mary Avenue

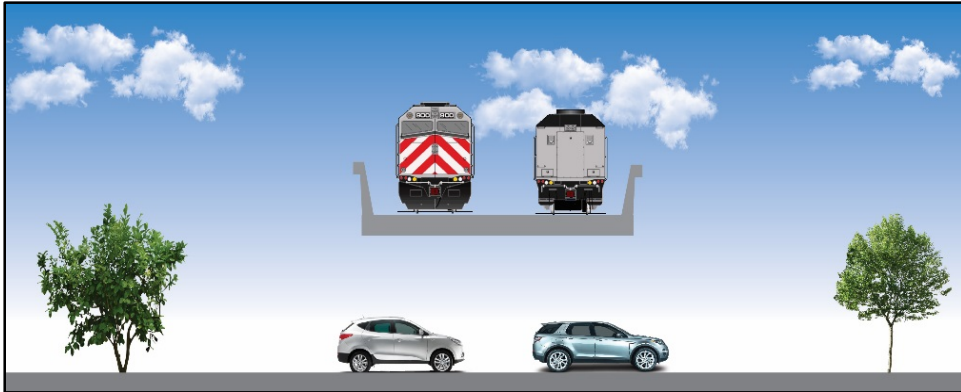




# Magnitude of Rail Impacts at Mary Avenue



# Eliminated Mary Avenue Alternatives



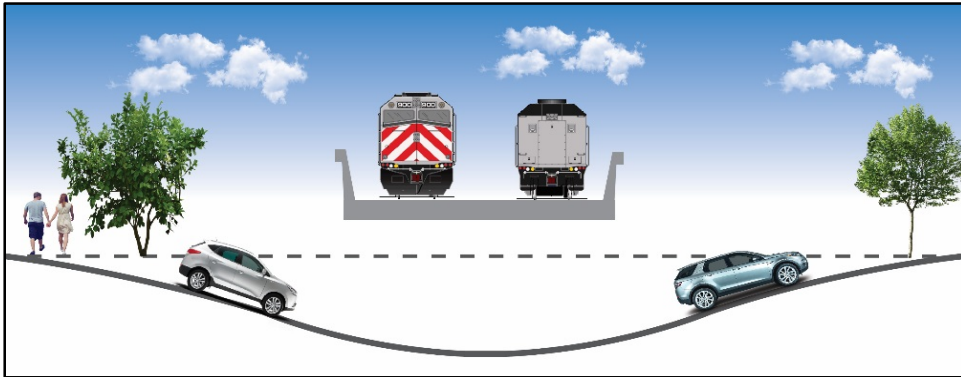
## Rail Overpass

Visual impacts along residences

Roadway / parcel impact with shoofly

Significant rail effect

\$\$\$\$ (Construction)



## Rail Split Overpass

Visual impacts along residences

Roadway / parcel impact with shoofly

Significant rail effect

\$\$\$\$\$ \$\$\$\$\$ (Construction)



## Rail Underpass

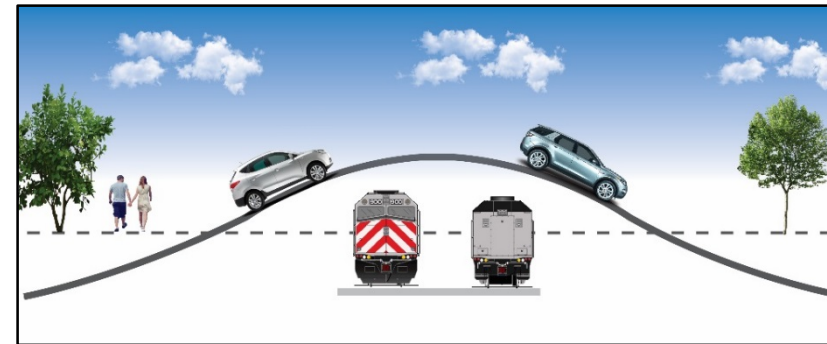
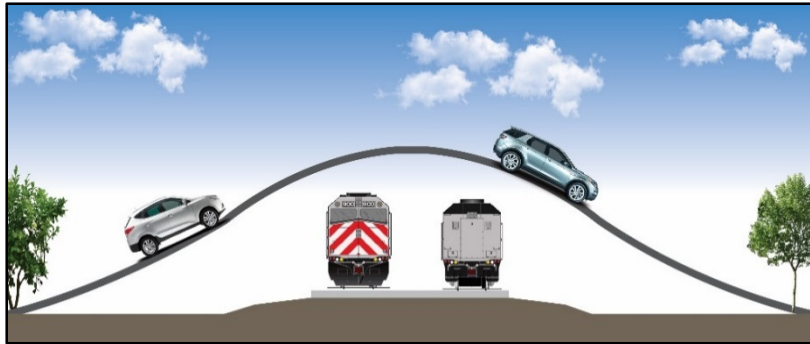
Roadway / parcel impact with shoofly

Significant rail effect

\$\$\$\$\$ \$ (Construction)



# Eliminated Mary Avenue Alternatives



## Roadway Overpass

12+ parcels to be acquired

Visual impacts along residences

No rail effect

\$\$\$ (Construction)

## Roadway Split Overpass

1+ parcels to be acquired

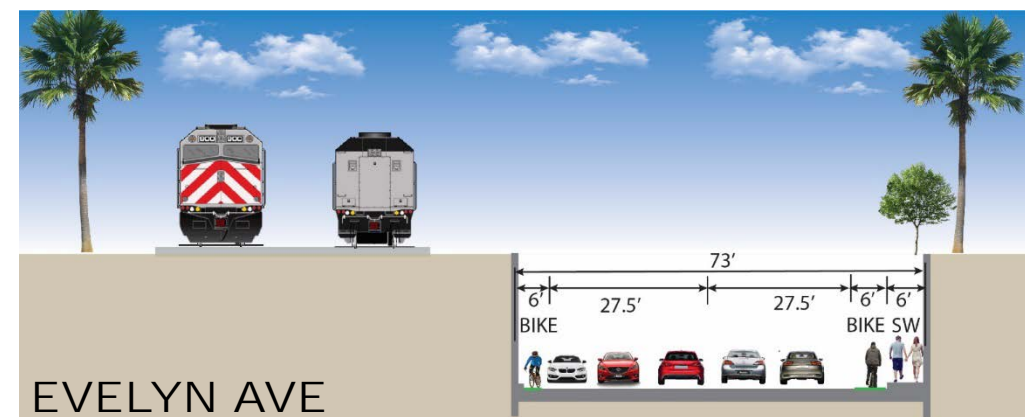
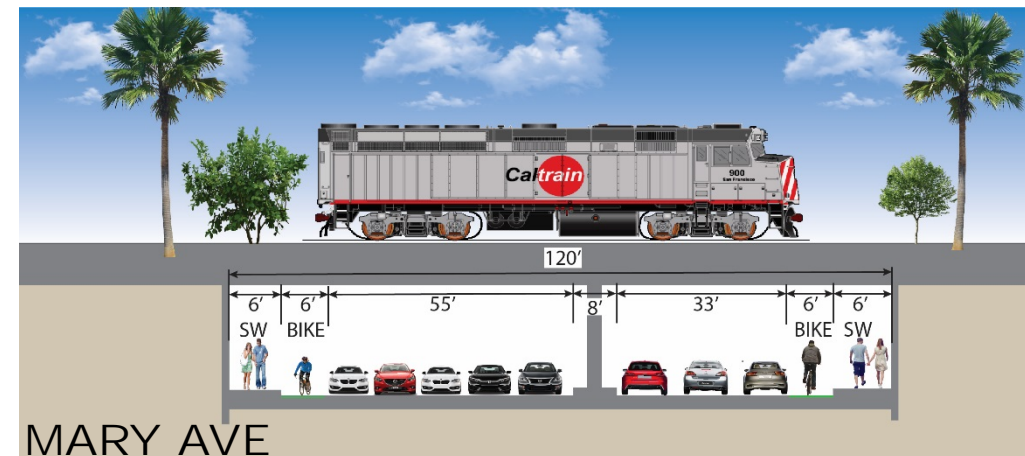
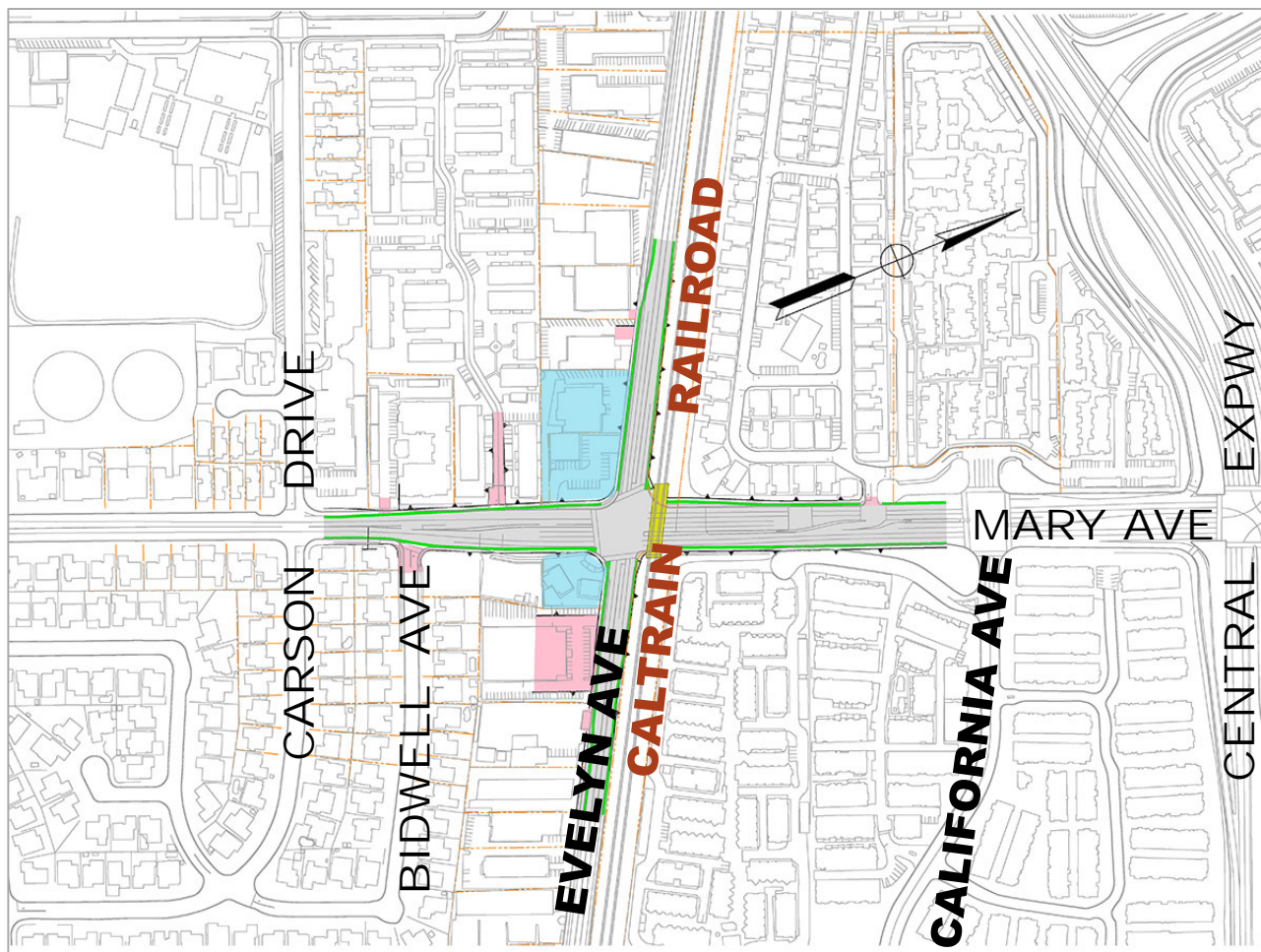
Visual impacts along residences

Significant rail effect

\$\$\$\$\$ (Construction)



