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Project name:
Palo Alto Rail Management Service

Project ref:
60577356

From:
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Date:
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To:
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CC:
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Memo

Subject: Narrative Geometry Description for Ideas CAH, CAR, and PAH

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

Churchill Avenue Hybrid (CAH)

The Churchill Avenue hybrid idea is for Churchill Avenue to go under railroad and the railroad to be partially raised.

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 swing east starting at the south end of the Embarcadero Road Underpass, run parallel to the existing tracks and then swing back west into the existing tracks at the north end of the California Avenue Station and remain at grade level for the entire alignment. The total temporary track length is 5,475 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: From south of the Embarcadero Road Underpass, the permanent track will rise at a grade of 0.6% on retained fill into a 1,240 feet long vertical curve over Churchill Avenue. This places the top-of-rail 10 feet above the existing Churchill Ave roadway. It then descends on retained fill at the maximum allowed 1.0% grade to meet the existing mainline grade north of the California Avenue Station. The existing mainline profile between Embarcadero Road and California Avenue is at a negative 0.4% grade.

Roadway Geometry: Midway between Castilleja Street and Mariposa Avenue, Churchill Avenue will be lowered at a maximum grade of 7.4%. After a 330-foot sag curve Churchill will rise at 7.4% and return to the existing grade approximately 300 feet east of Alma Street. The total length of roadway impacted on Churchill Avenue is 665 feet and the roadway will be lowered a maximum of 15 feet from the existing grade. Mariposa Avenue and Alma Street will also be lowered, 5 feet and 9 feet respectively, to maintain their intersections with Churchill Avenue. The maximum grade on both streets will be 5%. The total length of roadway impacted on Alma Street will be 610 feet, 310 feet to the north and 300 feet to the south. Mariposa Avenue will be impacted for 220 feet south of Churchill. The design speed is 35 mph for Alma Street and 25 mph for Mariposa and Churchill avenues.

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

- The removal of all 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 double tracks, the width of Alma Street will be temporarily reduced from 45 feet to 25 feet. This will result in temporary loss of traffic lanes and parking.
- About 14 residential properties will be significantly impacted, and about 8 residential properties will require driveway modifications.
- Major utility relocations are required along with the addition of a pump station for the lowered roadways.
- Elevation of the railroad will have visual impacts.

Churchill Avenue Reverse Hybrid (CAR)

The Churchill Avenue reverse hybrid idea is for Churchill Avenue to go over railroad and the railroad to be partially lowered.

Temporary Railroad Geometry: Temporary double tracks to bypass the mainline track and structures during construction are the same as described above for the CAH idea.

Permanent Railroad Geometry: From south of the Embarcadero Road Underpass, the permanent tracks will descend in a trench at a grade of 1.0% into a 1200-foot long vertical curve under Churchill Avenue. This places the top-of-rail 6 feet under the existing Churchill Avenue roadway. It then rises in a trench at a 1.0% grade to meet the existing mainline grade north of the California Avenue Station.

Roadway Geometry: Approximately 200 feet east of Mariposa Avenue, Churchill Avenue will be raised at a maximum grade of 8%. After a 350-foot crest curve Churchill will be lowered at 8.0% and return to the existing grade approximately 400 feet east of Alma Street. The total length of roadway impacted on Churchill Avenue is 910 feet and the roadway will be raised a maximum of 22 feet from the existing grade. Mariposa Avenue and Alma Street will also be raised, 14 feet and 22 feet respectively, to maintain their intersections with Churchill Avenue. The maximum grade on both streets will be 5%. The total length of roadway impacted on Alma Street will be 1300 feet, 600 feet to the north and 700 feet to the south. Mariposa Avenue will be impacted for 380 feet south of Churchill. The design speed is 35 mph for Alma Street and 25 mph for Mariposa and Churchill avenues.

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

- The removal of all 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 double tracks, the width of Alma Street will be temporarily reduced from 45 feet to 25 feet. This will result in temporary loss of traffic lanes and parking.
- About 43 residential properties will be significantly impacted, and about 3 residential properties will require driveway modifications.
- Major utility relocations are required along with the addition of a pump station for the lowered railroad in a trench.
- Elevation of the roadways will have visual impacts.

Palo Alto Avenue Hybrid (PAH)

The Palo Alto Avenue hybrid idea is for the railroad to go over Palo Alto Avenue and for Palo Alto Avenue to be partially lowered.

Permanent Railroad Geometry: in order to not impact the historic bridge over San Francisquito Creek, a permanent railroad alignment will be constructed. An initial evaluation of a westerly alignment indicated impacts to an apartment building in Menlo Park so an easterly alignment was evaluated. From the north end of the Palo Alto Station platform, the permanent track will rise at a grade of 1.0% on retained fill or viaduct into 1,550 long vertical curve over San Francisquito Creek. This

places the top-of-rail 7 feet above the existing grade at the creek. It then descends on retained fill or viaduct at 1.0% grade to meet the existing grade north of the creek within the City Limits of Menlo Park.

Roadway Geometry: Just east of El Camino Real, Palo Alto will be lowered at a maximum grade of 7.0%. After a 190-foot sag curve Palo Alto will rise at 7.0% and return to the existing grade approximately 300 feet after Alma Street. The total length of roadway impacted along Palo Alto is approximately 800 feet and the roadway will be lowered a maximum of 15 feet from existing grade. Alma Street will also be lowered approximately 7 feet. The maximum grade on Alma Street will be 5% and the total length impacted will be 140 feet. The design speed is 25 mph for Palo Alto Ave and Alma Street.

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

- The removal of all the existing trees in the buffer between Alma Street and the mainline tracks (east side) to construct the permanent double tracks and maintain the Caltrain revenue service on the existing alignment.
- Also to accommodate the permanent double tracks, east side parking on Alma Street may be removed.
- The driveway to the Palo Alto Condominiums on Palo Alto Avenue may require modification.
- Major utility relocations are required along with the addition of a pump station for the lowered roadways.
- Elevation of the railroad will have visual impacts.
- The permanent alignment impacts trees within El Palo Alto Park – additional surveys would be required to assess if the alignment impacts the heritage tree within the park.