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Palo Alto Rail Program Management

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Memo

Subject: "New Ideas" from XCAP Technical Working Group

- The Expanded Community Advisory Panel (XCAP) received and screened new ideas from the community at their November 13, 2019 Special XCAP meeting. In this meeting, they received New Ideas from five (5) community members. The XCAP voted to push forward ideas from four (4) of the presenters to their Technical Working Group for further review. The New Ideas that were pushed forward are listed below. Full descriptions of the New Ideas can be found under the "November 13, 2019 XCAP Special Meeting" at <https://connectingpaloalto.com/presentations-and-reports/>
- South Tunnel At-Grade Concept (Roland Lebrun)
- Embarcadero/Alma Roundabout and Viaduct (Tony Carrasco)
- Churchill Crossing Concept (Michael Price)
- Charleston/Meadow Underpass Concept (Elizabeth Alexis)

Below is a description of the distinguishing characteristics that AECOM used to review each New Idea and notable impacts related to the following categories:

- Geometrics/Structures
- Right of Way Requirements
- Groundwater/Stormwater Impacts
- Traffic/Access Circulation
- Safe Routes for Ped/Bikes
- Cost Effectiveness

Attachments:

- Churchill Crossing Concept, Typical Section
- Churchill Crossing Concept, Layout
- Charleston/Meadow Underpass Concept, Typical Section
- Charleston/Meadow Underpass Concept, Layout

South Tunnel At-Grade Freight Concept (Roland Lebrun)

This concept is a variation of the South Palo Alto Tunnel At-Grade Freight alternative already being studied. Variations include:

- Begin tunnel 200 feet north of Matadero Creek.
- Reduce spacing between twin bore tunnel to 30 feet.
- Split the two freight tracks, one to each side of the trench/tunnel section

Geometrics/Structures

- Extensive jet grouting would be required to accommodate the reduced spacing between the twin bore tunnels. impacting underground utilities. A geotechnical investigation is required to define ground improvement measures.
- Construction complications/inefficiencies due to restricted access for portal and boring construction activities.
 - a. The CPUC will not allow private at-grade crossings of the northbound track for construction and maintenance access.
 - b. Caltrain will not allow access across tracks during revenue hours.
- The permanent southbound freight trackway is within 3-feet of the western Caltrain right-of-way line and private properties (homes/backyards). There will be permanent freight train noise and vibration.

Right of Way Requirements

- Similar to the other South Palo Alto Tunnel alternatives, subsurface acquisitions are required for ground anchors for the trench retaining walls and right of way acquisitions will be required to construct pump stations.

Groundwater/Stormwater Impacts

- Adobe Creek will be impacted. Matadero Creek will not be impacted.
- Extensive jet grouting will impact ground water flow and containment of existing contaminated plumes.
- Pump station required to dewater the trench and tunnel.
- Numerous regulatory agency approvals required for creek diversions.

Traffic/Access Circulation

- Alma St. permanently reduced to three lanes at the South Portal.

Safe Routes for Ped/Bikes

- Pedestrian and bicyclists are separated from passenger train traffic only.

Cost Effectiveness

- This alternative will still be in the billions of dollars range (greatest level of local funding) and will not eligible for grade separation funding as the at-grade crossing for freight would remain.

Embarcadero/Alma Roundabout and Viaduct (Tony Carrasco)

This concept includes a roundabout at the Embarcadero/Alma, allowing all turning movements to/from Embarcadero and Alma.

Geometrics/Structures

- The rail has to be raised 20+ feet over its current elevation over Embarcadero, creating a 3-level “interchange”. As a result, the rail impacts extend about 1,000 feet further north than the Churchill viaduct.
- The existing rail and road bridges over Embarcadero would have to be demolished and reconstructed to accommodate a wider structure needed for a roundabout.
- The aforementioned wider structure would likely require lowering of Embarcadero itself (doable, but added cost).

Right of Way Requirements

- Right-of-way impacts on the west side are likely (at Palo Alto High School and the Town and Country shopping center).

Groundwater/Stormwater Impacts

- New pump station required at Embarcadero.

