City of Palo Alto (ID # 9492)

City Council Rail Committee Staff Report

Report Type: Action Items **Meeting Date: 8/15/2018**

Summary Title: Connecting Palo Alto Rail Program: Continued Screening of Ideas for Further Study

Title: Connecting Palo Alto Rail Program: Continued Discussion and Screening of Railroad Grade Separation Ideas Related to Meadow Drive and Charleston Road, Including the Further Study of Idea MCL and the Potential Merger and Further Study of Ideas MCR and MCT

From: City Manager

Lead Department: Transportation

Recommendation

Staff recommends that the Rail Committee receive information and a presentation regarding three grade separation ideas, specifically at Meadow Avenue and Charleston Road (MCL, MCR and MCT), as part of the Connecting Palo Alto Rail Program. The Committee may recommend further refinements to the eight remaining railroad grade separation ideas, including the potential merger of Meadow/Charleston reverse hybrid and trench or tunnel ideas (MCR and MCT).

Background

The City of Palo Alto currently has four at-grade crossings of the Caltrain tracks that divide the City. With much needed Caltrain service enhancements underway (and high-speed rail a possibility in the future), gate closures at these crossings are expected to increase delays to motorists, pedestrians, and bicyclists substantially in the future. As a result, the City Council has prioritized planning for railroad grade separations and the Rail Committee has been gathering public input and working to identify a handful of alternatives for in-depth analysis.

On June 19, 2018, City Council approved moving forward with the eight specific grade separation ideas, which are summarized below. Council also directed Staff to return to Council in August or earlier with a report on the impacts to properties for hybrid options for Charleston Road and Meadow Drive.

1. **CAX -** Churchill Avenue crossing closed (full or partially); study additional options for addressing traffic in the Embarcadero Road underpass area including actions to minimize redirected traffic onto residential streets in adjacent neighborhoods and

commit to adopting appropriate mitigations to address the impacts;

2. **MCL -** Meadow Drive and Charleston Road railroad over roadway hybrid and build Loma Verde Avenue bike/pedestrian crossing to connect to Margarita Avenue bicycle boulevard;
3. **MCR -** Meadow Drive and Charleston Road roadway over railroad reverse hybrid and build Loma Verde Avenue bike/pedestrian crossing to connect to Margarita Avenue bicycle boulevard;
4. **MCT -** Meadow Drive and Charleston Road roadway over railroad trench or tunnel; Alma Street would not be within trench or tunnel (maintains Alma Street connections to Meadow Drive and Charleston Road) with Alma Street in its existing alignment or a new alignment;
5. **MCV -** Meadow Drive and Charleston Road railroad over roadway viaduct;
6. **PAH -** Continue proposed Menlo Park railroad over roadway hybrid and/or viaduct across San Francisquito Creek and Palo Alto Avenue;
7. **PCX -** Palo Alto Avenue crossing closed; improvement options include: build an Everett Avenue bike/pedestrian undercrossing and widen University Avenue;
8. **WBP -** City-wide deep-bore railroad under roadway tunnel within Palo Alto city limits with two new underground rail stations with or without freight

Discussion

At the direction of Council, the Connecting Palo Alto consultant has completed preliminary analysis, layouts, and narratives for two ideas—*Meadow Drive and Charleston Road Railroad over Roadway Hybrid (MCL)* and *Meadow Drive and Charleston Road Roadway over Railroad Reverse Hybrid (MCR)*. The narrative information is included as Attachment A. A Staff presentation will be provided at the Rail Committee meeting.

Attachments:

- Attachment A - Narrative for Ideas MCL and MCR

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Project name:
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Project ref:
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Date:
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CC:
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Memo

Subject: Narrative Geometry Description for Ideas MCL and MCR

The following is based on a conceptual engineering evaluation and is intended for discussion purposes only.

Meadow Drive and Charleston Road Hybrid (MCL)

Grade separate Meadow Drive and Charleston Road with the railroad partially elevated over a partially lowered roadway and build Loma Verde Avenue bike/pedestrian crossing to connect to Margarita Avenue Bicycle Boulevard.