# Mary Avenue Underpass



**Mary Ave depressed**

Potential acquisition of 3+ parcels

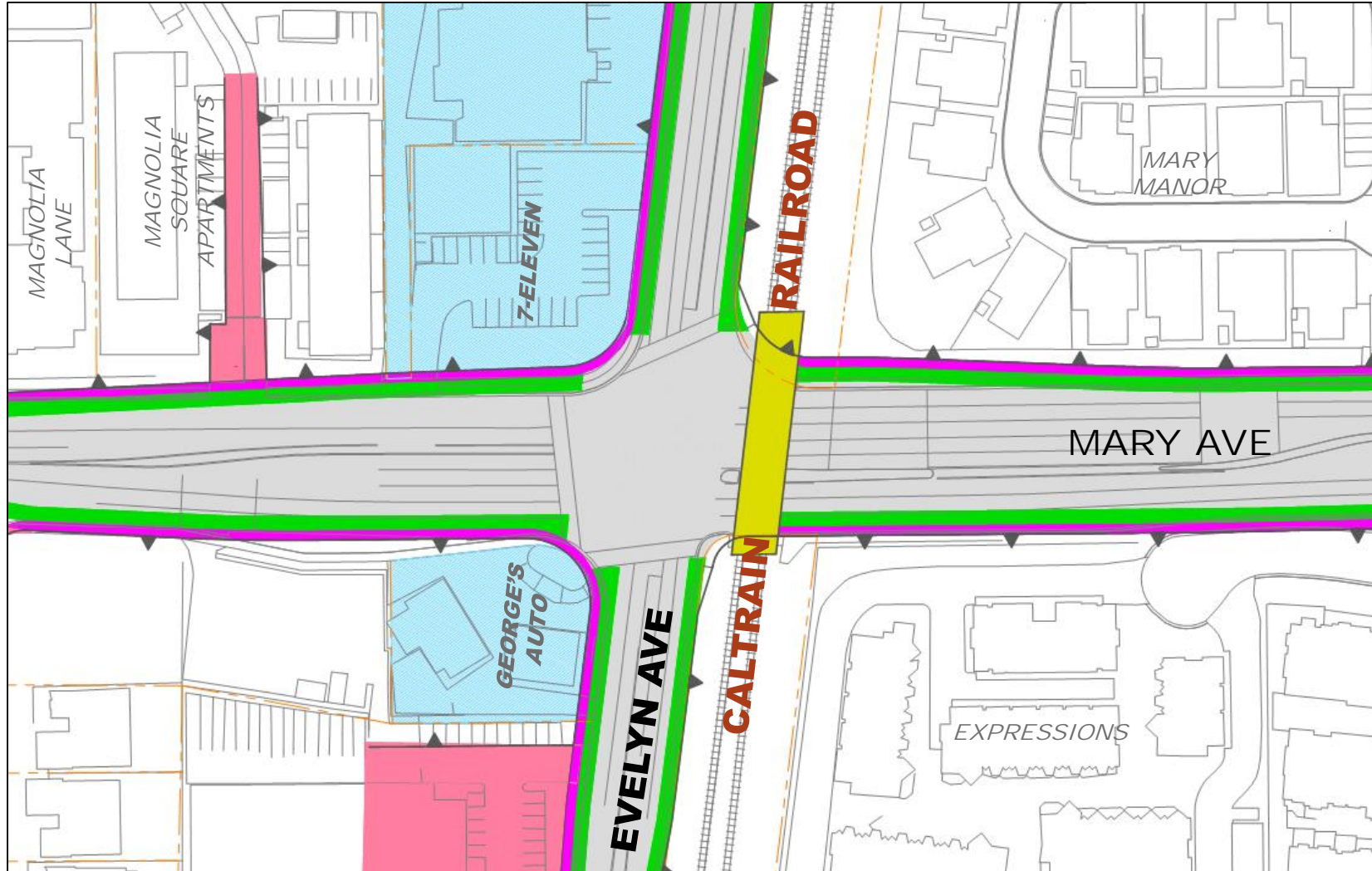
**X** Modifications to 8+ driveways

**Evelyn Ave depressed**

✓ No permanent rail impact

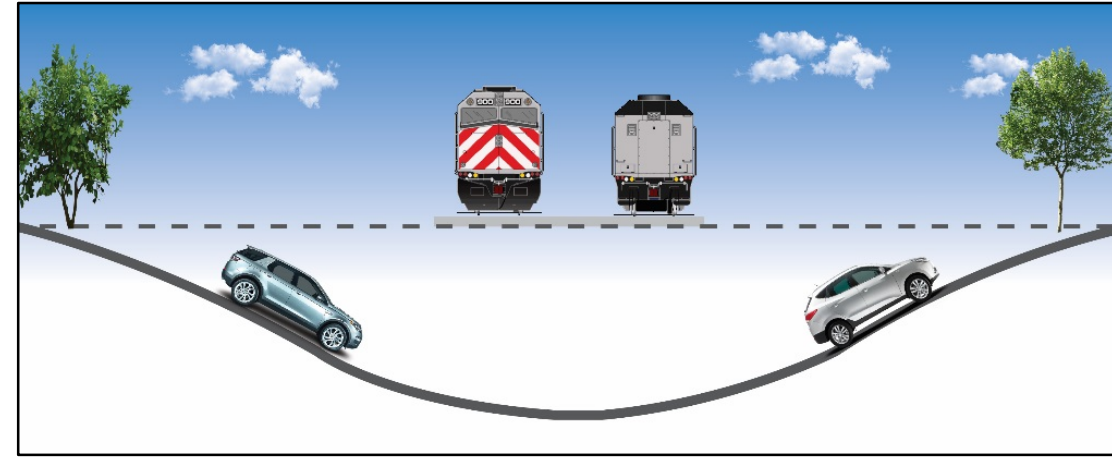
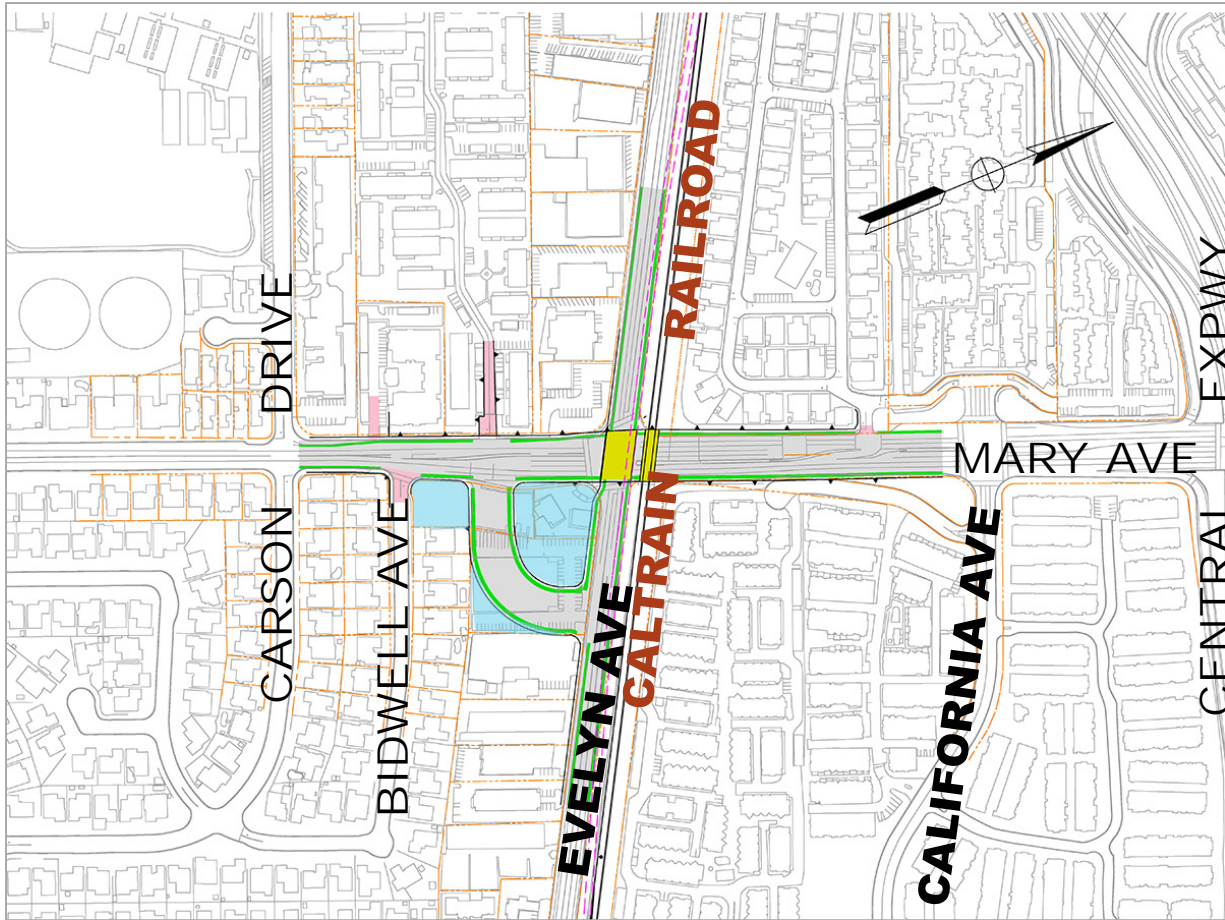
\$\$\$\$\$ \$ (Construction)

# Mary Avenue Underpass





# Mary Avenue Underpass with Jughandle



## Mary Ave depressed

Potential acquisition of 3+ parcels

\$\$\$\$ (Construction)

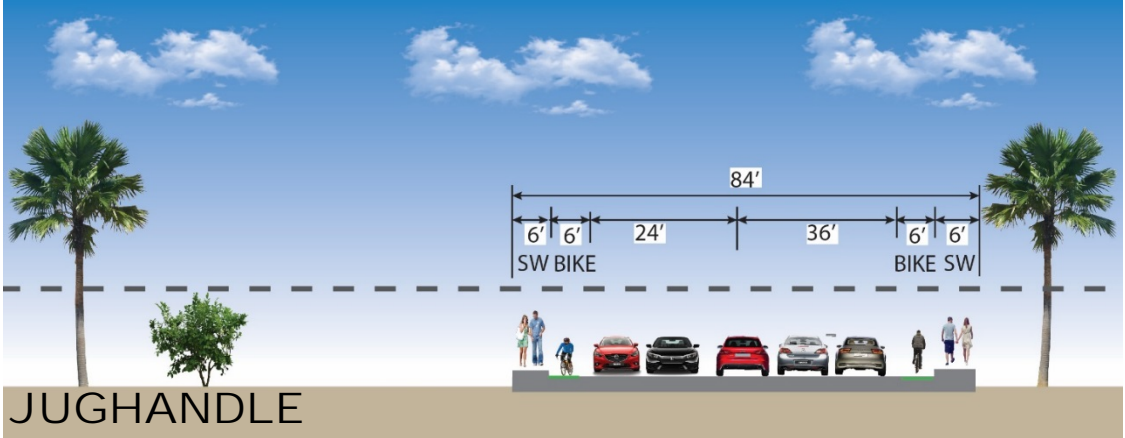
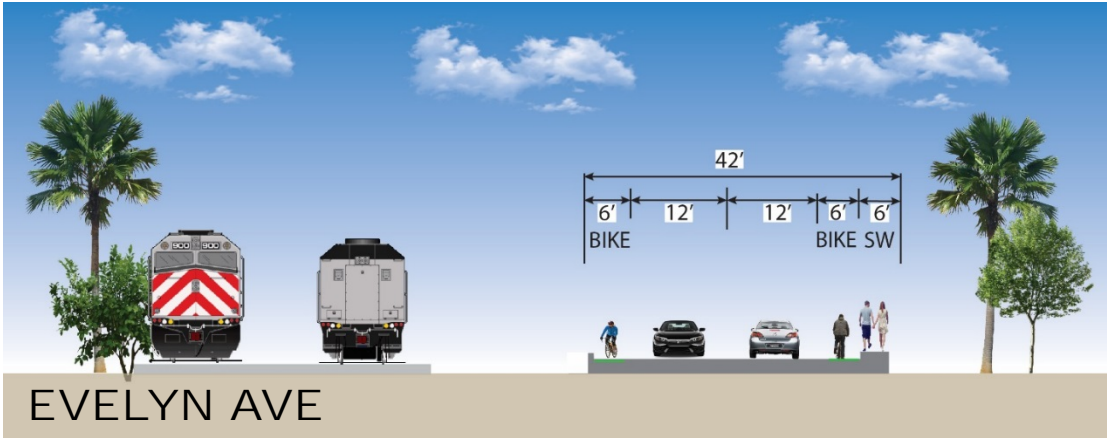
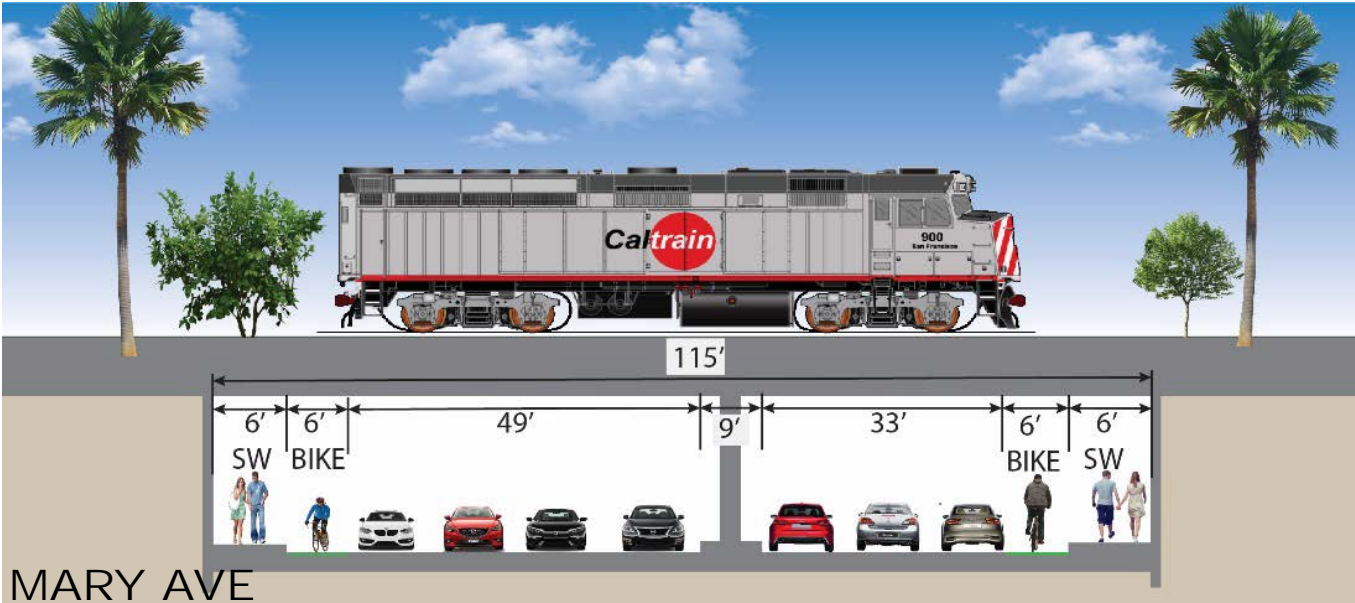
## Evelyn Ave remains at-grade