Traffic/Access Circulation

- Queues from the left turns onto Kingsley (from SB Alma) could back up into the circulatory roadway of the roundabout, impacting the roundabout itself, in addition to this being a safety issue too (sudden, unexpected stopping of vehicles).
- A private driveway would have to be accessed from the circulatory roadway of the roundabout (done in some cases, but certainly not desirable).
- Merging from the roundabout onto WB Embarcadero is problematic (sight distance is limited, plus there's not much distance to weave into the adjacent lane to make a left turn into the high school).

Safe Routes for Ped/Bikes

- Big roundabouts are typically difficult for ped/bikes to navigate.

Cost Effectiveness

- We have another alternative (the intersection at Kingsley/High) to address traffic circulation at Embarcadero/Alma that functions better and costs much less.

Churchill Crossing Concept (Michael Price)

This concept partially closes Churchill Avenue, but preserves access to Alma. A typical section and a schematic layout of this concept are attached.

Geometrics/Structures

- The “split” of the roadway on NB Alma and EB Churchill introduces a fixed object in the road (end of the retaining wall), but we should be able to design this so that it’s not a safety hazard.
- The retaining walls on Alma will be tall (~20 feet Max) and will have a tunnel-effect. Providing left and right shoulders would be ideal, especially 8 to 10-foot right shoulders for disabled vehicles. **To provide an 8-foot right shoulder on NB Alma St (connecting to Churchill Ave in the underpass), the landscaping strip on the east side of Alma St will have to be removed. This will reduce the setback distance from the curb line for many homes fronting Alma by approximately 9.5 feet.**
- Need to evaluate a profile on Churchill to see if there’s an impact to the Churchill/Paly/Castilleja intersection. At first glance, it appears we can avoid lowering this intersection.
- Since there are no ped/bikes on Alma and Churchill (under the tracks), we can be more aggressive with the road profile and use 10-12% Max. This will help reduce the construction limits and cost.
- The bridge geometry and lane configurations need to be hashed out. We’ll need two through lanes on NB Alma.
- **The sight distance at the T-intersection of Churchill and Alma will be less-than-standard for vehicles making rights/lefts onto Alma from EB Churchill. This is mainly due to very little space available for a right shoulder on SB Alma.**

Right of Way Requirements

- Temporary Construction Easements (TCEs) **will be required.**
- **Full acquisitions likely not required, but partial/sliver residential takes potentially needed along Alma St and potentially a home on the east side of Mariposa Ave.**
- **Curb setback distances must be reduced for homes along Alma St, as noted above.**
- **Potential minor relocation of the ped/bike trail on the north side of Churchill (between Castilleja Ave and the railroad).**
- **The far-right lane on SB Alma St will encroach inside Caltrain’s R/W. This will have to be reviewed/approved by Caltrain.**

Groundwater/Stormwater Impacts

- Pump Station will be needed to drain the lowered Churchill/Alma intersection.

Traffic/Access Circulation

- This concept will create circuitous routes for some and introduce more traffic on residential streets.
- Several traffic movements are eliminated... likely to cause driver confusion for those not familiar with the configuration:
 - a. Traffic from WB Churchill must turn right onto NB Alma
 - b. No thru-movement allowed on Churchill
 - c. Traffic from SB Alma cannot make a left onto EB Churchill
 - d. Traffic from NB Mariposa cannot access Churchill (vehicles would have to turn around). Residents on Mariposa (south of Churchill and north of Miramonte) would be forced to travel south, generating more traffic on other Southgate neighborhood streets (Castilleja Ave and Miramonte Ave).

- e. One private driveway on Churchill (between Castilleja and Mariposa) will front a one-way “frontage” road (traveling north), which will force them to travel north and make a right onto Mariposa to exit the Southgate neighborhood.
- f. Left turns not allowed from WB Churchill onto Mariposa (same condition as today).
- g. The left turn movements to/from Kellogg Ave and Coleridge Ave will have to be prohibited because drivers trying to make a left turn onto Alma will not have adequate sight distance to approaching vehicles traveling on NB and SB Alma St, respectively. A concrete barrier will likely be placed at these locations to prohibit the left-turn movements at each intersection.

Safe Routes for Ped/Bikes

- Grade separation for motor vehicles is not ped/bike friendly, so need a separate undercrossing for ped/bikes (similar to the current Option 1 for the Churchill closure).

