

Expanded Community Advisory Panel (XCAP)

THIS PACKET INCLUDES:

A compilation of emails (public comments, etc) submitted to the XCAP email box, XCAP@CityofPaloAlto.org, between **January 27 and February 3, 2021 at 12:00 pm approximately.**



Note: This PDF contains bookmarks separating each email in this compilation. If you'd like to see the bookmarks but your internet browser doesn't show them, download this PDF from your browser, then re-open it in a PDF reader (such as Adobe Reader, Foxit, etc) and make sure your bookmarks panel is open.

From: [Susan Newman](#)
To: [Expanded Community Advisory Panel](#)
Subject: Comments and suggestions for Chapter 3.2 and the Majority Opinion
Date: Wednesday, January 27, 2021 12:55:53 PM
Attachments: [21.01.26Chapter 3.2 Churchill Avenue.pdf](#)

CAUTION: This email originated from outside of the organization. Be cautious of opening attachments and clicking on links.

Dear XCAP,

This is a little late, I know — we had a roof leakage as I was rushing to get done before the 12:00 deadline. I hope you will take a look at it anyway.

I apologize for whatever may be awkward about conveying comments through PDF annotations, but it would have been hard to describe everything in an email without the context of the chapter.

There are a couple of places in the text where I question the representation of one thing or another, or encourage you to do parallel analysis on all options, but overall I want to thank the authors for doing an equitable job discussing the alternatives. I know how hard everyone has worked, and even though I don't fully agree with your conclusions, I respect your positions and appreciate the work you have put in and the issues you have brought up over the course of the XCAP.

Here 'tis:

Comments on Chapter 3.2 and the Majority Opinion:

Good luck today.

regards,
Susan

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Churchill Ave

Summary of Actions

XCAP evaluated three alternatives, the Viaduct, Partial Underpass, and Closure plus Mitigations for the Churchill Ave rail crossing.¹

XCAP voted to recommend Closure with Mitigations by a 6-to-3 vote (No: [Phil Burton, Nadia Naik, Keith Reckdahl](#)). The dissenting minority opinion is available on page XX...

Since the Closure with Mitigations option has two options [for bike/ped designs](#), XCAP also voted by a 7-0-2 vote (Abstained: [Phil Burton, Tony Carrasco](#))² to recommend ~~the second of these options~~ [Option 2](#), which calls for a bicycle / pedestrian tunnel that runs down the middle of Churchill east of Alma Street and then proceeds under Alma and the railroad tracks.³

Commented [1]: Note correction -Phil and Tony abstained

Additional mitigations, some suggested by the consultant and others by XCAP members, were unanimously recommended by XCAP.

Viaduct

~~In this alternative the railroad tracks would be elevated on a structure, with the bottom of the structure about 20 feet above ground, with the bottom of the structure about 15.5 feet above ground as it crosses Churchill. The viaduct would be topped by six-foot sound wall barriers (parapets), plus an overhead contact system for electrical power that reaches a height of about 30 feet above the top of railtracks.~~

Commented [2]: Per Staff suggested change

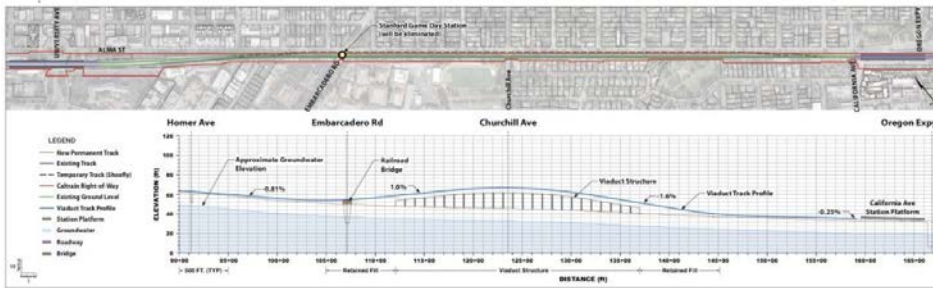
¹ XCAP Meeting Summary 9/2/2020: https://connectingpaloalto.com/wp-content/uploads/2020/09/2020-09-02_XCAP-Meeting-Summary_Cybertary.pdf

² Pg. 9 of https://connectingpaloalto.com/wp-content/uploads/2020/09/2020-09-16_XCAP-Meeting-Summary_Cybertary.pdf

³ XCAP Meeting Summary 9/16/2020: https://connectingpaloalto.com/wp-content/uploads/2020/09/2020-09-16_XCAP-Meeting-Summary_Cybertary.pdf



Proposed Ground Level View - Looking East
Churchill Avenue Intersection



Concept Plan and Profile
Concept Plan and Profile

The new electrified railroad tracks would be built at the same location as the existing railroad tracks and, going north to south, would begin rising near Homer Avenue, remain elevated over Churchill Avenue, and return to the existing track grade near the California Avenue Station. The Stanford game day station⁴ would be eliminated. The roadway at Churchill Avenue would remain at its existing grade and have a similar configuration to what exists today. This design

⁴.AECOM's response to XCAP regarding Stanford Game Day Station <https://connectingpaloalto.com/wp-content/uploads/2020/04/InfoReport-Staff-Update-FollowUpReXCAPQuestions.pdf>: "No, there is not a legal requirement to continue the operation of the Stanford Game Day Caltrain Station. The City of Palo Alto does not have an agreement with Caltrain for this stop and Caltrain does not have an agreement in place with Stanford for this station. Stanford acknowledges the usefulness of the stop but also could function with using the nearby stations if needed."

would require expanding the width of Churchill Ave through the underpass of the railroad to accommodate a the new column supporting the railroad structure.