Relocate Mary/Evelyn intersection



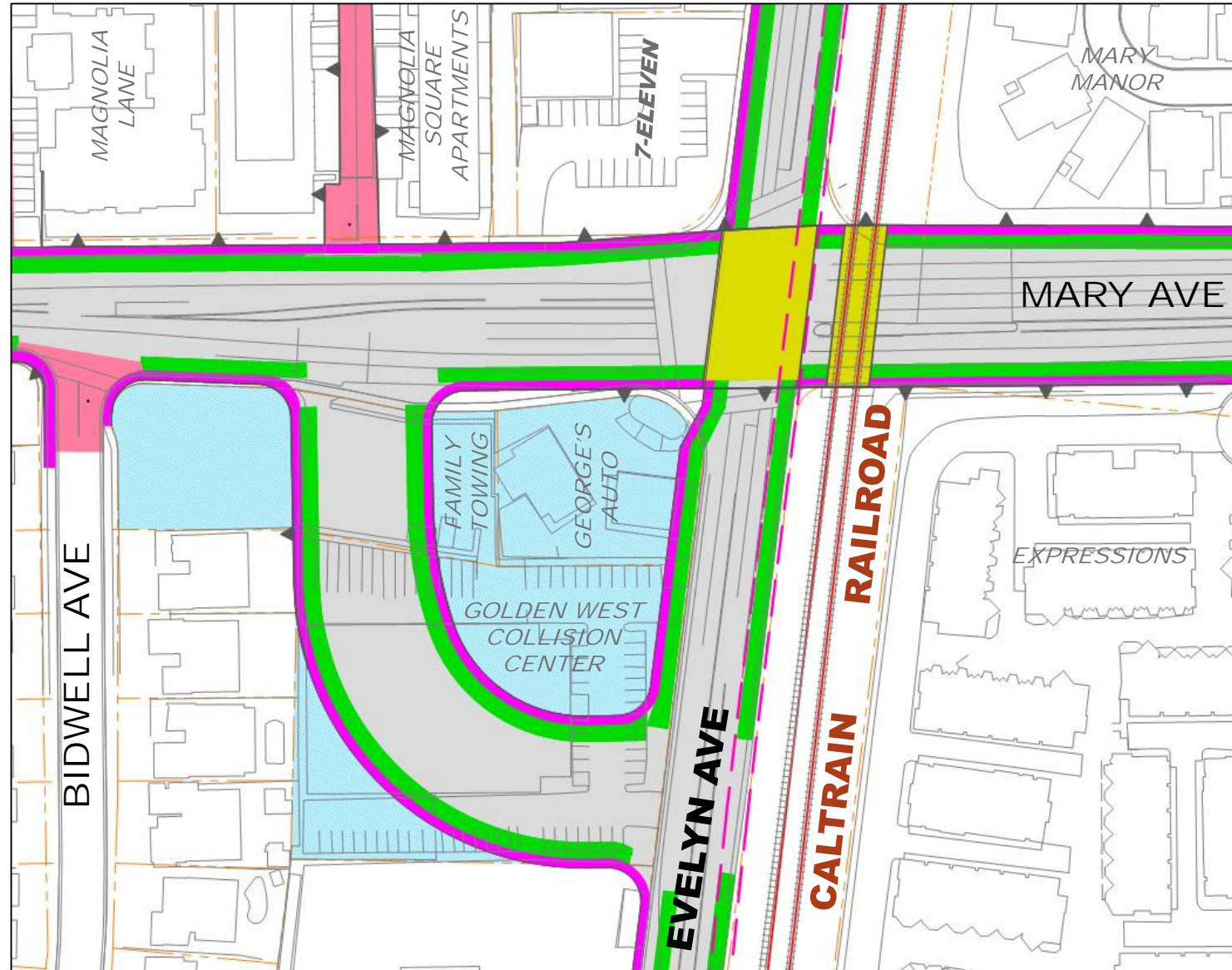
No permanent rail impact

# Mary Avenue Underpass with Jughandle





# Mary Avenue Underpass with Jughandle

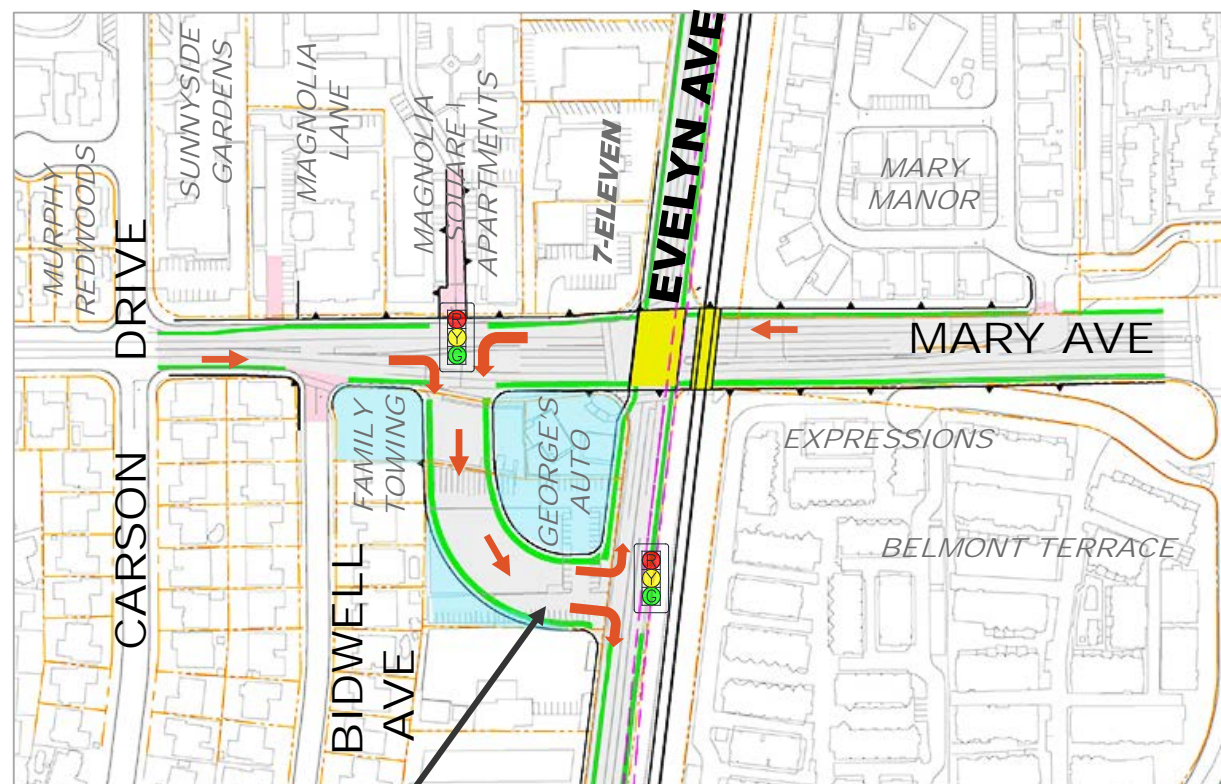
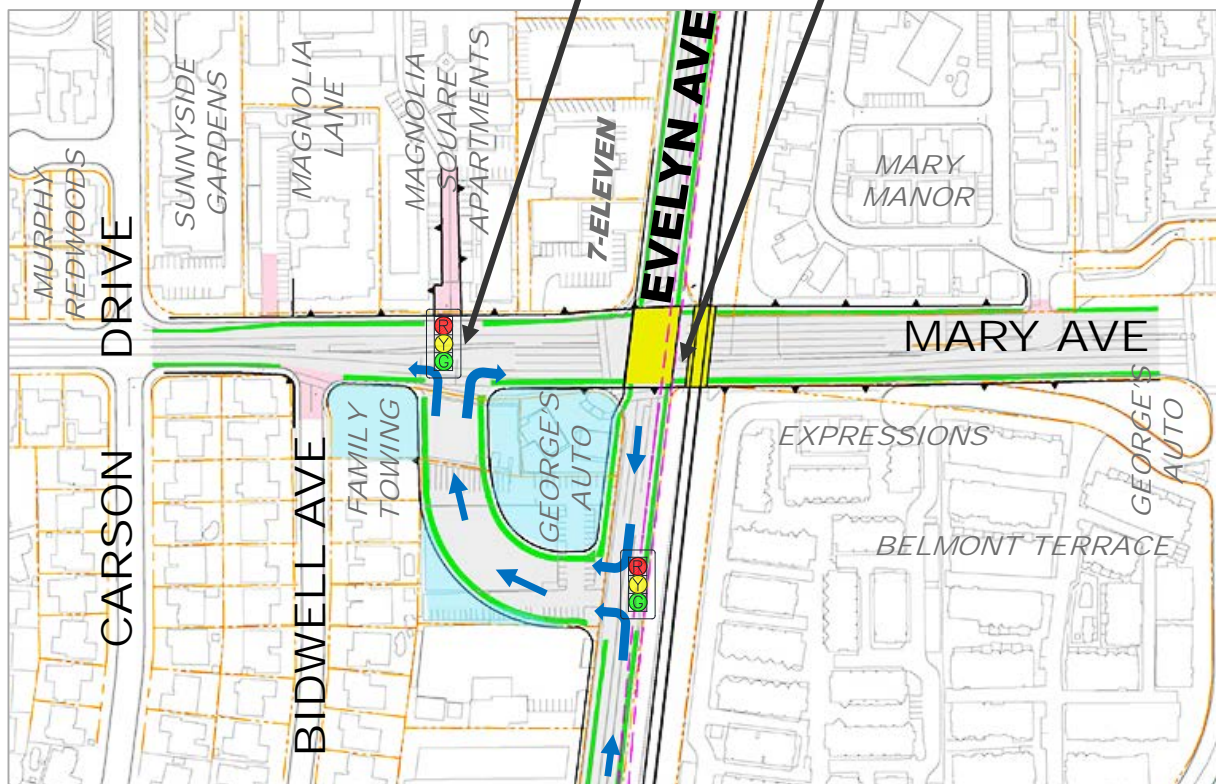




# Mary Avenue Underpass with Jughandle

Mary Ave/Evelyn Ave Connection

Mary Ave Underpass



On/Off-Ramp Connection

# Discussion Questions

---

## Mary Avenue

1. How can we make shortlisted options work best for peds and bikes?



# Sunnyvale Avenue



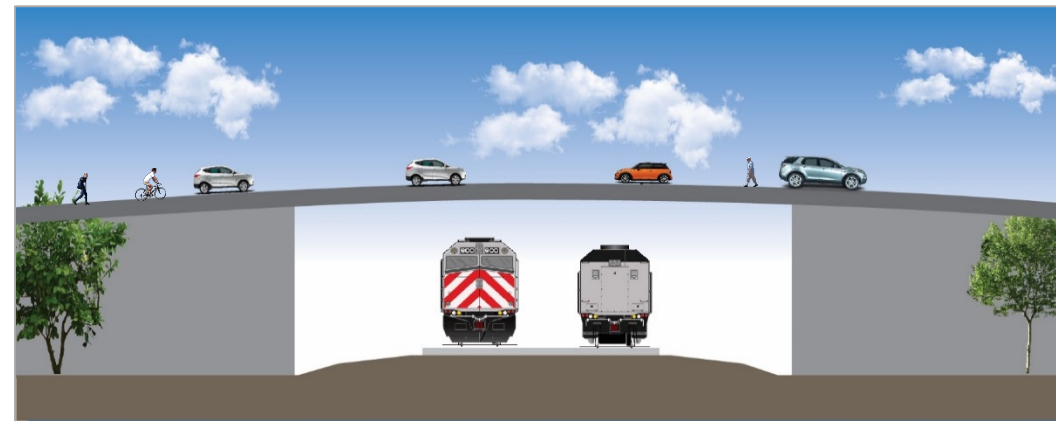
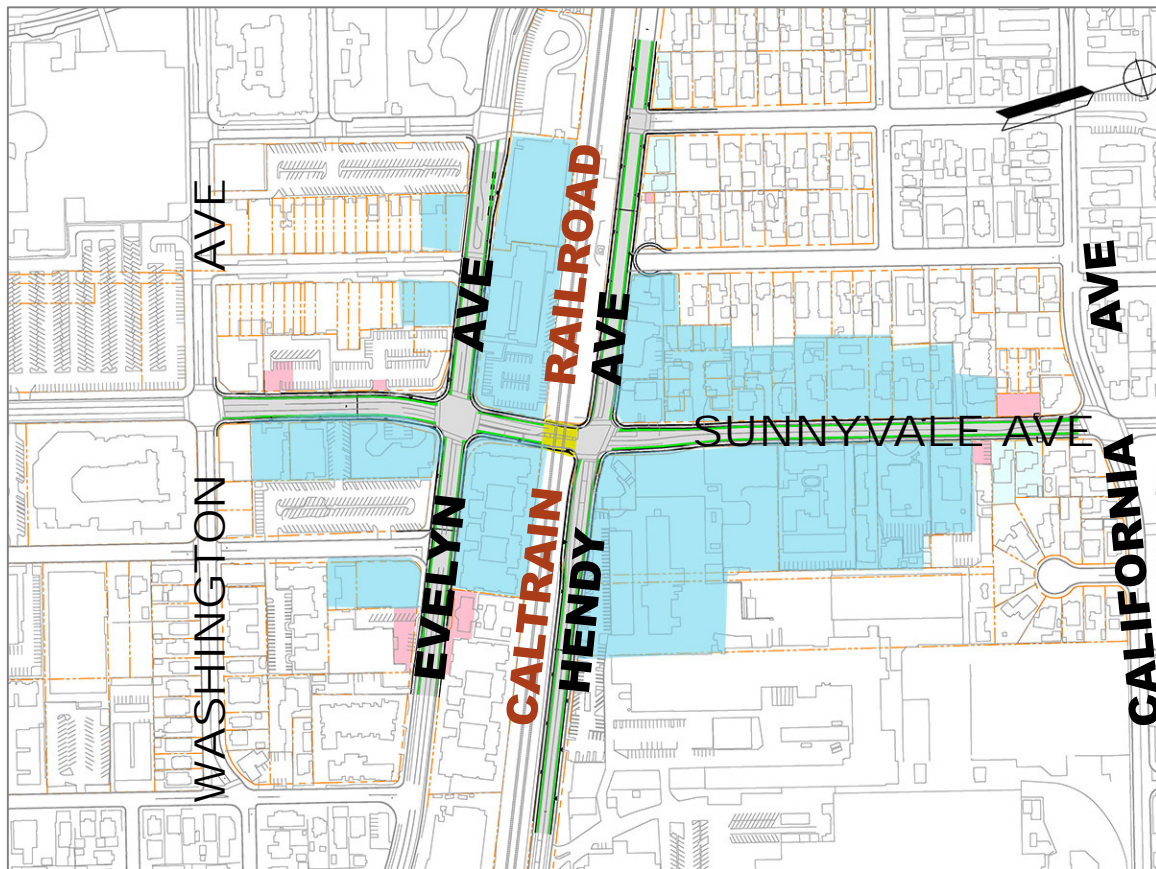