Stage Construction

- This alternative would likely reduce Alma St to two lanes (one lane in each direction) with no access to the west side of the tracks for a lengthy duration during construction while the underpass and a lowered Alma/Churchill are built. Unless Caltrain accepts top-down construction or some other non-traditional construction method, shoofly tracks will also be required.

Cost Effectiveness

- This idea is more costly than a closure of Churchill, but potentially less costly than the Churchill viaduct.

Charleston/Meadow Underpass Concept (Elizabeth Alexis)

This concept provides a grade separation at Charleston and Meadow without raising the tracks. A typical section and a schematic layout of this concept are attached.

Geometrics/Structures

- The east/west through movements would pass under two structures (one for the railroad, one for Alma St), similar to Embarcadero today.

Right of Way Requirements

- The presentation infers no property impacts, but the width needed to accommodate the turning movements (the u-turn bay, for example) for truck/buses will likely require sliver takes (at the very least) or complete property acquisitions. A 2-lane roundabout (~172-foot outside diameter, including sidewalks) would be required to accommodate the additional traffic and turning movements. The roundabout's footprint would require full property acquisitions.
- Slide 8 does not show standard merge distances, so the footprint (along M/C) would likely be much larger than presented on this slide.
- The existing width of Charleston on the east side of the tracks (from back of sidewalk to back of sidewalk) is approximately 85 feet. To obtain an adequate cross section of the frontage roads and underpass, we need approximately 95 feet of width, which will require a sliver acquisitions on each side of the road (see x-section). The curb setback distance for the homes on the south side Charleston would be reduced by ~ 16 feet.
- The width of Charleston on the west side of the tracks is even more narrow, thus, having greater impact on private properties.
- The width of Meadow on the east side of the tracks is only ~ 62 feet (back of sidewalk to back of sidewalk), making the same configuration on Meadow less feasible.

Groundwater/Stormwater Impacts

- Same as other underpass options... a pump station will be needed to drain the lowered roads.

Traffic/Access Circulation

- A circuitous route is proposed for EB vehicles on Charleston and Meadow.
- Traffic on NB and SB Alma St destined for El Camino Real and other locations on the west side of the tracks would also have to traverse a circuitous route. In the NB direction, drivers will likely opt for Ely PI to access Charleston via Mumford PI to avoid any backups on Alma St, thus generating more traffic on residential streets.
- Road geometry would have to be hashed out to ensure queuing of vehicles (for the u-turn movement, for example) does not impact through movements.

Safe Routes for Ped/Bikes

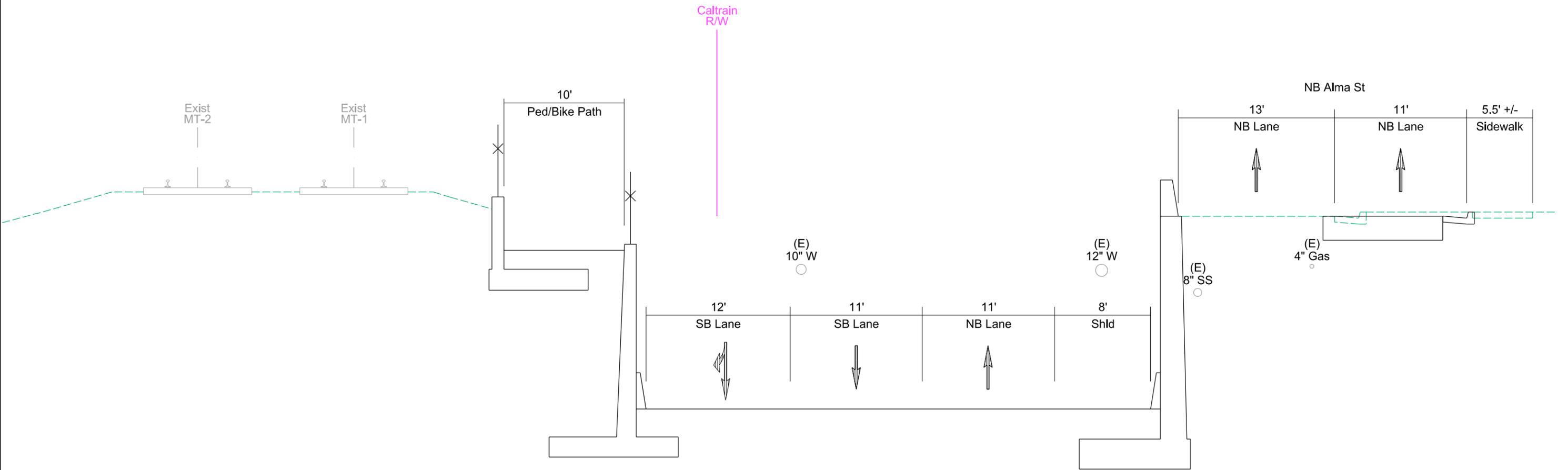
- The "split" of Meadow and Charleston will create a conflict between peds/bikes and motor vehicles, i.e., peds would be on the outside of the road approaching the railroad, but then cross one lane of (moderately high speed) traffic to get to the inside lane (to enter the underpass section of M/C).