Please see the Churchill Ave Vicinity Viaduct Fact Sheet for more information.⁵

Closure with Mitigations

The second alternative considered is to close Churchill to vehicular traffic across the railroad tracks and introduce mitigations at Embarcadero Road and Oregon Expressway to handle traffic diverted from the closed Churchill intersection. In this alternative, the railroad tracks would remain at their existing location and elevation. A separate tunnel would be provided for pedestrians and cyclists to cross Alma at Churchill, enabling access to and from Palo Alto High, Stanford University, and points beyond.

Churchill Avenue would become a T-intersection with Alma Street on the east side and would end at Mariposa Avenue on the west side. Two options for the Churchill bike/ped undercrossing were studied.

Closure Option 1

The first option would allow bikes and pedestrians on the east side of Alma to use a call button to activate a traffic signal to go across Alma and then descend a ramp that would run alongside the train tracks, going under the tracks and emerging on the other side of the tracks via another ramp running alongside the rail right of way. In this option, similar to the condition today, bikes and pedestrians would cluster at the intersection waiting for the crosswalk signal.



Proposed Churchill Avenue Undercrossing Concept Overview - Option 1

⁵Churchill Ave Vicinity Viaduct Fact Sheet, Appendix XX.



Proposed Churchill Avenue Undercrossing Concept - Option 1
- Looking North

Closure Option 2

The second option would provide a straight path running down the center of Churchill Ave under both Alma and the rail tracks, with vehicle traffic allowed on either side of the entrance to the ramps along the east side. There would be complete separation of vehicle traffic from cyclists and pedestrians and they would not need to wait for vehicle traffic to cross.



Proposed Churchill Avenue Undercrossing Concept Overview - Option 2



Proposed Churchill Avenue Undercrossing Concept - Option 2
- Looking West

Additional Mitigations

As part of this alternative, the City would also construct several intersection improvements in order to mitigate the anticipated diversion in traffic resulting from the closure. These improvements would be constructed and funded as part of the overall project. They include:

1. Construction of a pedestrian/bike overcrossing at Embarcadero Road and Alma Street
2. Reconstructing or replacing the existing Alma Street overpass over Embarcadero.
3. Adding a right turn lane from eastbound Embarcadero Road to Kingsley Ave.
4. Adding a left turn lane from southbound Alma Street to Kingsley Ave.
- 4-5. Installation of two new signal lights on the Alma Street overpass at Embarcadero Road, at the Embarcadero slip road and at Kingsley Ave.
- 5-6. Installing a new signal at Embarcadero Road/Kingsley Avenue/High Street with two possible options: One that provides full connectivity to and from High Street, or an optional alternative that maintains the movements to and from High Street as they are today.
- 6-7. Improvements at Embarcadero/High Street for bicycles and pedestrians per the Neighborhood Traffic Safety and Bicycle Boulevard (NTSBB) projects plans.⁶
- 7-8. Optimize signal timing at El Camino and Embarcadero and install an additional westbound left turn lane on Embarcadero onto El Camino and northbound right turn lane on El Camino onto Embarcadero Road.
- 8-9. Signalize on Alma Street both on/off ramps at Alma and Oregon Expressway
- 9-10. Optimize signal timing and install a westbound right turn lane and northbound right turn lane from Oregon Expressway to El Camino Real

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(need to add all available graphics and figure out how to reference them to correspond with the list above)

⁶ The Neighborhood Traffic Safety and Bicycle Boulevard (NTSBB) page:
https://www.cityofpaloalto.org/gov/depts/trn/bicycling_n_walking/ntsbb.asp

Please see the Churchill Ave Closure with Mitigations Fact Sheet for more information.⁷

Partial Underpass

The Partial Underpass would separate Churchill Avenue from the current Caltrain tracks via an underpass. However, there would no longer be through traffic on Churchill Avenue east of Alma; instead, it would now form a T-intersection.



Churchill Avenue Partial Underpass Overview - Looking Northwest



Churchill Avenue Partial Underpass Aerial (Plan)

Traffic on eastbound Churchill Avenue from the Palo Alto High School/Castilleja Avenue intersection would descend and pass under the railroad tracks, which would remain at their current grade. The down ramp would terminate at a lowered, signal-controlled, T-intersection at Alma Street where vehicles could make a left turn onto northbound Alma Street or a right turn onto southbound Alma Street, and then ascend and return to existing roadway grade along

⁷ Churchill Ave Closure with Mitigations Fact Sheet, Appendix XX.

Alma Street. ~~Thru traffic across Alma is prohibited. Other existing turning movements would not be supported.~~

Commented [3]: Per Staff Suggestion

Traffic on westbound Churchill Avenue would terminate at a T-intersection at Alma Street. Right turns only (onto northbound Alma Street) would be permitted. Similarly, westbound traffic on Kellogg Avenue and Coleridge Avenue approaching Alma Street would be permitted to make right turns only onto northbound Alma Street.