# Magnitude of Rail Impacts at Sunnyvale Avenue





# Sunnyvale Avenue Overpass



## Sunnyvale Ave elevated

- ✗ Potential acquisition of 27+ parcels
- ✗ Modifications to 7+ driveways

## Evelyn Ave elevated

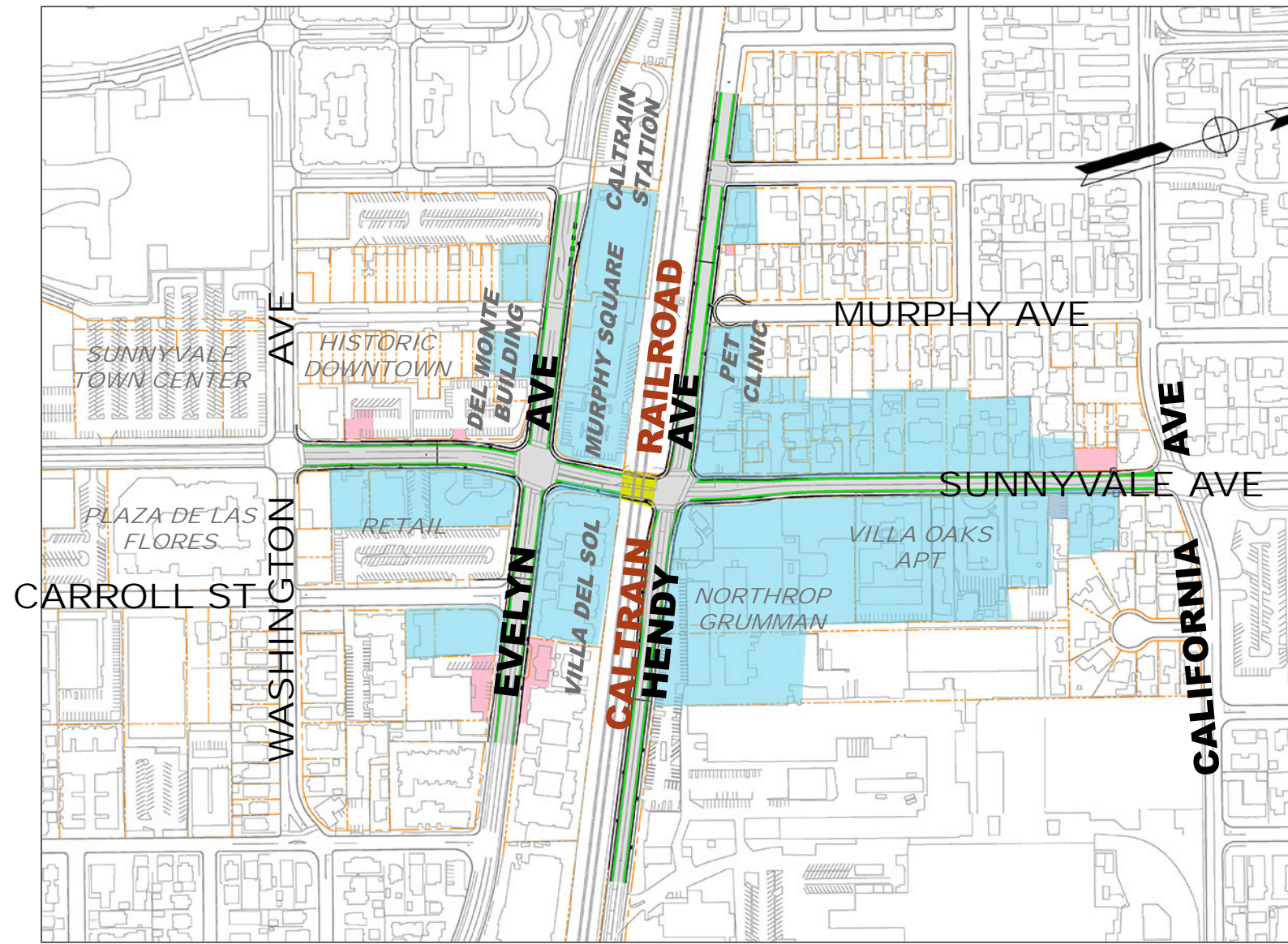
- ✗ Significant bridge cost
- \$\$\$\$\$ (Construction)

## Hendy Ave elevated

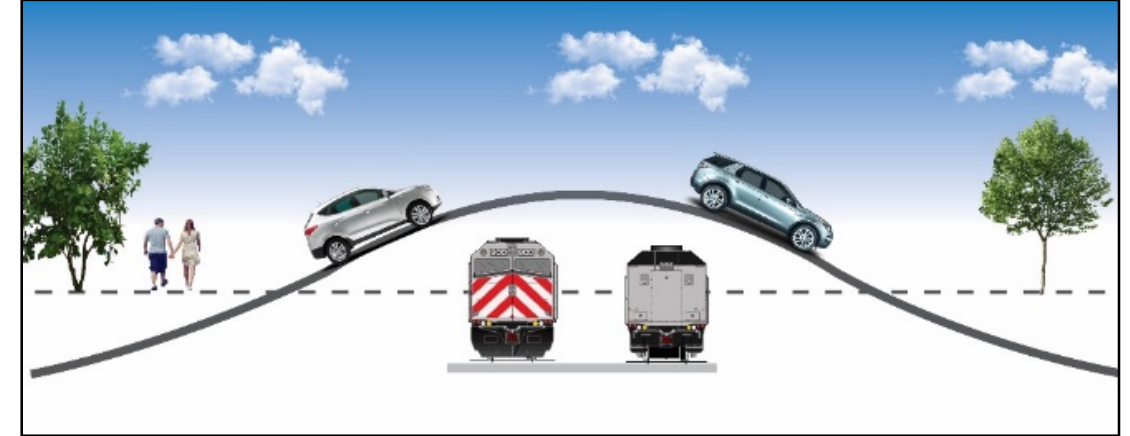
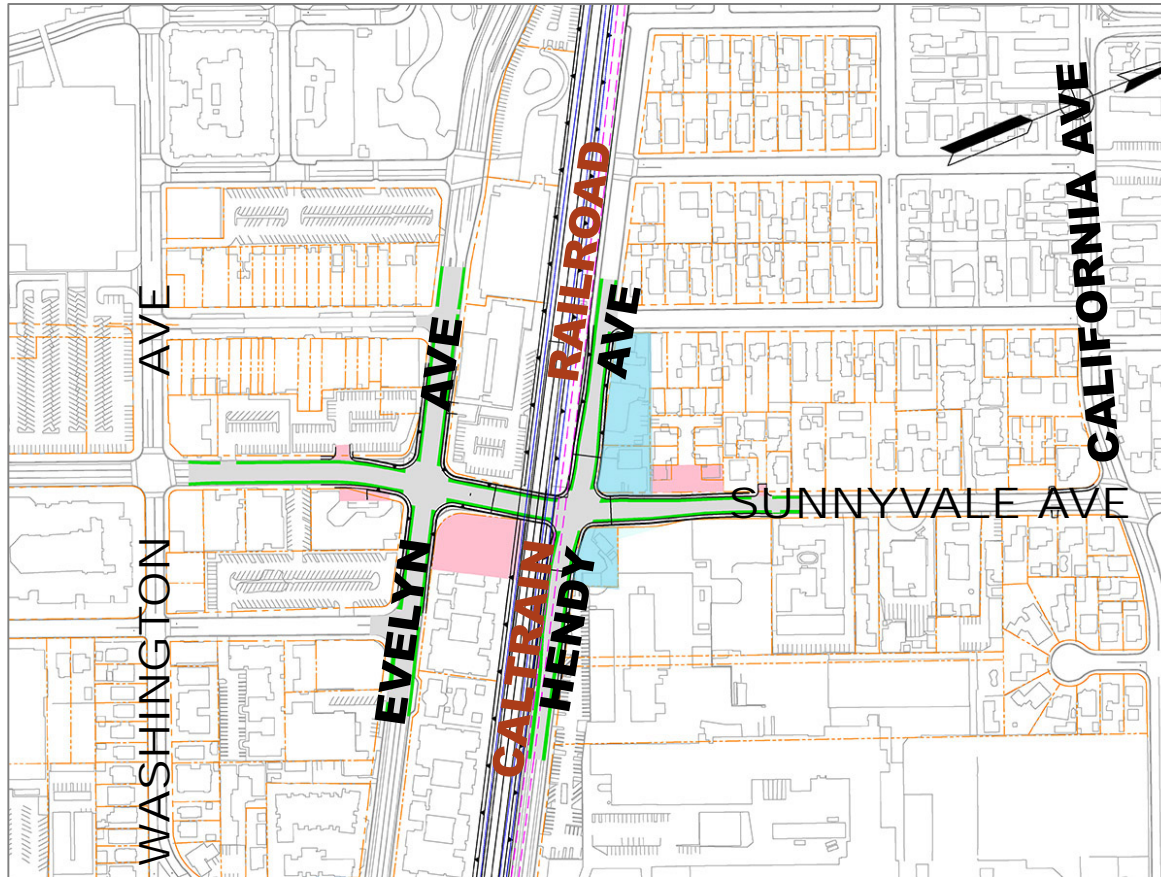
- ✓ No rail construction required
- ✓ No station reconstruction



# Sunnyvale Avenue Overpass



# Sunnyvale Ave Split Overpass



## Sunnyvale Ave partially elevated

✗ Potential acquisition of 10+ parcels

Modifications to 4+ driveways

## Evelyn Avenue partially elevated

✗ Significant bridge cost

\$\$\$\$\$ \$\$\$ (Construction)

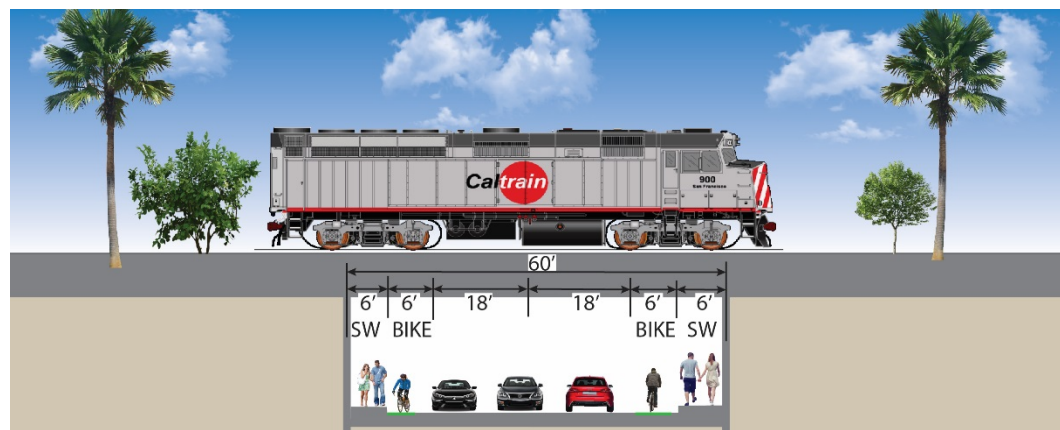
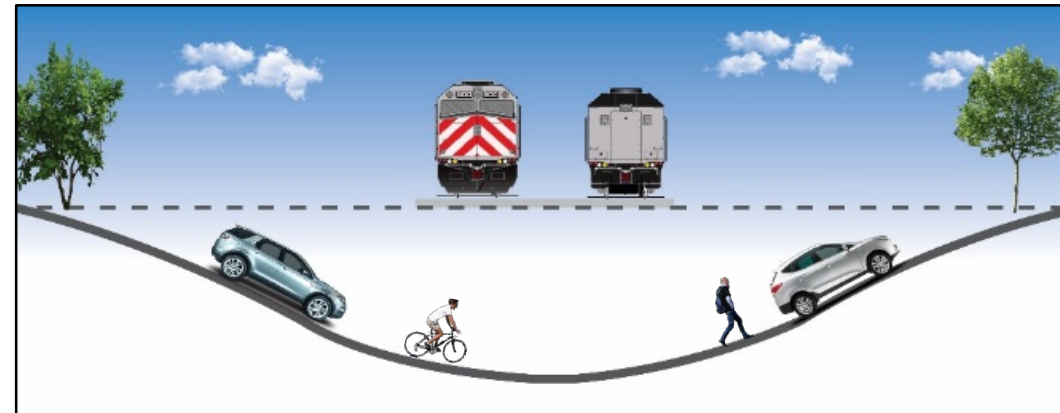
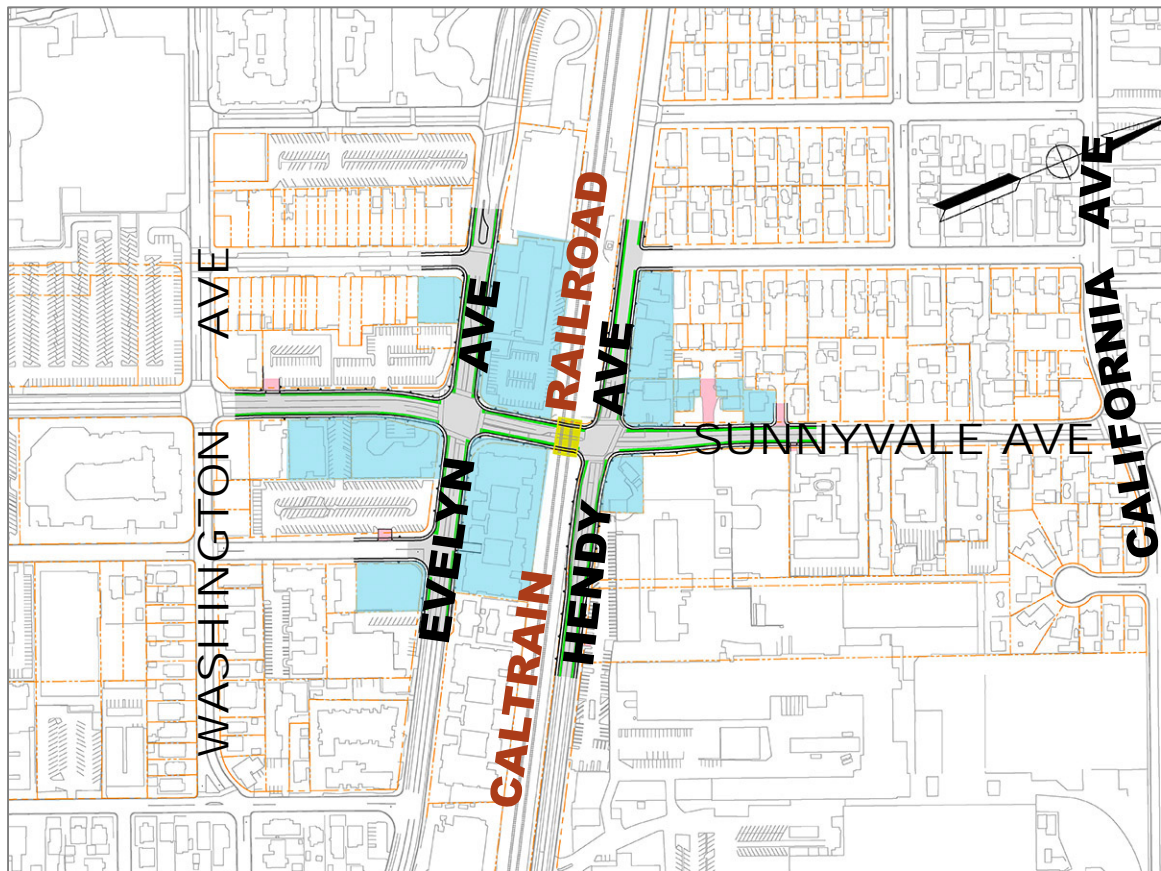
## Hendy Avenue partially elevated