Temporary Railroad Geometry: Temporary tracks to bypass the mainline track and structures during construction are required. The temporary double tracks will be positioned on the east side of the existing mainline tracks. The tracks will swing east starting 700 feet south of Loma Verde Avenue, run parallel to the existing tracks and then swing back west into the existing tracks 1,600 feet north of San Antonio Road and remain at grade level for the entire alignment. The temporary tracks will encroach on Alma Street approximately 5 feet between intersections and 15 feet at the intersections where there are additional turning lanes. The total length of temporary track is 6,400 feet. The temporary tracks are designed with the required safety and construction clearances and for a maximum speed of 75 mph. The proposed mainline vertical alignments (profiles) are controlled by the required length of vertical curves, length of tangents between curves and the overall length of the available mainline track clear for construction.

Permanent Railroad Geometry: The permanent horizontal railroad alignment will match the existing horizontal alignment. The permanent railroad profile was analyzed for maximum grades of 1% and 2% (it should be noted that Caltrain design criteria specifies a 1% maximum grade and grades up to 2% would require approval on a case-by-case basis for new construction). The maximum grade of 2% could not be achieved due to requirements for the length of vertical curves and the minimum length of connecting tangents (330 feet); however, a grade of 1.7% could be achieved and is described below:

- For the 1% Maximum Grade. The permanent track will rise from El Verano Avenue at a grade of 1.0% on retained fill into a 320 feet long vertical curve over Meadow Drive. This places the top-of-rail 14 feet above the existing Meadow Drive roadway elevation. It continues at a slope of 0.4% into a 760 feet long vertical curve over Charleston Rd. This places the top-of-rail 14 feet above the existing Charleston Road roadway elevation. The track then descends at a negative 1% grade on retained fill to meet the existing mainline track 2,300 feet north of San Antonio Road. The existing mainline grade is a positive 0.2% grade.
- For the 2% Maximum Grade. The permanent track will rise from 400 feet south of El Verano Ave at a grade of 1.7% on retained fill into a 730-foot long vertical curve over Meadow Drive. This places the top-of-rail 14 feet above the existing Meadow Drive roadway elevation. It continues at a slope of 0.3% into an 810-foot long vertical curve over Charleston

Road. This places the top-of-rail 14 feet above the existing Charleston Road roadway elevation. The track then descends at a negative 1.2% grade on retained fill to meet the existing mainline track 2,600 feet north of San Antonio Rd. The existing mainline grade is a positive 0.2% grade.

Roadway Geometry: Between Park Boulevard and Alma Street, Meadow Drive will be lowered at a maximum grade of 5%. Beginning at Park Boulevard to the east, it will be lowered a maximum of 7 feet from existing grade below the railroad tracks and then it will rise to meet the existing grade approximately 170 feet east of Alma Street. The total length of roadway impacted on Meadow Drive is 460 feet. The total length of roadway impacted on Alma Street 680 feet, 280 feet to the north and 400 feet to the south of Meadow Drive. Alma Street will be lowered a maximum of 4 feet from the existing grade to maintain the existing intersection with Meadow Drive. The maximum grade on Alma Street will be 1.0%. The design speed for Meadow Drive is 25 MPH and 35 MPH for Alma Street.

Between Park Boulevard and Alma Street, Charleston Road will be lowered at a maximum grade of 5%. Beginning at Park Boulevard to the east, it will be lowered a maximum of 6 feet from the existing grade below the railroad tracks and then it will rise to meet the existing grade approximately 190 feet east of Alma Street. The total length of roadway impacted on Charleston Road is 550 feet. The total length of roadway impacted on Alma Street is 540 feet, 270 feet to the north and 270 feet to the south of Charleston Road. Alma Street will be lowered a maximum of 4 feet from the existing grade to maintain the existing intersection with Charleston Road. The maximum grade on Alma Street will be 1.0%. The design speed on Charleston Road is 25 MPH and 35 MPH on Alma Street.

Initial Assessment of Potential Impacts: The MCL idea has the following potential impacts.

- The removal of the existing trees in the buffer between Alma Street and the mainline tracks (east side) to construct the temporary double tracks and maintain the Caltrain revenue service.
- Also to accommodate the temporary tracks, the width of Alma Street will be temporarily reduced approximately 5 feet between intersections and 15 feet at the intersections where there are additional turning lanes.
- Property impacts are relatively minor (driveway modifications).
- Utility relocations are required with the depressed roadway and a pump station may be required.
- Elevation of the railroad will have visual impacts.