Traffic on southbound Alma Street would operate as it does today except left turns onto Kellogg Avenue, Churchill Avenue and Coleridge Avenue would not be permitted. The Caltrain tracks would be supported on a new rail bridge spanning a lowered Churchill Avenue at approximately its current location. A separate pedestrian/bicycle crossing would be provided at Kellogg Avenue. From westbound Kellogg Avenue, a 10-foot-wide path would descend at the center of the road, at which point it would widen to 20 feet and cross under both Alma Street and the Caltrain tracks and joins the Embarcadero Bike Path adjacent to Palo Alto High School.

(add image of Kellogg Ave and Alma Street intersection Looking North)

Please see the Partial Underpass Fact Sheet for more information.⁸

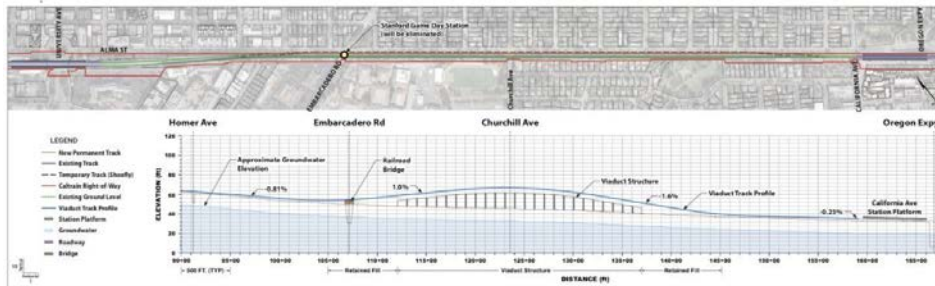
Viaduct

In this alternative the railroad tracks would be elevated on a structure, with the bottom of the structure about 15 feet above ground, (20 feet above ground to top of rail). The viaduct would be topped by six-foot sound wall barriers (parapets), plus an overhead contact system for electrical power that reaches a height of about 30 feet above the top of rail.



Proposed Ground Level View - Looking East
Churchill Avenue Intersection

⁸ Partial Underpass Fact Sheet, Appendix XX



Concept Plan and Profile

Concept Plan and Profile

The new electrified railroad tracks would be built at the same location as the existing railroad tracks and, going north to south, would begin rising near Homer Avenue, remain elevated over Churchill Avenue, and return to the existing track grade near the California Avenue Station. The Stanford game day station⁹ would be eliminated. The roadway at Churchill Avenue would remain at its existing grade and have a similar configuration to what exists today. This design would require expanding the width of Churchill Ave through the underpass of the railroad to accommodate a new column supporting the railroad structure.

Please see the Churchill Ave Vicinity Viaduct Fact Sheet for more information.¹⁰

Compared with City Council-Adopted Criteria

This section compares the alternatives with the city-council adopted criteria for grade separations.

Facilitate movement across the corridor for all modes of transportation

Under Closure with Mitigations, Churchill Avenue vehicular traffic will be somewhat impeded since traffic will be closed to vehicles at the railroad tracks. On the other hand, the movements of pedestrians and cyclists will be significantly enhanced as they will be grade separated from both the railroad and Alma vehicular traffic under Option 2.

"somewhat" seriously understates the case, making the report seem biased. How about: "vehicular movement across the corridor will be no longer be possible at the Churchill intersection under this option. On the other hand..."

⁹ AECOM's response to XCAP regarding Stanford Game Day Station <https://connectingpaloalto.com/wp-content/uploads/2020/04/InfoReport-Staff-Update-FollowUpReXCAPQuestions.pdf>: "No, there is not a legal requirement to continue the operation of the Stanford Game Day Caltrain Station. The City of Palo Alto does not have an agreement with Caltrain for this stop and Caltrain does not

¹⁰ Churchill Ave Vicinity Viaduct Fact Sheet, Appendix XX.

, remaining open for cars, bikes and pedestrians. In the absence of frequent interruptions in road traffic due to increased traffic, this option could also result in increased traffic volumes along Churchill, especially in the absence of improvements in traffic flow along Embarcadero.

Under

would

In the Viaduct alternative, Churchill Avenue will be grade separated from the railroad for all modes and will remain open. The Viaduct thus would provide opportunities for additional traffic volumes for all modes.

With the Partial Underpass Alternative, Churchill Avenue would be grade separated from the railroad for all modes, **certain** remain open, with the exception that through traffic on Churchill Avenue and various turns from and to Alma would no longer be possible. Thus, some vehicular traffic would have to take alternate routes.

to and from

Reduce delay and congestion for vehicular traffic at rail crossings

The Closure with Mitigations alternative will reduce delay and congestion and delay on Alma but will adversely affect nearby intersections. The mitigations described are intended to reduce these impacts.

Under the Viaduct alternative, ~~the railroad crossing gates and warning lights at Churchill Avenue would be removed and~~ rail-crossing-related delay and congestion eliminated on Alma. No nearby streets would be negatively affected.

would be

both Churchill and Alma.

and most movements between Churchill and Alma, but southbound turning movements from Churchill east of Alma and

Under

In the Partial Underpass alternative, ~~the railroad crossing gates and warning lights at Churchill Avenue would be eliminated, but certain~~ rail crossing-related delay and congestion on Alma would be eliminated, but certain east-bound traffic to and from Alma would also be eliminated.

east-bound traffic along Churchill. Drivers wishing to turn south from Churchill east of Alma, or continue along Churchill from

In all alternatives, the railroad crossing lights at Churchill Avenue would be removed.