✗ Rail construction required

✗ Station reconstruction required



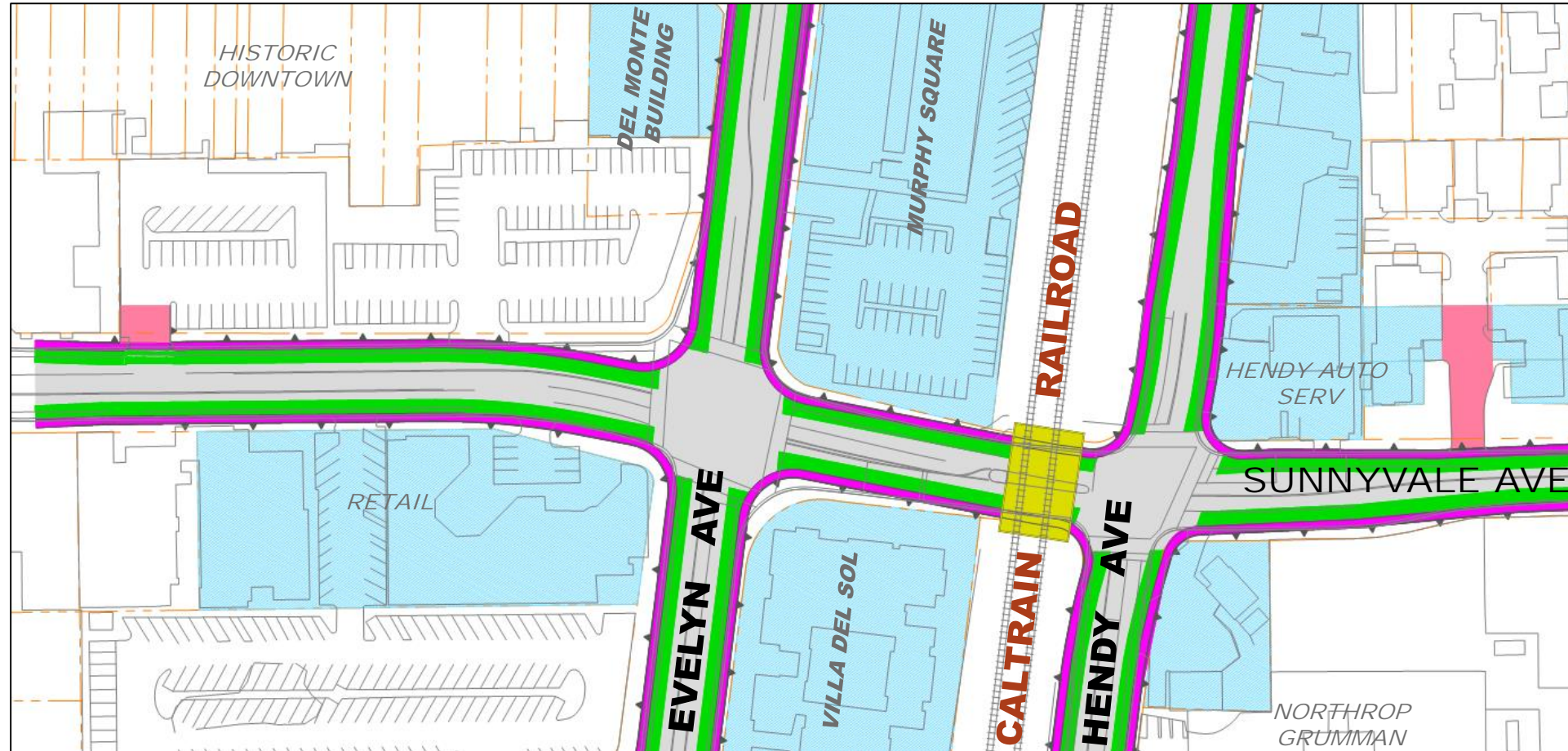
# Sunnyvale Avenue Underpass



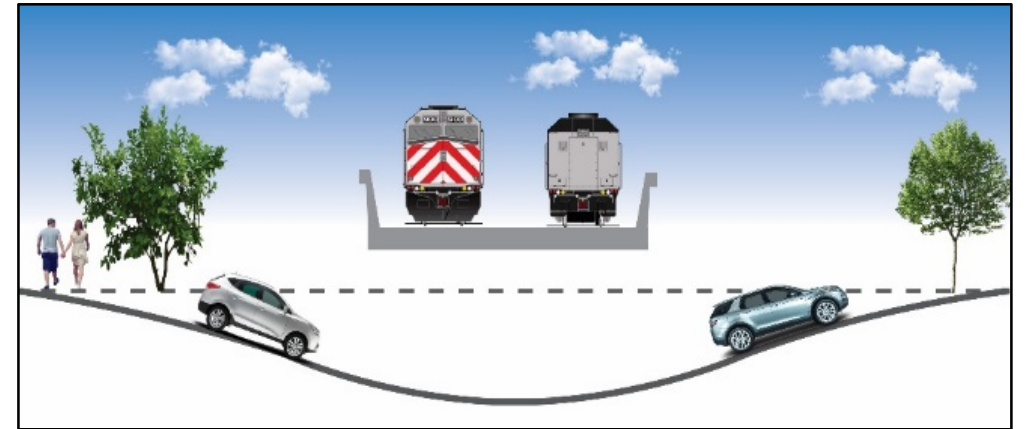
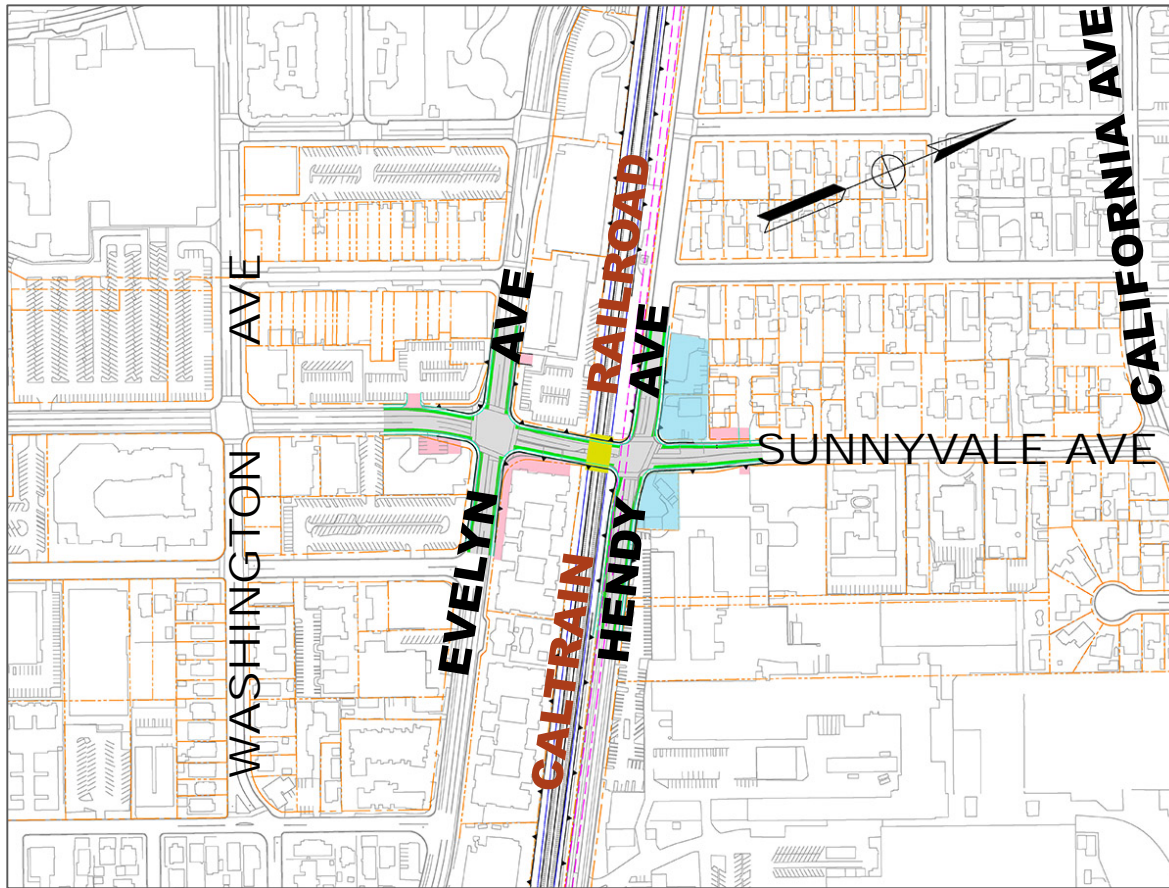
Sunnyvale Ave depressed	Evelyn Ave depressed	Hendy Ave depressed
✗ Potential acquisition of 11+ parcels	✓ No permanent rail impact	✓ No station reconstruction
✗ Modifications to 5+ driveways	\$\$\$\$\$ \$\$\$ (Construction)	



# Sunnyvale Avenue Underpass



# Sunnyvale Avenue Split Underpass



**Sunnyvale Avenue partially depressed**

Potential acquisition of 3+ parcels

Modifications to 7+ driveways

**Evelyn Avenue partially depressed**

**✗** Significant rail cost

\$\$\$\$\$ \$\$\$\$\$ \$\$\$\$ (Construction)