Cost Effectiveness

- The property impacts will likely make this concept more costly than the Hybrid alternative, and thus, potentially cost prohibitive.

DRAFT: For Discussion Only

Price - Typical Section for Churchill Concept



Typical Section
Alma St (North of Churchill Ave)

Kellogg Ave

Churchill Ave

Coleridge Ave

Price - Churchill Underpass Layout

Ped/Bike Bridge

Alma St

Caltrain R/W

Mariposa Ave

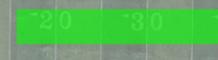
Paly Rd

Castilleja Ave

Legend



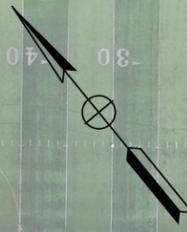
Encroachment inside Caltrain R/W



Sliver Takes and/or TCEs

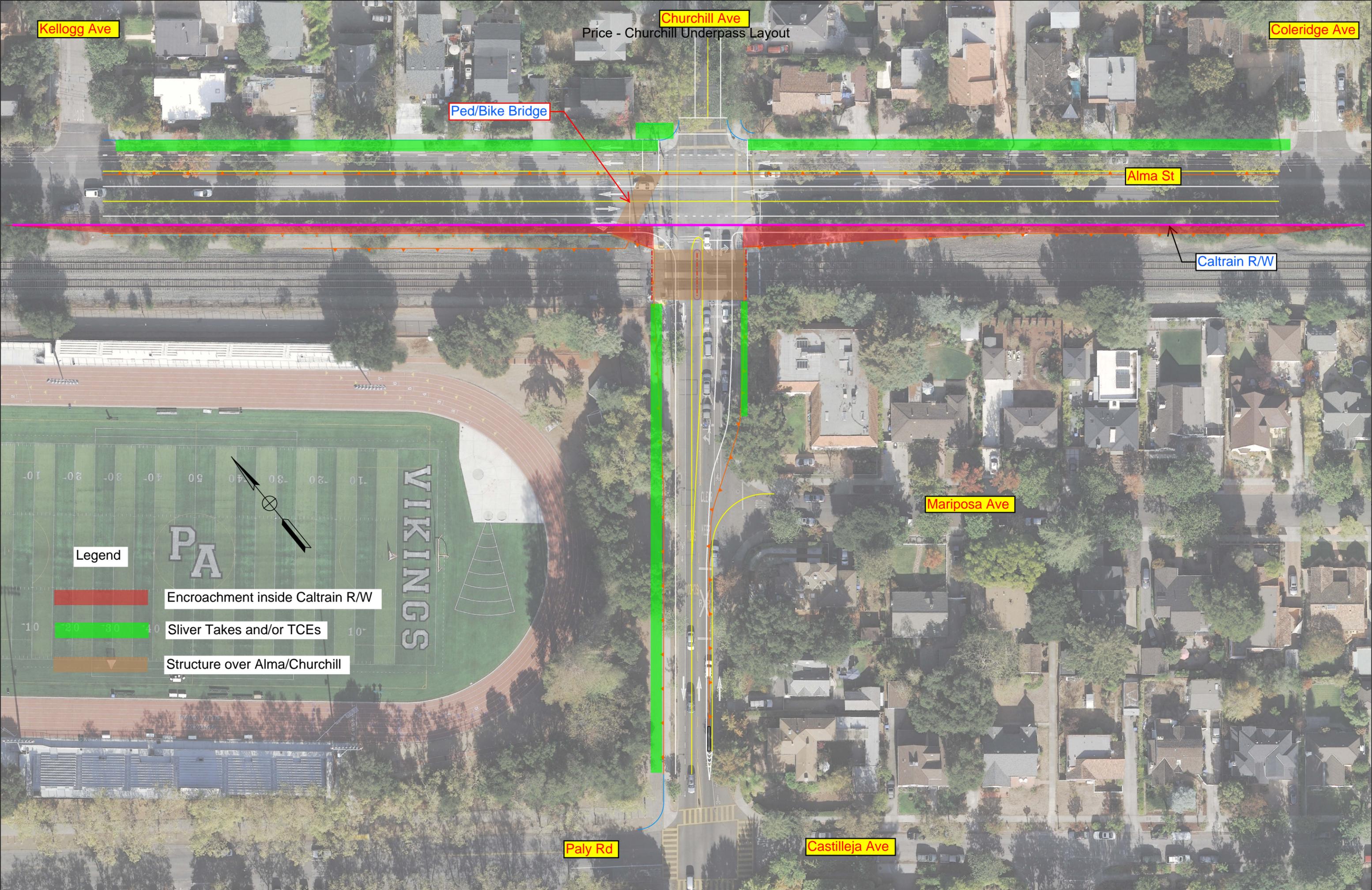


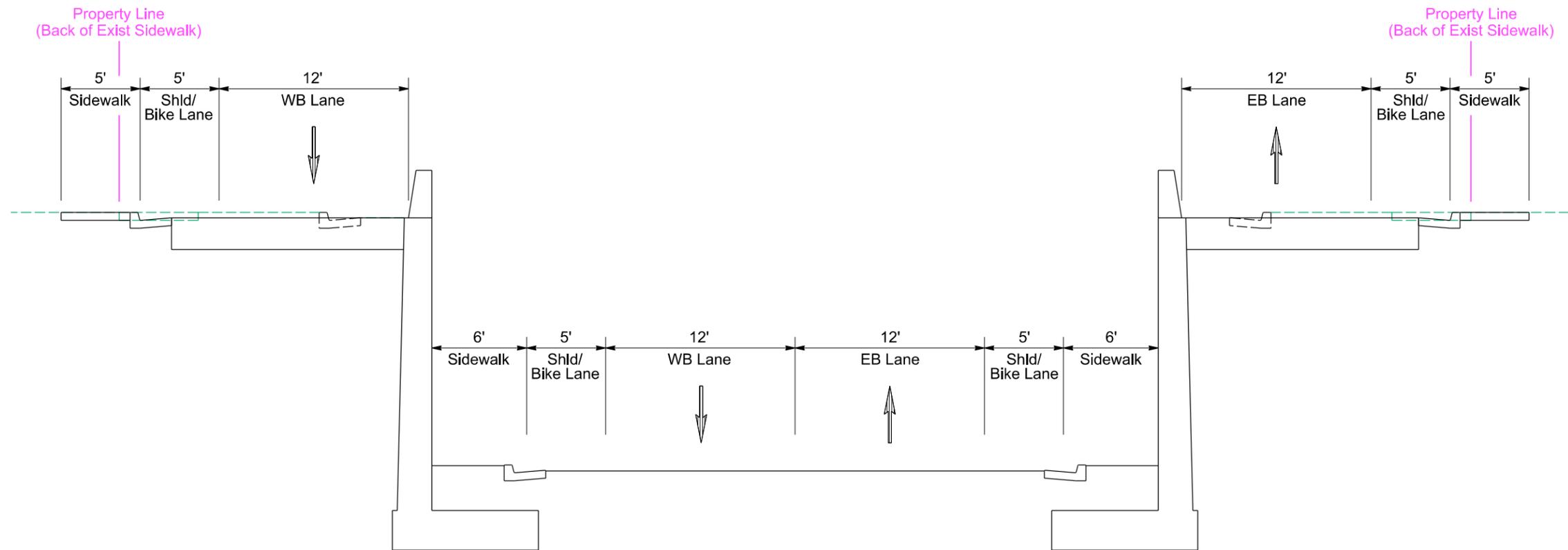
Structure over Alma/Churchill