Support continued rail operations and station improvements

~~With the Closure plus Mitigations alternative, no shoofly track ("shoofly") will be required.~~

With the Viaduct alternative, ~~a shoofly would be required, and the~~ Stamford game day station would be eliminated.

~~With the Partial Underpass alternative, a shoofly is likely to be required unless an alternate construction methodology and sequencing is acceptable to Caltrain.~~

~~A shoofly track increases the time of construction and the cost of the project.~~

with the cost coming primarily from mitigations.

Cost

Closure plus Mitigations is by far the lowest cost option at \$50 to \$65 million, where the cost comes primarily from the mitigations.

The Partial Underpass alternative is estimated to cost \$160-200 million, and the Viaduct is estimated to cost \$300-\$400 million.

Minimize right-of-way acquisition

In both the Closure with Mitigation and the Partial Underpass alternatives, no acquisition would be required.

What are these impacts?

Describe the nature and extend of this loss

In the Closure with Mitigation alternative, there would likely be some minimal impacts to Palo Alto High School property. **There could also be some parking loss on the east side of Churchill Avenue for the pedestrian/bike undercrossing (Option 2).**

The specificity and apparent magnitude of impacts on residential parking for this option contrasts strongly with the "some parking loss on the east side of Churchill" for the tunnel along Churchill. This reads as biased. It would be better to treat the options as similarly as possible and make arguments for the preferred options later.

In the Partial Underpass alternative, driveway modifications would likely be required due to the removal of planter strips along Alma Street. Some minor "sliver" acquisition of the high school and/or residential properties fronting Churchill Avenue on the west side of the tracks might also be required. Most significantly, this option's bike/pedestrian tunnel on Kellogg would require the elimination of on-street parking on both sides of Kellogg Avenue along the pedestrian/bike ramp for approximately 250-300 feet from Alma Street. Two "sliver" acquisitions on the corners of Kellogg and Alma might also be required.

Reduce rail noise and vibration

In all alternatives, train horn noise and crossing gate warning bells would be eliminated with the removal of the at-grade crossings. EMU trains, compared to diesel engines, will also reduce noise. Eliminating these horn and bell sounds means that all alternatives will be at least 10 dBa quieter than the situation today.

Electric multiple unit ("EMU") trains using electric engines/motors, compared to the diesel engines of existing Caltrain trains, will also reduce noise. Note that freight trains running on the tracks will still retain their diesel engines.

In general, the Viaduct and the partial underpass would have slightly less noise than a Closure with Mitigations (a difference of about 3 dBa, which is considered barely perceptible)¹¹. If a six-foot-high noise barrier is added to the Closure with Mitigations, then it becomes equal to the others. However, if the Partial Underpass gets a noise barrier, it does significantly better (about 6 dBa difference).

The Viaduct would provide the most reduction of vibration impacts for homes on both the east and west sides of the track. The Closure with Mitigations would have no change in vibration impacts and the Partial Underpass would have little to no change.

Minimize visual changes along the corridor

The Closure with Mitigations alternative, with the railroad tracks remaining at existing grade, produces the least visual change of the three alternatives. Residual roadway areas from closure

¹¹ To quote from the noise report at <https://connectingpaloalto.com/noise-vibration/>: "...it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5-dB increase is generally perceived as a distinctly noticeable increase, and a 10-dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3-dB increase in sound level, would generally be perceived as barely detectable."

would provide opportunities for landscaping that would essentially enhance the viewscape when compared with above current conditions.

New paragraph here

The visual impact of the Viaduct is the most significant of three options, with railroad tracks approximately 20 feet above the current grade with the trains and attendant structures such as electrical power line poles 30 feet higher. Landscaping with trees could be incorporated for screening where feasible. Depending on the vantage point, the Partial Underpass option would ~~have~~ have an impact on views, primarily from the underpass structure itself. Also, mature trees within the Alma Street planting strip, from just north of Kellogg Avenue to just south of Coleridge Avenue, would be removed with landscaping restoration limited due to space constraints.

also have

Minimize disruption of construction

for most of the construction period to accommodate

Closure with the Partial Underpass is the least disruptive alternative, requiring only minimal road closures (approximately 1-2 days/weekends only). Construction would last for approximately 2 years. It would have minor noise and vibration impacts during construction.

The Viaduct alternative would require ~~extended~~ lane reductions at Alma Street (one lane in each direction) for the shoofly track. Construction would ~~also~~ last for approximately 2 years and would have moderate noise and vibration impacts.

The Partial Underpass would require closure of Churchill Avenue between Alma Street and Mariposa Avenue for the majority of its 2.5 to 3 years of construction. Alma Street will be one-way northbound for approximately 6+ months. There would be severe noise and vibration impacts during construction according to the noise report submitted to XCAP.¹²

With the Closure plus Mitigations alternative, no temporary railroad track ("shoofly") will be required. With the Partial Underpass alternative, a shoofly is likely to be required unless an alternate construction methodology and sequencing is acceptable to Caltrain. With the Viaduct alternative, a shoofly is required.