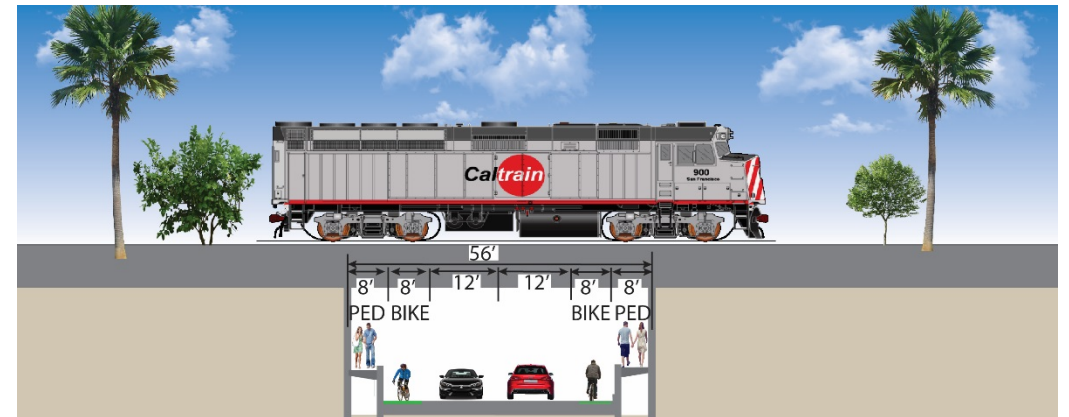
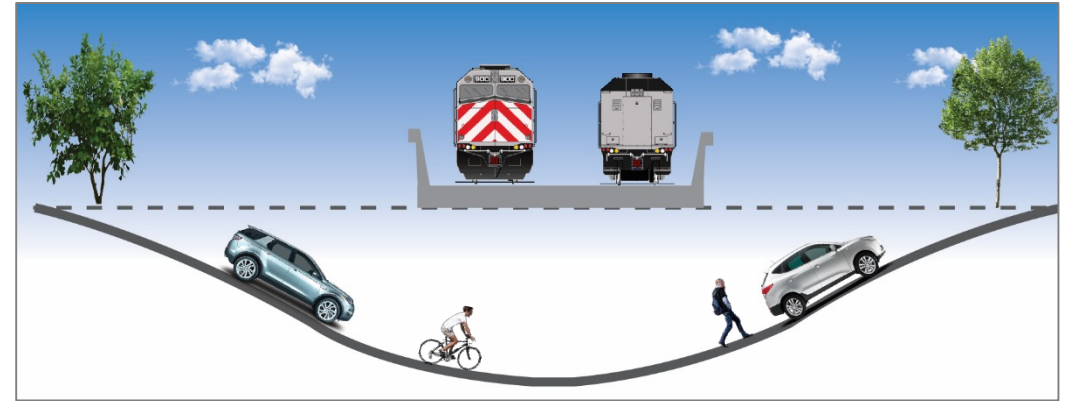
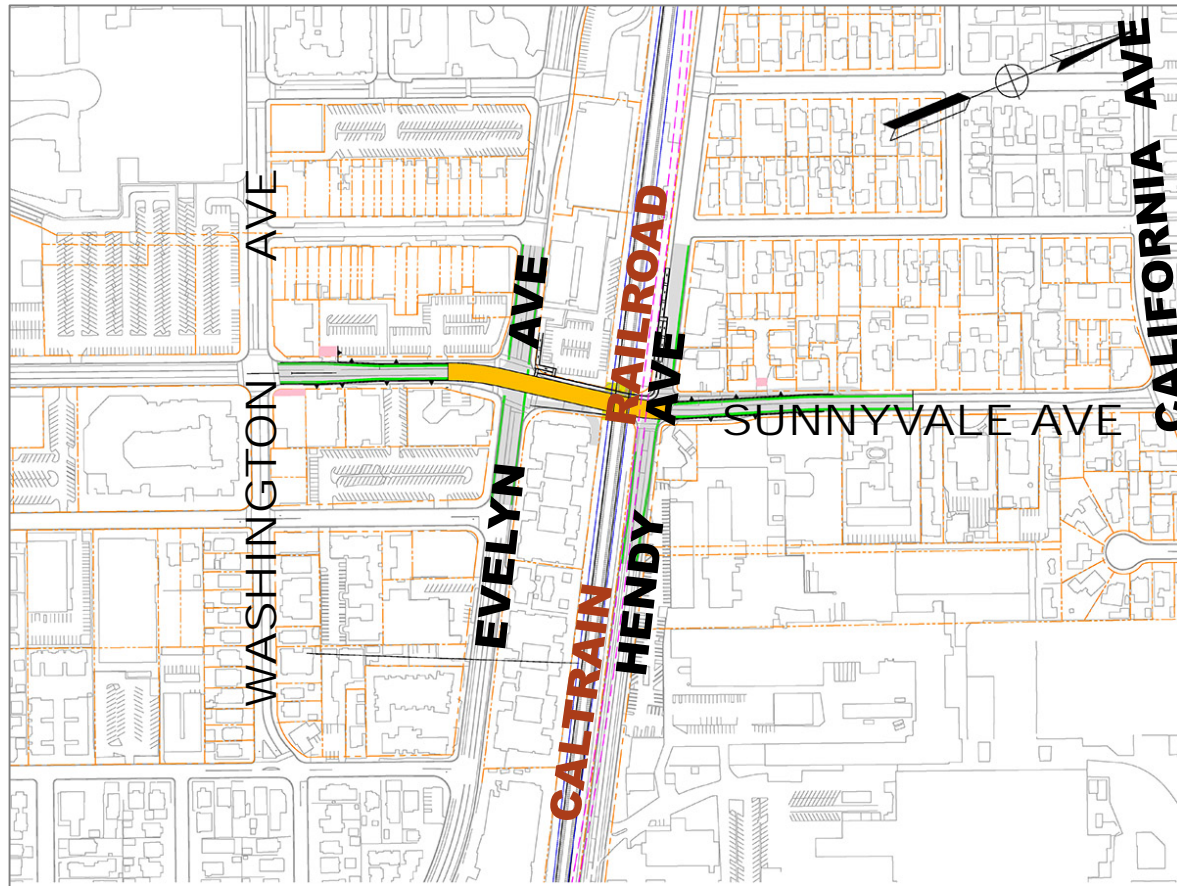
**Hendy Avenue partially depressed**

**✗** Permanent rail impact

**✗** Station reconstruction



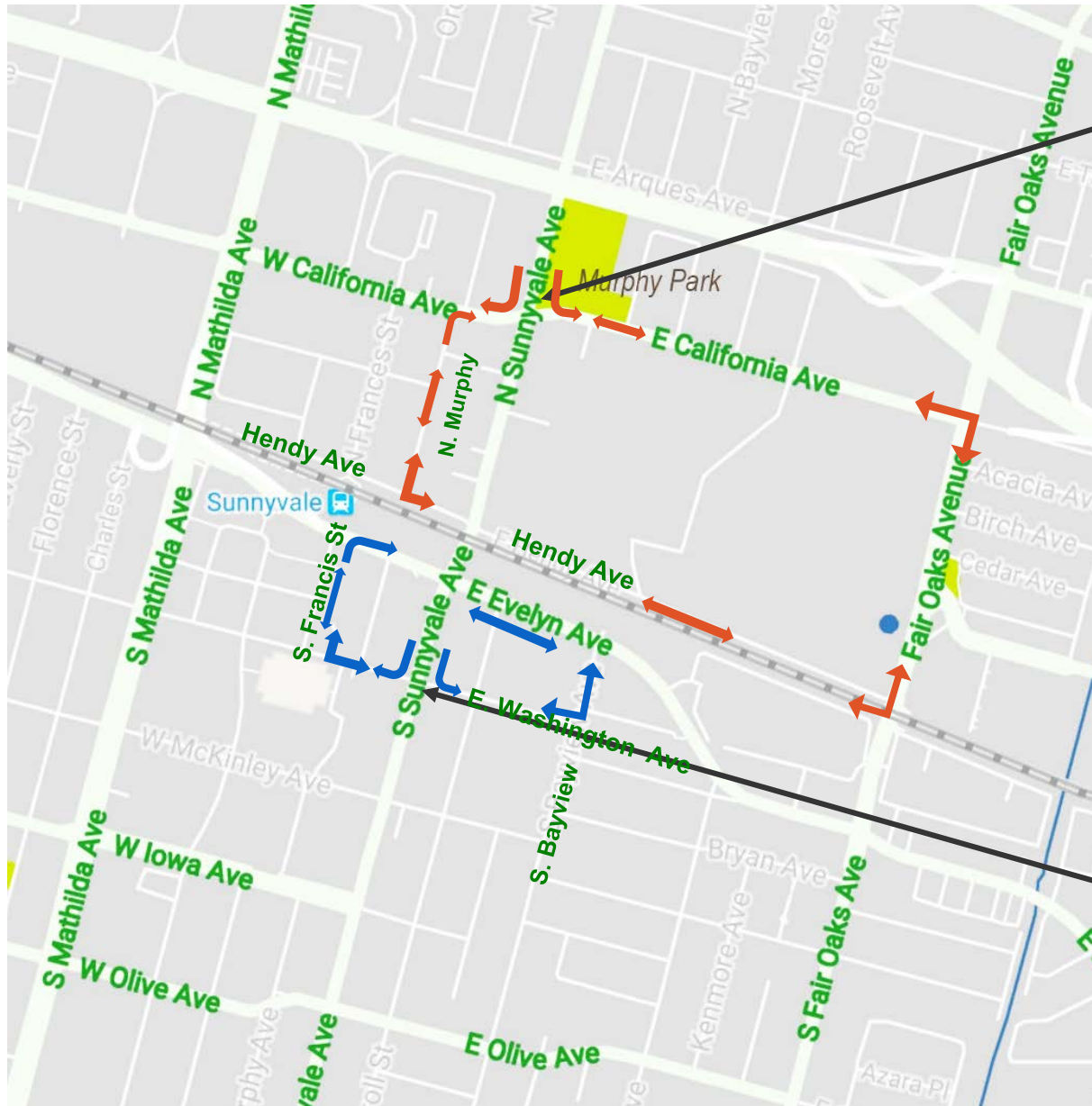
# Sunnyvale Avenue Underpass / Tunnel



Sunnyvale Ave depressed	Evelyn Ave at-grade	Hendy Ave at-grade
✓ No significant impacts of parcels	✗ No Sunnyvale access to Evelyn or Hendy	✓ No permanent rail impact
✓ Modifications to 3+ driveways	\$\$\$\$ (Construction)	✓ No station reconstruction



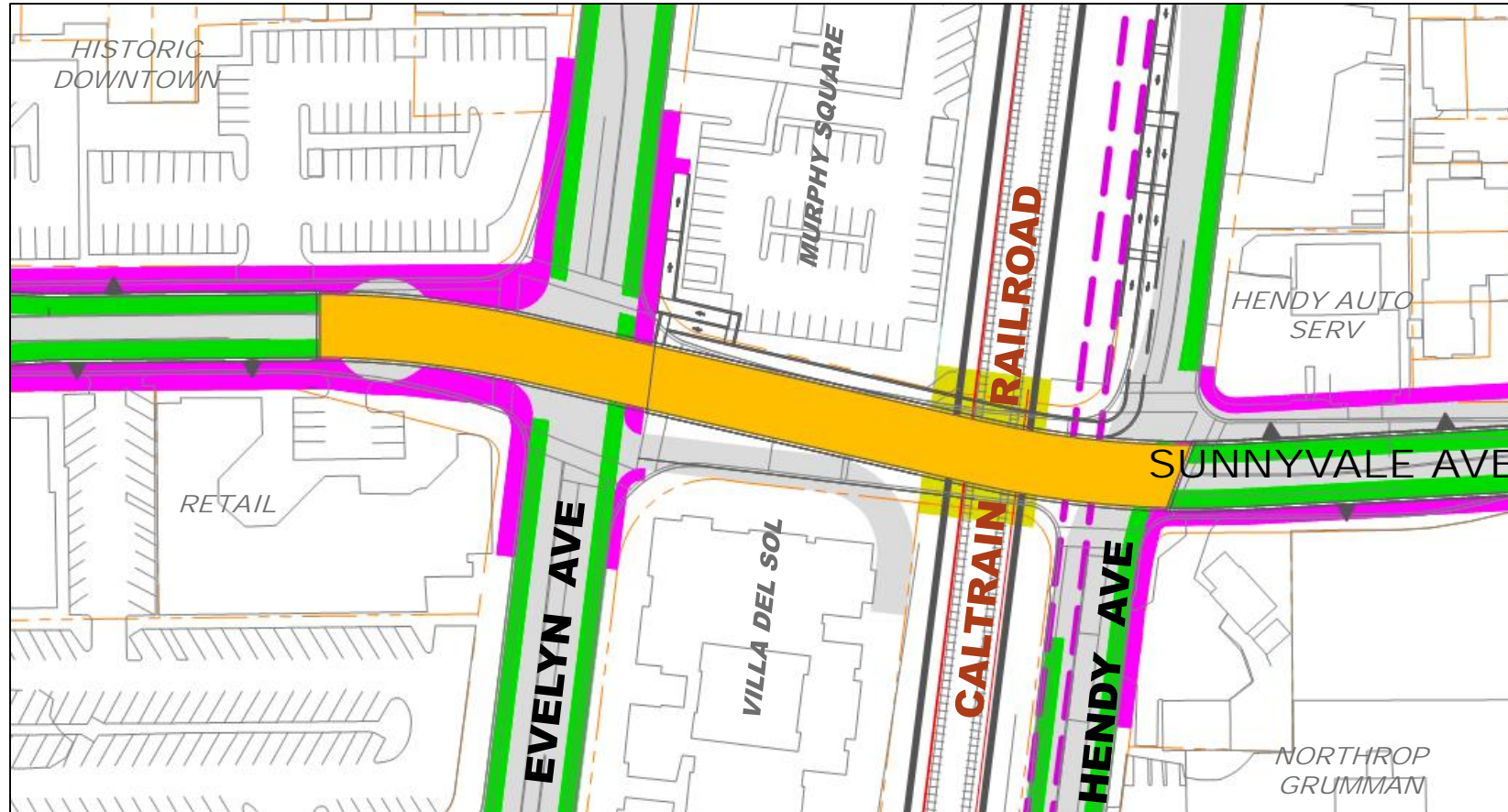
# Sunnyvale Avenue Underpass / Tunnel – Traffic Circulation



- Sunnyvale Ave tunnel
- No connection to Hendy Ave

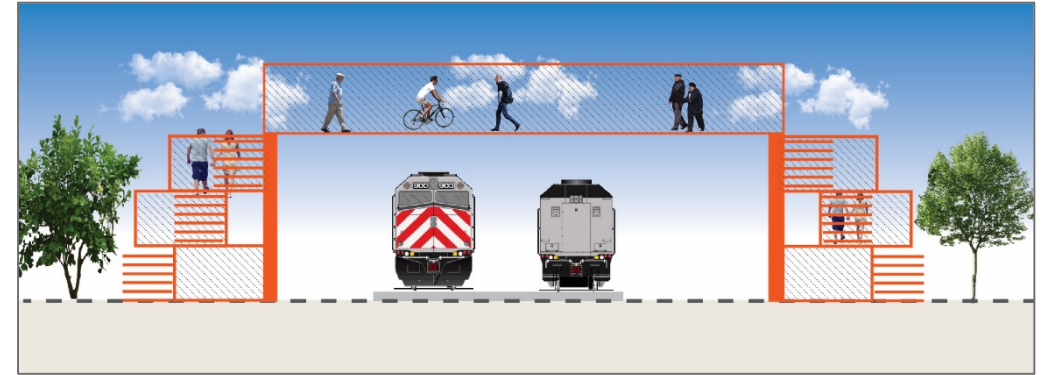
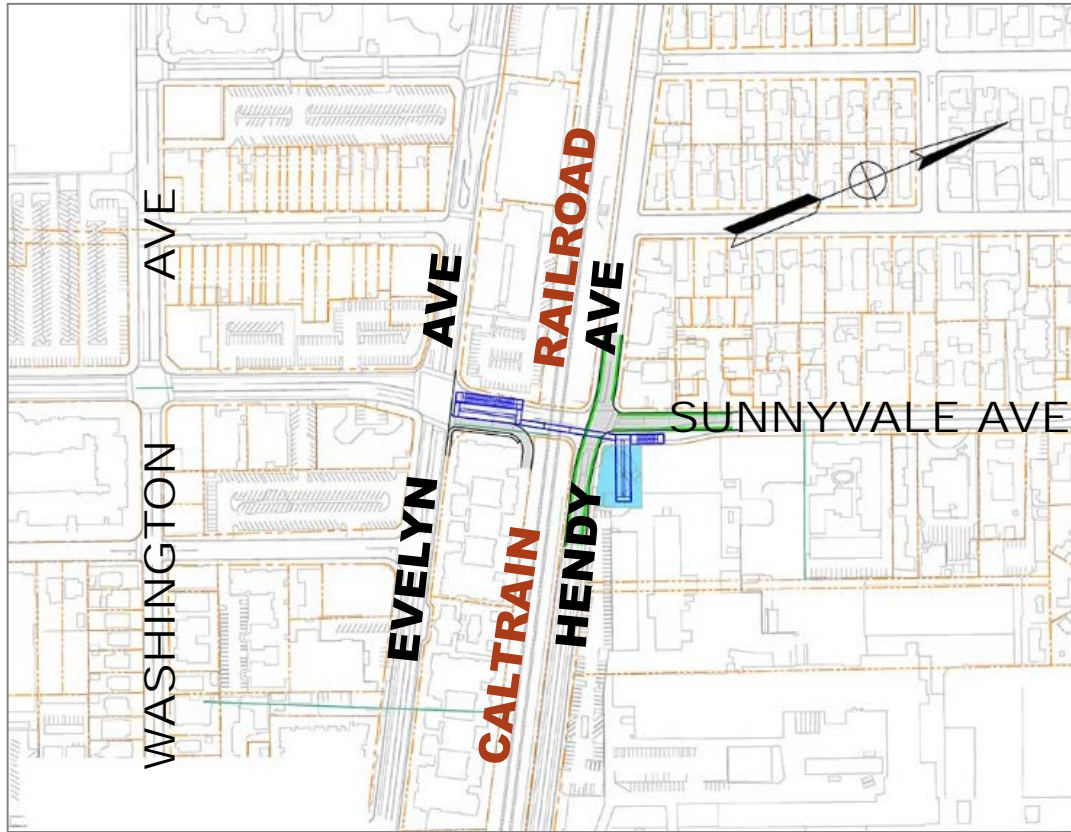
- Sunnyvale Ave tunnel
- Tunnel: No Connection to Evelyn Ave