Meadow Drive and Charleston Road Reverse Hybrid (MCR)

Grade separate Meadow Drive and Charleston Road with the roadway partially elevated over a partially lowered railroad and build Loma Verde Avenue bike/pedestrian crossing to connect to Margarita Avenue Bicycle Boulevard.

Temporary Railroad Geometry: Temporary tracks to bypass the mainline track and structures during construction are required. The temporary double tracks will be positioned on the east side of the existing mainline tracks. The tracks will swing east starting at Loma Verde Avenue, run parallel to the existing tracks and then swing back west into the existing tracks 1,100 feet north of San Antonio Road and remain at grade level for the entire alignment. The temporary tracks will infringe on Alma Street approximately 5 feet between intersections and 15 feet at the intersections where there are an additional turning lanes. The total length of temporary track is 7,600 feet. The temporary tracks are designed with the required safety and construction clearances and for a maximum speed of 75 mph. The proposed mainline vertical alignments (profiles) are controlled by the required length of vertical curves, length of tangents between curves and the overall length of the available mainline track clear for construction.

Permanent Railroad Geometry: The permanent horizontal railroad alignment will match the existing horizontal alignment. The permanent railroad profile was analyzed for maximum grades of 1% and 2% (it should be noted that Caltrain design criteria specifies a 1% maximum grade and grades up to 2% would require approval on a case-by-case basis for new construction). The maximum grade of 1% grade cannot be achieved due to the limited available length of trackway between San Antonio Road and Charleston Road and the vertical clearance requirement for track between the rail and the overhead structure (24.5 feet). For the maximum grade of 2%, the permanent track will start descending 900 feet south of Loma Verde Avenue at a grade of negative 1.7% into a 1,215 feet long vertical curve under Meadow Drive. This places the top-of-rail 31 feet below the existing Meadow Drive roadway elevation. It continues at a slope of 0.6% into a 770-foot long vertical curve

under Charleston Road. This places the top-of-rail 31 feet below the existing Charleston Road roadway elevation. The track then rises at a 2% grade to meet the existing mainline track 1,800 feet north of San Antonio Road. The existing mainline grade is a positive 0.2% grade.

Roadway Geometry: Between Park Boulevard and Alma Street, Meadow Drive will be raised a maximum grade of 4%. Beginning at Park Boulevard, Meadow Drive will rise a maximum of 4 feet above the railroad track and then descend to meet the existing grade approximately 190 feet east of Alma Street. The total length of roadway impacted on Meadow Drive is 550 feet. The total length of roadway impacted on Alma Street is 480 feet, 280 feet to the north and 200 feet to the south of Meadow Drive. Alma Street will be raised by a maximum of 4 feet to maintain the existing intersection with Meadow Drive. The total length of roadway impacted on Alma Street 480 feet and the maximum grade is 1.7%. The design speed of West Meadow Drive is 25 MPH and 35 MPH on Alma Street.

Between Park Boulevard and Alma Street, Charleston Road will be raised at a maximum grade of 4%. Beginning at Park Boulevard, Charleston will rise a maximum of 4 feet above the railroad track and then descend to meet the existing grade approximately 200 feet east of Alma Street. The total length of roadway impacted on Charleston Road is 560 feet. The total length of roadway impacted on Alma Street is 390 feet, 195 feet to the north and 195 feet to the south of Charleston Road. Alma Street will be raised a maximum of 2 feet from the existing grade to maintain the existing intersection with Charleston Road. The maximum grade on Alma Street is 1.50%. The design speed on Charleston Road is 25 MPH and 35 MPH on Alma Street.

Initial Assessment of Potential Impacts: The MCR idea has the following potential impacts.

- The removal of the existing trees in the buffer between Alma Street and the mainline tracks (east side) to construct the temporary double tracks and maintain the Caltrain revenue service.
- Also to accommodate the temporary tracks, the width of Alma Street will be temporarily reduced approximately 5 feet between intersections and 15 feet at the intersections where there are additional turning lanes.
- Property impacts are relatively minor (driveway modifications).
- Elevation of the roadway will have visual impacts.