A shoofly track increases the time of construction and the cost of the project.

Comment: AECOM engineers confirmed several times that it would be possible to move the viaduct closer to Alma and therefore eliminate the shoofly construction along Alma. Would it be worth noting, here or elsewhere, that further design/engineering work on both the Viaduct and the Partial Underpass might result in changes to the construction durations, costs and disruptions?

Combine these sentences into a single paragraph, beginning with "The need to build shoofly tracks increases the time and cost of construction."

Commented [4]: From updated AECOM Matrix

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Additional Considerations

Creek/Drainage Impacts

There is no creek in the vicinity of Churchill, so the only considerations are related to drainage impacts.

¹² <https://connectingpaloalto.com/noise-vibration/>

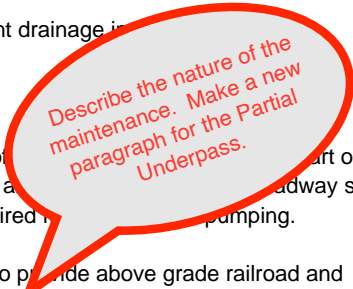
The Closure plus Mitigations alternative will require a pump station for the pedestrian/bike undercrossing. Also, the pump station at Embarcadero Road would require relocation to accommodate the widening of Alma Street, as proposed in the mitigations.

Similarly, a pump station would be required for the Partial Underpass, to service both its lowered roadway and proposed bike/pedestrian undercrossing. the lowered roadway and the proposed bike/pedestrian undercrossing.

The Viaduct alternative would have no significant drainage impacts.

Long-Term Maintenance

Long term maintenance involves maintenance of all components of any proposed alternatives. These include the above alternatives, roadway structures and also pumping system facilities that are required for the alternatives for pumping.



For the Viaduct, the structures that will be built to provide above grade railroad and embankments will require long term maintenance. Similarly, for the Partial Underpass, the road and rail-related structural components will also require long term maintenance.

The Closure Alternative ~~options provide~~ provides for below-ground pedestrian passageways/tunnels. Also, for the Partial Underpass alternative, the road will be depressed below the railroad structure to accommodate adequate vehicular clearance. Due to high groundwater conditions in the area, the pumping facilities and related structures will be required for these alternatives. Therefore, these alternatives will require long-term maintenance of such pumping facilities and structures.

Both the Closure and the Partial Underpass alternatives provide for below-ground pedestrian passageways/tunnels. In addition, under the Partial Underpass option, the road will be depressed. Due to high groundwater conditions in the area, pumping facilities and related structures will be required for these alternatives, and these in turn require long-term maintenance.

Utility Relocations

The Viaduct option has minimal impacts to utilities.

For the Closure plus Mitigations option, there could be minor utility relocations due to Embarcadero/Alma Street improvements. The potential exists for utility relocations due to the bike/pedestrian undercrossing.

The Partial Underpass option would require major utility relocations because of its lowered roadways.

Local Street Circulation Impacts during Construction

Areas in/around the construction areas will be impacted during construction.

For the Closure plus Mitigations option, these would be:

- The path along Palo Alto High School would temporarily be impacted during construction.

- Temporary night and weekend closures of lanes on Churchill Avenue, Alma Street, El Camino Real, Oregon Expressway, and Embarcadero Road.

For the Viaduct option:

- Alma Street reduced to one lane in each direction~~two lanes~~.
- Removal of right turn lane on southbound Alma Street at Churchill Avenue.
- Temporary night and weekend closures of lanes on Alma Street and Churchill Avenue.

For the Partial Underpass option:

- Lane reduction on Alma Street during construction ~~during~~
- Likely closure of Churchill Avenue ~~throughout the~~ excavation and construction of the undercrossing and related features.
- Likely closure of Kellogg Avenue for the duration of the pedestrian underpass construction ~~from one direction only~~.

Caltrain right-of-way

The City of Palo Alto ~~coordinate~~ with Caltrain if any encroachment into their right-of-way is needed ~~and the probability of approval by Caltrain is unknown at this time.~~

The Closure plus Mitigations option, requires permanent longitudinal encroachment inside Caltrain's right-of-way for the pedestrian/bike ramps for undercrossing Option 1, there is the potential for Caltrain right-of-way impact for the construction of the pedestrian/bike undercrossing option 2.

The Viaduct option requires no Caltrain right-of-way acquisition, permanent encroachment inside Caltrain's right-of-way. However, options of a linear park or dual use under the viaduct would require Caltrain approval.

~~In the Partial Underpass design requires permanent longitudinal encroachment inside Caltrain's right-of-way for the pedestrian/bike ramps (to the undercrossing at Kellogg Ave) and for the lanes/shoulders for southbound Alma Street, encroachment into Caltrain's ROW, especially during construction, would be from the southbound lane/shoulder on Alma Street and the pedestrian/bike ramps on the west side of the tracks for the underpass at Kellogg avenue.~~

Caltrain Design Exceptions Needed

The Closure plus Mitigations and Partial Underpass options do not require any Caltrain design exceptions. The Viaduct option requires a 1.6% vertical grade, whereas the current maximum grade allowed by Caltrain design standards is 1%.