# Sunnyvale Avenue Underpass / Tunnel





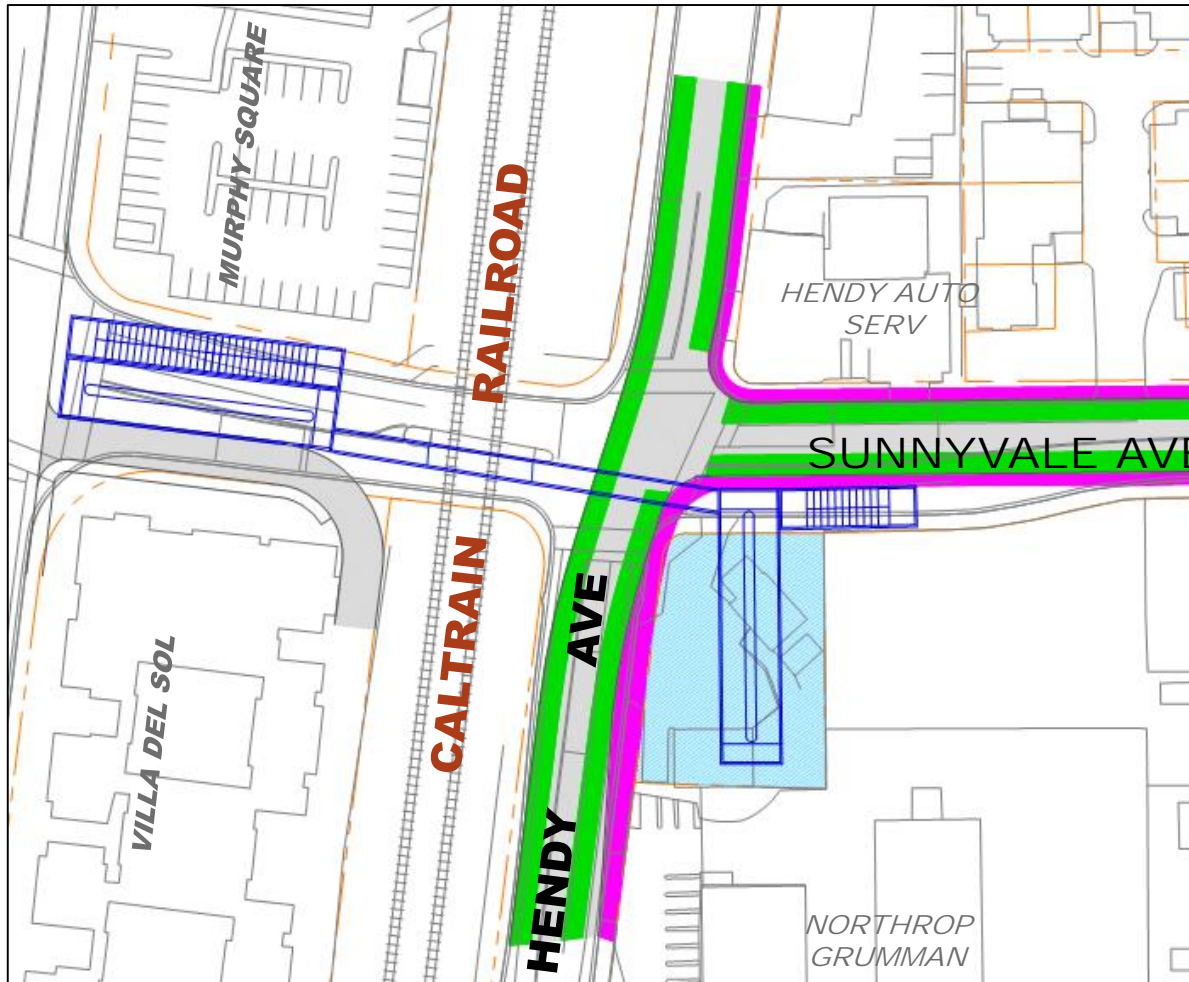
# Sunnyvale Avenue Bike/Pedestrian Overpass



Sunnyvale Ave at grade	Evelyn Ave at-grade	Hendy Ave at-grade
✗ Vehicle access via Fair Oaks or Mathilda	Least cost alternative	✓ No rail construction required
Potential acquisition of 1+ parcel	✗ Permanent change to traffic circulation	✓ No station reconstruction
Modifications to 1+ driveways	\$\$ (Construction)	

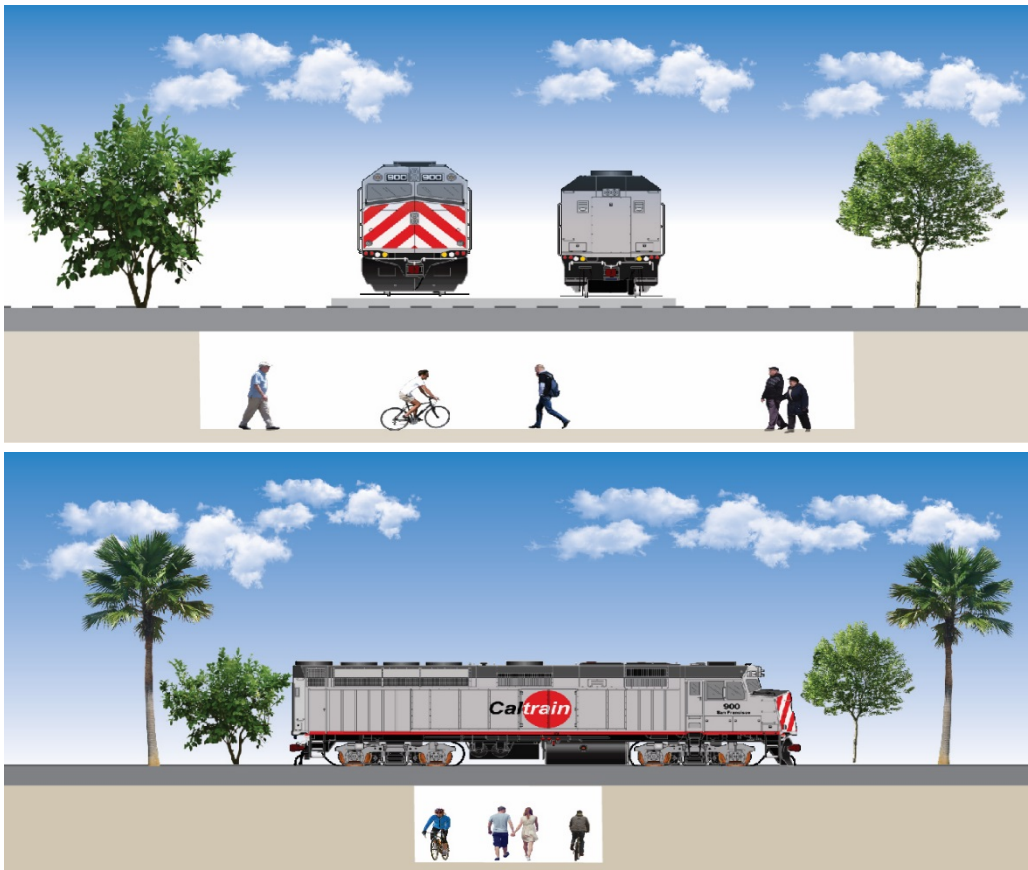
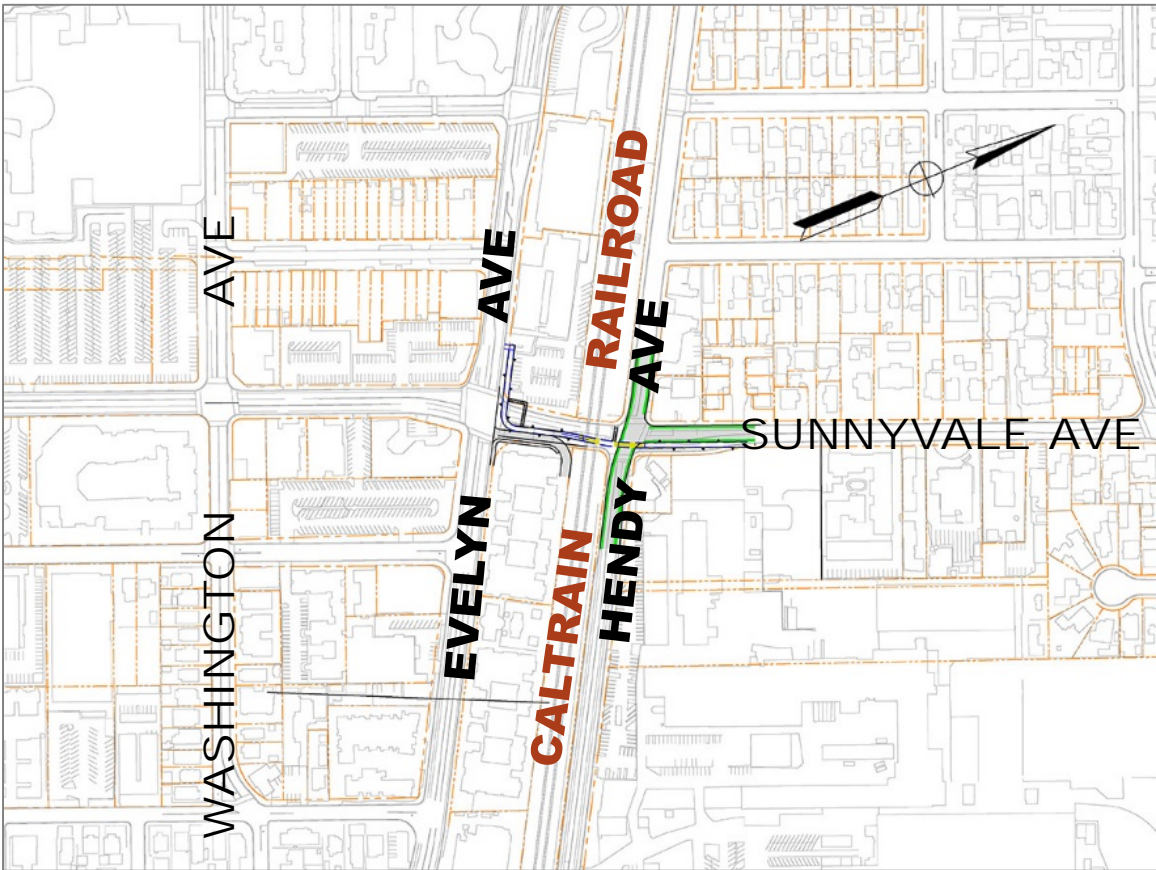