PA

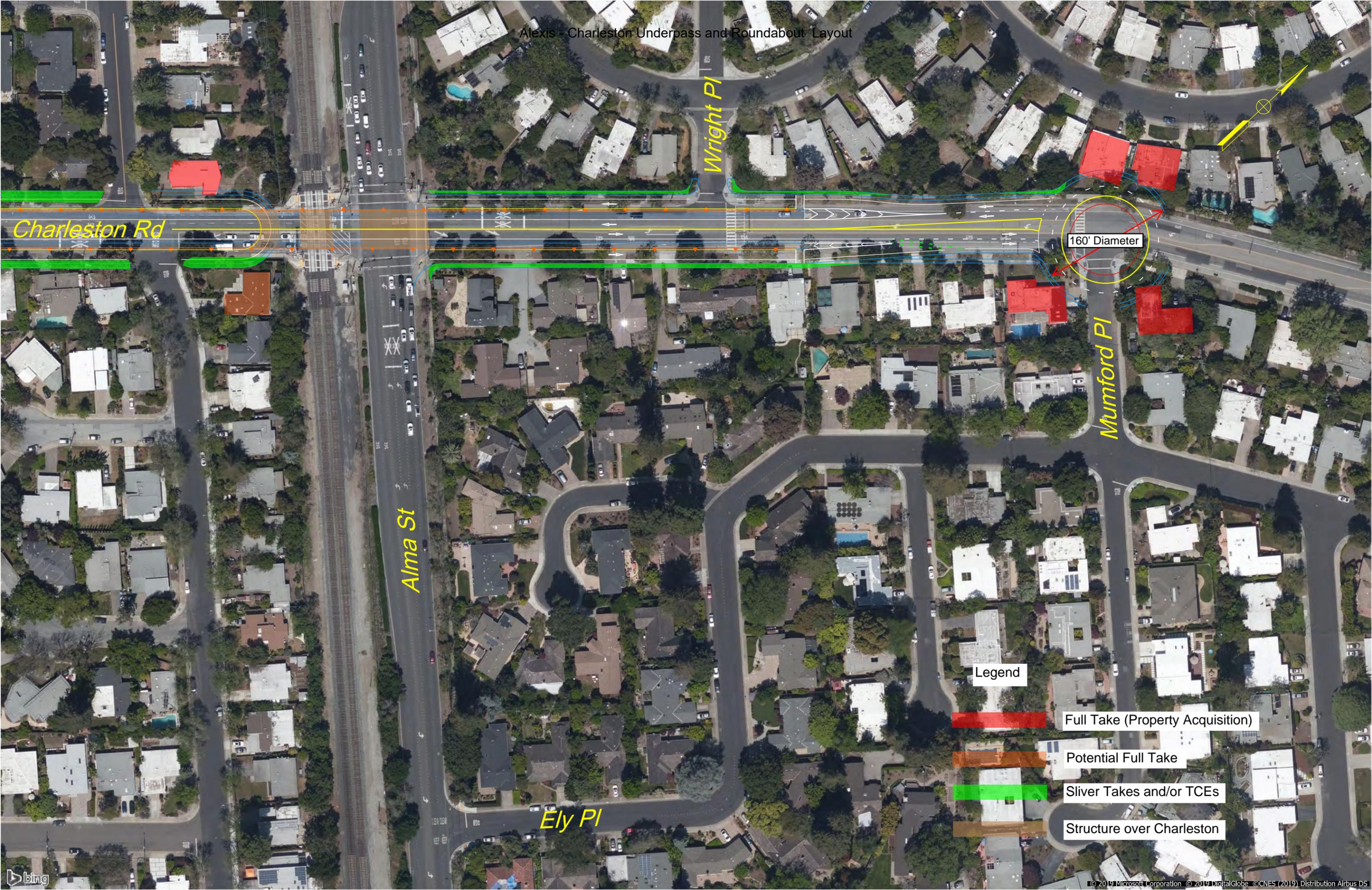
VIKINGS





Typical Section
Charleston Rd (East of Alma St)

Alexis - Charleston Underpass and Roundabout Layout



Charleston Rd

Wright Pl

160' Diameter

Mumford Pl

Alma St

Ely Pl

Legend

-  Full Take (Property Acquisition)
-  Potential Full Take
-  Sliver Takes and/or TCEs
-  Structure over Charleston