Traffic Studies

The traffic impact of the alternatives has been extensively studied by AECOM's consultant, Hexagon Transportation Consultants, which built upon results from previous consultants,

The probability of approval by Caltrain is unknown at this time.

This comment seems out of place here, since a linear park was not part of the official design. Should go somewhere, perhaps in a discussion of design possibilities not yet explored.

Commented [5]: The Matrix says: "Potential for Caltrain right-of-way impact with the construction of the pedestrian/bike undercrossing." -

I'm unclear if it means ONLY during construction there is impact, but upon completion, there is none - or if it is a permanent encroachment. Additionally, I believe it is Option 1 that requires the "temporary encroachment" to build the up/down ramps alongside the ROW.

I'm asking Staff to clarify for us.

Commented [6]: Updated based on newest AECOM matrix

TJKM.¹³ Analyses were performed under existing traffic conditions and projected conditions in 2030. They also examined potential mitigations and their projected effects on level of service at various intersections.

Analyses of the Closure plus Mitigations, Viaduct, Partial Underpass options showed results summarized in the tables below:

Table 1
Alma and Churchill Grade Separation Alternatives – Existing Traffic Volumes

	Traffic Operations (Existing Traffic Volumes)															
	No Improvements (No Electrification) ¹				Churchill Closure ²				Viaduct ⁴				Partial Underpass ⁴			
	AM		PM		AM		PM		AM		PM		AM		PM	
	Delay (secs)	LOS	Delay (secs)	LOS	Delay (secs)	LOS	Delay (secs)	LOS	Delay (secs)	LOS	Delay (secs)	LOS	Delay (secs)	LOS	Delay (secs)	LOS
Alma Street & Churchill Avenue	88.9	F	66.67	E	23.58	C	28.23	C	45.39	D	42.73	D	15.62	B	21.66	C

Notes:-
1. All turning movements permitted. Analysis assumes 8 trains per hour under existing conditions. Traffic analysis was conducted using PTV Vissim software.
2. The following turning movements would not be possible:- left-turn, right-turn and through traffic from eastbound Churchill, through traffic from westbound Churchill, northbound left-turns and southbound right-turn from Alma. Traffic analysis was conducted using PTV Vissim software.
3. All turning movements permitted. Traffic analysis was conducted using PTV Vissim software.
4. The following turning movements would not be possible:- eastbound and westbound through traffic on Churchill Avenue across Alma Street, left-turn from westbound Churchill, and left-turn from southbound Alma. Traffic analysis was conducted using SimTraffic.

Table 2
Alma and Churchill Grade Separation Alternatives – Future Traffic Volumes

	Traffic Operations (Year 2030 Traffic Volumes)																			
	No Improvements (No Electrification) ¹				No Improvements (With Electrification) ²				Churchill Closure ³				Viaduct ⁴				Partial Underpass ⁵			
	AM		PM		AM		PM		AM		PM		AM		PM		AM		PM	
	Delay (secs)	LOS	Delay (secs)	LOS	Delay (secs)	LOS	Delay (secs)	LOS	Delay (secs)	LOS	Delay (secs)	LOS	Delay (secs)	LOS	Delay (secs)	LOS	Delay (secs)	LOS	Delay (secs)	LOS
Alma Street & Churchill Avenue	118.5	F	90	F	173.5	F	178.5	F	25.1	C	30.6	C	48.4	D	56.77	E	15.65	B	30.97	C

Notes:-
1. All turning movements permitted. Analysis assumes 8 trains per hour with no electrification. Traffic analysis was conducted using PTV Vissim software.
2. All turning movements permitted. Analysis assumes 14 trains per hour with electrification. Traffic analysis was conducted using PTV Vissim software.
3. The following turning movements would not be possible:- left-turn, right-turn and through traffic from eastbound Churchill, through traffic from westbound Churchill, northbound left-turns and southbound right-turn from Alma. Traffic analysis was conducted using PTV Vissim software.
4. All turning movements permitted. Traffic analysis was conducted using PTV Vissim software.
5. The following turning movements would not be possible:- eastbound and westbound through traffic on Churchill Avenue across Alma Street, left-turn from westbound Churchill, and left-turn from southbound Alma. Traffic analysis was conducted using SimTraffic.

Traffic conditions at the study intersections were evaluated using level of service (LOS). Level of service is a qualitative description of operating conditions ranging from LOS A, or free-flow conditions with little or no delay, to LOS F, or jammed conditions with excessive delays. The acceptable LOS in the City of Palo Alto is LOS D or better for signalized and unsignalized intersections.¹⁴

¹³ Churchill, Meadow and Charleston Grade Separation Traffic Analysis, Hexagon Transportation Consultants, dated 8/13/2020, Appendix XX: https://connectingpaloalto.com/wp-content/uploads/2020/08/Traffic-Analysis-Report_Churchill-Meadow-and-Charleston-Grade-Separation.pdf

¹⁴ From Introduction of Churchill, Meadow and Charleston Grade Separation Traffic Analysis, Hexagon Transportation Consultants, dated 8/13/2020, Appendix XX: https://connectingpaloalto.com/wp-content/uploads/2020/08/Traffic-Analysis-Report_Churchill-Meadow-and-Charleston-Grade-Separation.pdf

As Table 1 shows, under existing conditions, both the Closure plus Mitigations and the Partial Underpass options result in substantial improvements at Alma/Churchill from today's conditions, raising LOS in the AM and PM from F and E to Cs in the Closure plus Mitigations option, and to B and C in the Partial Underpass option, respectively. The Viaduct option trails slightly at LOS of Ds for both AM and PM.