# Sunnyvale Avenue Bike/Pedestrian Overpass





# Sunnyvale Avenue Bike/Pedestrian Underpass



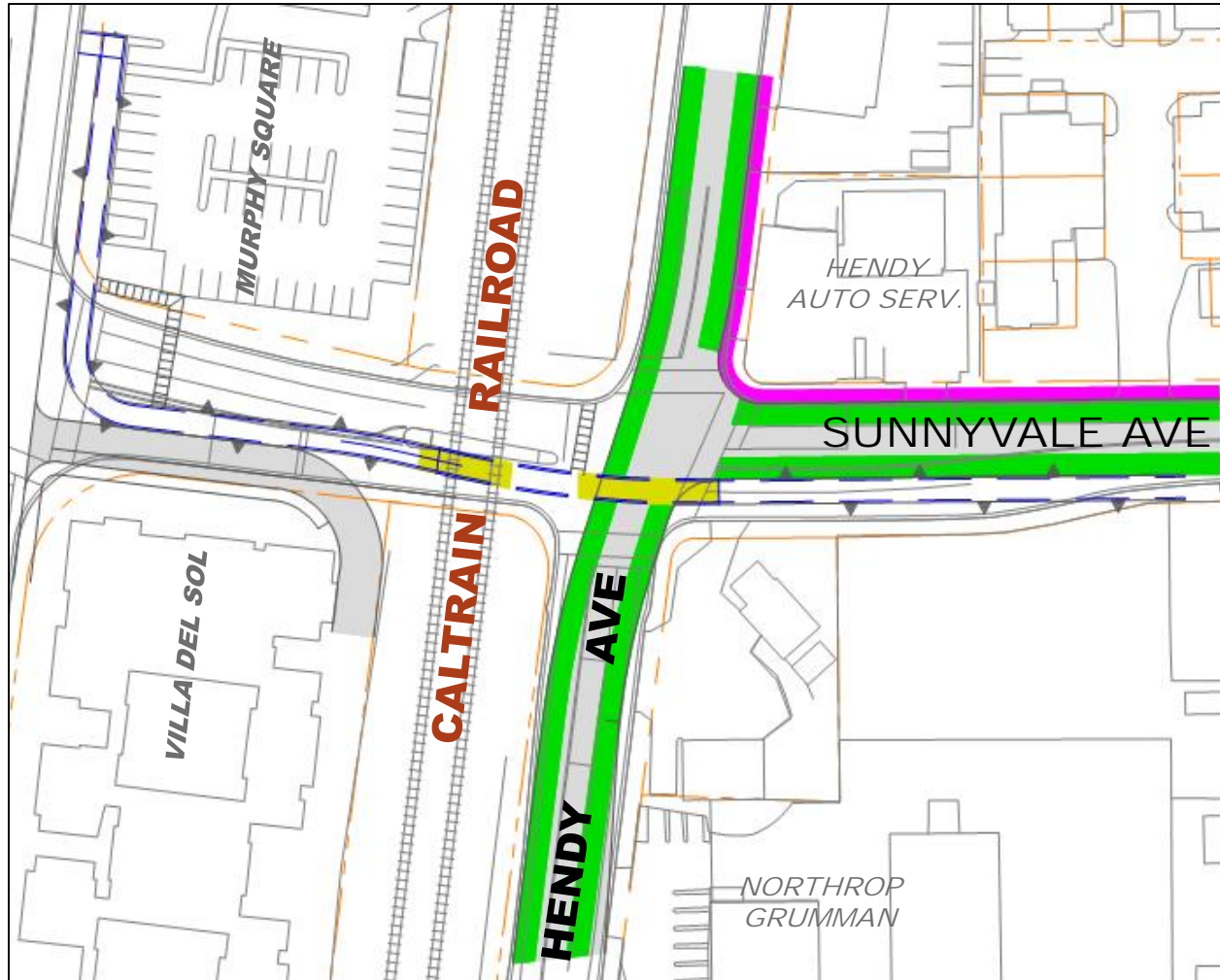
Sunnyvale Ave at grade	Evelyn Ave at-grade	Hendy Ave at-grade
<div>✗</div> Vehicle access via Fair Oaks or Mathilda	<div>✗</div> Permanent change to traffic circulation	<div>✓</div> No rail construction required
<div>✓</div> Reconstruction to 1+ road access	<div>✗</div> Circuitous access to ped/bike portals	<div>✓</div> No station reconstruction
<div>✓</div> No significant impacts to parcels	\$\$\$ (Construction)	<div>✓</div> Least cost alternative

# Grade Separated Crossing – Underpass

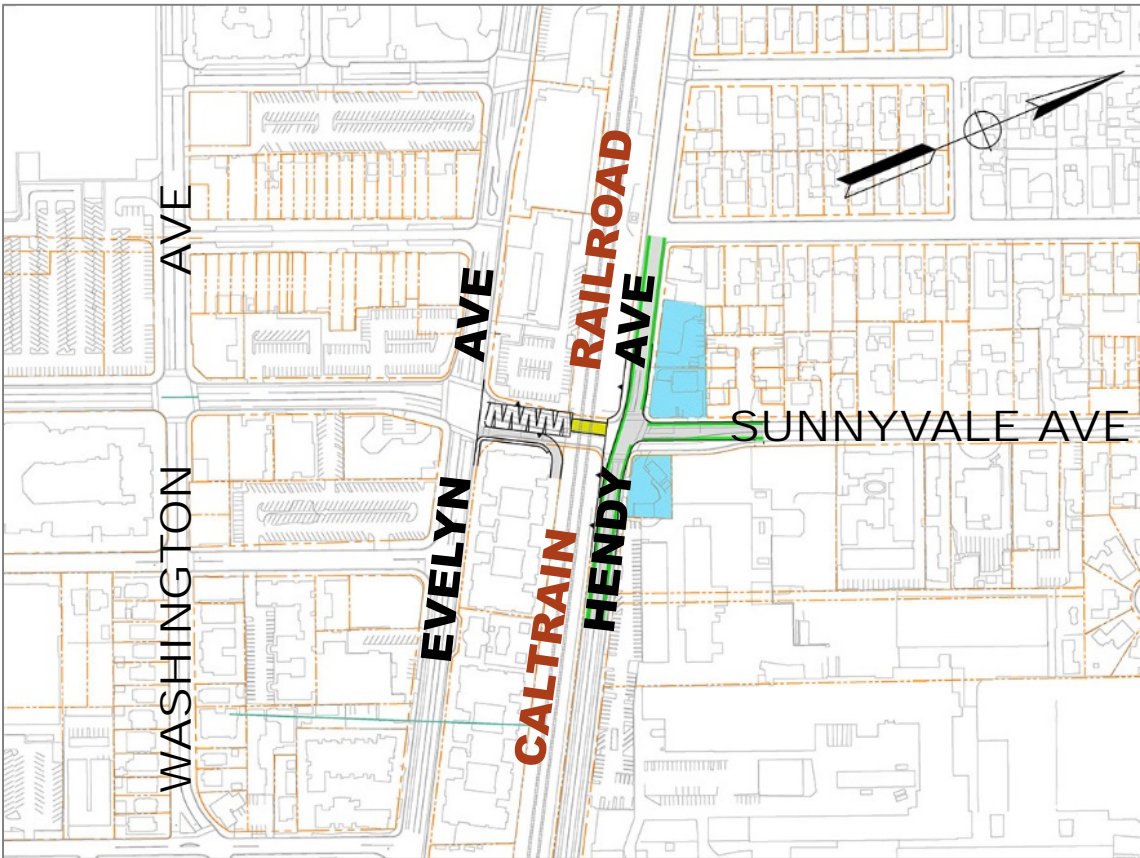




# Sunnyvale Avenue Bike/Pedestrian Underpass



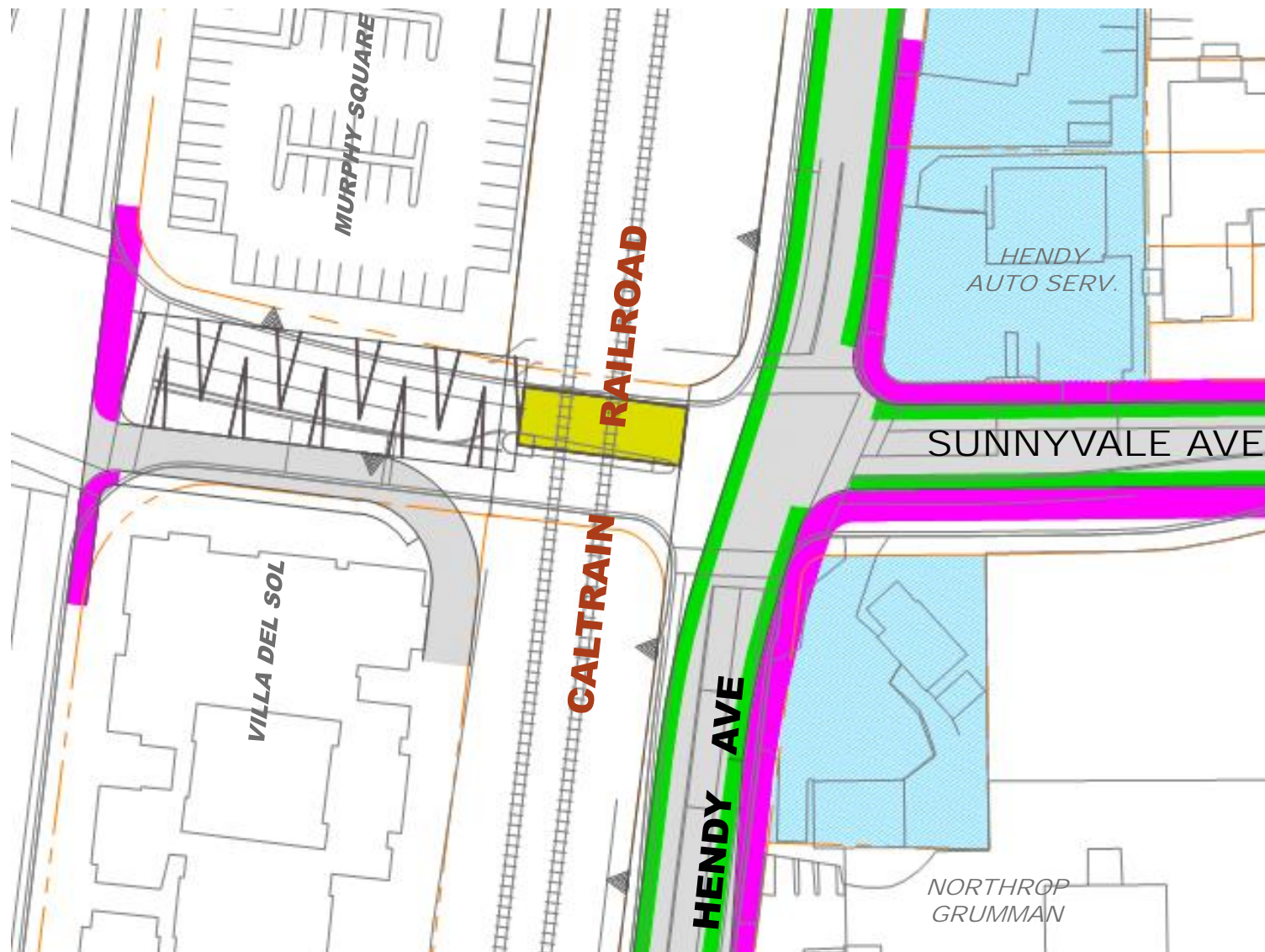
# Sunnyvale Avenue Bike/Pedestrian Underpass Switchback



Sunnyvale Ave at grade	Evelyn Av at-grade	Hendy Ave at-grade
<div>✗</div> Vehicle access via Fair Oaks or Mathilda	<div>✗</div> Permanent change to traffic circulation	<div>✓</div> No rail construction required
Potential acquisition of 3+ parcels	Switch-back access to ped/bike	<div>✓</div> No station reconstruction
<div>✓</div> Modifications to 1+ driveways	\$\$\$	<div>✓</div> Least cost alternative



# Sunnyvale Avenue Bike/Pedestrian Underpass





# Bike Channel Along Stairs

---





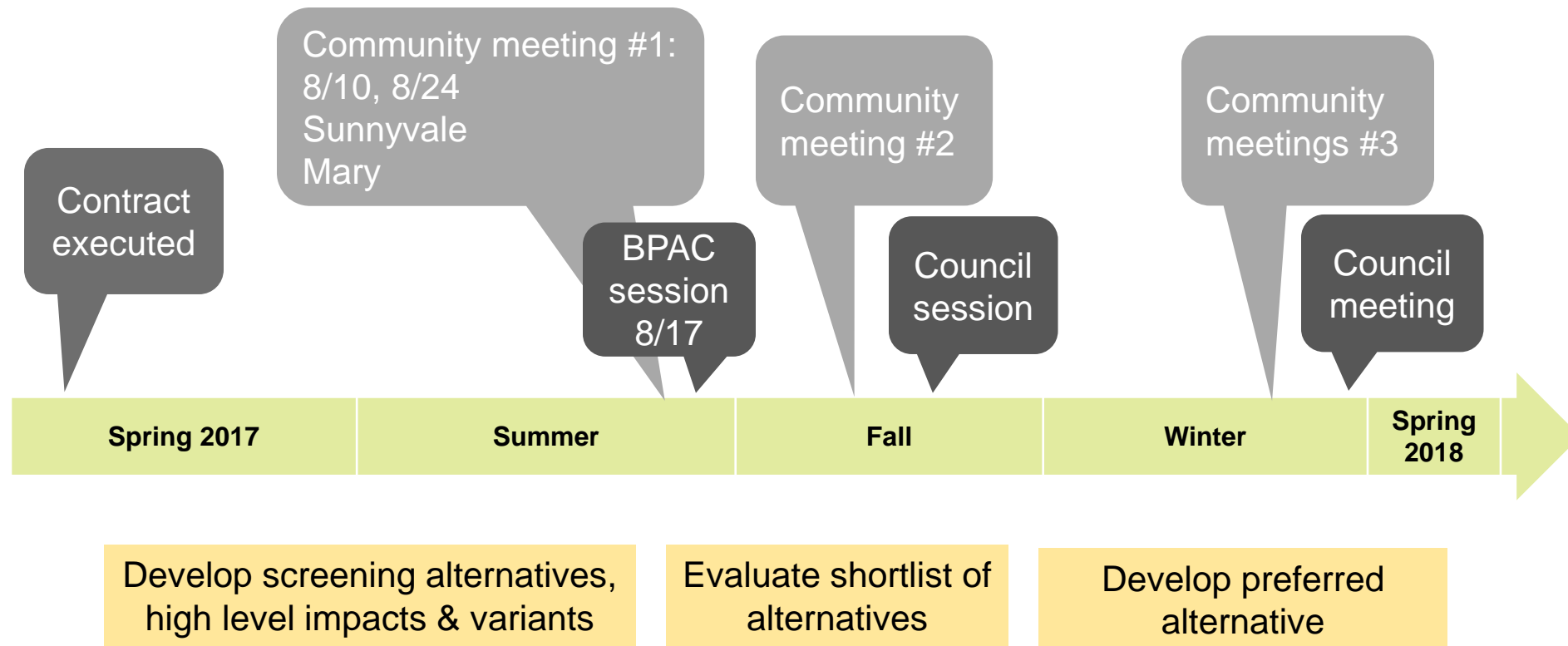
# Discussion Questions

---

## Sunnyvale Avenue

1. What are pros and cons of each option from a ped/bike perspective?
2. Which alternatives work best for peds and bikes?
3. Can BPAC provide input on the ped/bike undercrossing variants?

# Schedule and Next Steps





# Thank You!



Sunnyvale

Ria Hutabarat Lo, PhD

408 730 7502  
[rlo@sunnyvale.ca.gov](mailto:rlo@sunnyvale.ca.gov)