~~In 2030 projected conditions, the Closure plus Mitigations and the Partial Underpass options remain the same, whereas if the intersection were left as it is now, the LOS would worsen to F in both AM and PM. The Viaduct option, however, would worsen slightly in the PM from LOS D to E.~~

As Table 2 shows, in 2030, when Electrification is completed but if no improvements are made, the LOS at Alma/Churchill remains an F, but with ~~has~~ even more delay, resulting in unclearable queues. However, in 2030, both the Closure plus Mitigations and the Underpass would maintain significant improvement. Of the three alternatives, Partial Underpass provides the best LOS, with Closure plus Mitigations next and Viaduct last. The Closure plus mitigations would improve the LOS to a C in both the AM and the PM and the Partial Underpass would improve the AM LOS to a B and the PM LOS to a C. The Viaduct would improve the AM LOS to a D and the PM LOS to an E.

In the Viaduct and Partial Underpass options, some XCAP members noted that if flow were not impeded by the train crossing, the traffic on Churchill might increase due to induced flow attracted by the lack of a train crossing, increasing the possibility of traffic backups in the small section of Churchill between Alma and El Camino. This was not studied by the consultant. Some XCAP members desired more work should be done in this area, but the consultant disagreed.

In addition, further studies are desired by XCAP members to examine the impacts and potential mitigations of bicycle and pedestrian traffic. (see Recommendations in XX)

Other Information

Palo Alto Unified School District (PAUSD)

Letter from PAUSD, dated February 26, 2020:

*The Palo Alto Unified School District (PAUSD) has not taken an official position regarding proposed options to mitigate increased rail traffic. Additional details regarding PAUSD usage of the intersection with vehicles, student distractions, and other discussion can be found in the full memo in Appendix XX.*¹⁵

¹⁵ PAUSD Memo on the potential implementation of the Closure plus Mitigations option, in Appendix XX: <https://connectingpaloalto.com/wp-content/uploads/2020/02/InfoReport-SharedatMeeting-Feb262020-Churchill-Closure-Impacts-PAUSD-Feb2020.pdf>

Commented [7]: @philburton.pagradecrossings@gmail.com you mentioned wanting to rearrange this paragraph. I am unsure what you wanted to do. Can you help?

Commented [8]: Deleting to substitute with suggested text per Staff. See next page

Commented [9]: Suggested text per Staff because the above paragraph compares FUTURE volume and traffic conditions with EXISTING conditions – but it is more relevant to compare future conditions with no improvements.

Note: slightly different than what was presented in the Memo – improved (hopefully) to make it more clear.

Letter from PAUSD, dated December 7, 2020

PAUSD asked to participate in any further future review (see appendix) [insert details from newly received PAUSD letter - wait until approved to release]

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Commented [10]: Confirm with Staff status of PAUSD letter

Additional details regarding PAUSD usage of the intersection with vehicles, student distractions, and other discussion can be found in the full memo in Appendix XX.¹⁶

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The Palo Alto Council of Parent Teacher Associations (PTAC) submitted a letter on January 18th, 2021 (after XCAP had completed its deliberations^{see}) saying that as “one of the key partners of the Safe Routes to School (SRTS) program, PTAC has not had a chance to fully participate in any designs or decisions” and have asked to “work with Staff on future designs of the grade separation projects and any mitigations...” See appendix XX

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Commented [11]: Per PTAC letter received 1/18/21
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Palo Alto Fire Department

Memo from Palo Alto Fire Department, dated October 30, 2019:

Conclusion: The data available clearly indicate that only a very small number of incidents (probably fewer than 0.5%, city-wide) will be affected by the closure [of Churchill]. Response time delays for these few incidents may be on the order of a minute or more.

Additional supporting data and discussion can be found in the full memo in Full letter in Appendix XX.¹⁷

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Palo Alto Police Department

Memo from Palo Alto Police Department, dated October 30, 2019:

The Police Department recognizes the local and regional importance of this project and will be able to successfully adapt their responses to whichever option is ultimately selected.

Additional supporting data and discussion can be found in the full memo in Full letter in Appendix XX.¹⁸

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¹⁶ PAUSD Memo on the potential implementation of the Closure plus Mitigations option, in Appendix XX: <https://connectingpaloalto.com/wp-content/uploads/2020/02/InfoReport-SharedatMeeting-Feb262020-Churchill-Closure-Impacts-PAUSD-Feb2020.pdf>

¹⁷ Palo Alto Fire Department Memo on the potential implementation of the Closure plus Mitigations option, in Appendix XX: <https://connectingpaloalto.com/wp-content/uploads/2019/10/Item-3CA-PAFD-Grade-Sep-memo.pdf>

¹⁸ Palo Alto Police Department Memo on the potential implementation of the Closure plus Mitigations option, in Appendix XX: <https://connectingpaloalto.com/wp-content/uploads/2019/10/Item-3CB-PAPD-Grade-Sep-memo.pdf>

Summary of the Majority Opinion

Six XCAP members voted to recommend Closure with mitigations to the City Council as the preferred alternative for the Churchill grade separation for the following reasons:

Lowest cost option

Closure with Mitigations is by far the lowest cost option, estimated at \$50-65M. The Partial Underpass option is estimated at \$160-200M, and the Viaduct option is estimated at ~~higher still~~ costs of \$300-400M. The likelihood of achieving a funding goal is maximized when the amount sought is minimized.

The Majority felt that additional expenditure of public funds to further study the Partial Underpass is not justified since the Partial Underpass is already an expensive alternative that is unlikely to be improved with additional design iteration. In addition, the Minority's support of the Partial Underpass seems rooted more in their support for further study rather than their belief that the Partial Underpass is actually a superior alternative. The Minority, in effect, is acknowledging that Partial Underpass as presently designed is not implementable.

yet higher

Commented [12]: Added by Dave and Larry – for XCAP review

Minimal aesthetic impacts

The Closure plus Mitigations option minimizes visual changes of the surroundings. There are no large structures being constructed. The bike/pedestrian underpass will create a new below ground structure, although much smaller in visual impact than a structure that serves vehicles. Proposed mitigations at Embarcadero will result in modifications in lane designations, improved accommodations for cyclists and pedestrians, and new traffic signals, but do not include the construction of large structures nor large modifications of existing structures.

On the other hand, both the Viaduct and Partial Underpass options will have much greater visual impact and resulting controversy.

The Viaduct option will introduce a new above-ground structure that runs for some length, visible from Embarcadero to some point beyond Churchill Ave. Those who own houses with their backyards adjacent to the train tracks will experience a structure with a train running on it over 40 feet in the air. Because of the width of the rail corridor near Churchill, the viaduct would be constructed only a few feet from property lines, increasing the impact on the nearby properties.

During construction, there would be additional visual impact with temporary, shoofly tracks running on Alma Street with Alma Street narrowed down to two lanes.

The Partial Underpass, while below ground, would also create a large concrete structure whose roadways are more complicated than a simple underpass, due to a design that preserves some

Should *visual* impact during construction be considered here? If so, shouldn't there be some discussion of the visual impacts of construction with the Closure option? Particularly expanding the overpass section of Alma, but also building the bike tunnel and modifying the intersection of Embarcadero and Alma.

?

of its turns and not others. There would be many concrete retaining walls arranged to support the proposed turning movements and roadways.

During construction, the Partial Underpass would also require temporary shoofly tracks running on Alma Street, and a subsequent lane reduction on Alma. Both of these changes will result in visual impacts during construction.

Minimized construction time

Along with the Viaduct option, the Closure plus Mitigation option has the least amount of construction time at approximately 2 years, thus minimizing any disruption to traffic and the community. In contrast, the construction time for the Partial Underpass is estimated to be greater at 2.5 to 3 years.

Vehicular traffic moved elsewhere can be mitigated

As previously discussed in the Traffic Studies section in this chapter, the vehicular traffic diverted to other roadways by the closure of Churchill can be successfully mitigated, if not improved in service level.

Mitigations were examined by Hexagon at many different intersections where traffic was projected to be rerouted. Details of currently proposed mitigations can be found in its report¹⁹. A summary of projected results of the mitigations, and the affected intersections, is shown in the table²⁰ below:

¹⁹ See Appendix A, Churchill Closure Traffic Study in the document, Churchill, Meadow and Charleston Grade Separation Traffic Analysis, Hexagon Transportation Consultants, dated 8/13/2020, Appendix XX: https://connectingpaloalto.com/wp-content/uploads/2020/08/Traffic-Analysis-Report_Churchill-Meadow-and-Charleston-Grade-Separation.pdf

²⁰ Ibid., Table 5 page 49.

Table 5
Churchill Closure – Mitigated Intersection Levels of Service under Existing Conditions

#	Intersection	Peak Hour	Churchill Closure - Existing Conditions					
			No Improvements			With Improvements		
			Traffic Control	Avg. Delay (sec.)	LOS	Traffic Control	Avg. Delay (sec.)	LOS
1	Alma Street & Lincoln Avenue	AM	One-Way	>=50	F	One-Way	5.7	A
		PM	Stop	>=50	F	Stop	21.1	C
2	Alma Street & Embarcadero Road	AM	One-Way	>=50	F	Signal	4.8	A
		PM	Stop	>=50	F	Signal	3.0	A
3	Alma Street & Kingsley Avenue	AM	One-Way	>=50	F	Signal	13.3	B
		PM	Stop	>=50	F	Signal	18.3	B
4	El Camino Real/Embarcadero Rd*	AM	Signal	>80	F	Signal	67.1	E
		PM	Signal	>80	F	Signal	61.1	E
5	El Camino Real/Oregon Expwy-Page Mill Rd*	AM	Signal	>80	F	Signal	72.5	E
		PM	Signal	>80	F	Signal	73.5	E
6A	Alma St & Oregon Expwy WB Off Ramp (Oregon Ave)	AM	One-Way	>=50	F	Signal	6	A
		PM	Stop	>=50	F	Signal	6.7	A
6B	Alma St & Oregon Expwy EB Off Ramp	AM	One-Way	>=50	F	Signal	17.9	B
		PM	Stop	>=50	F	Signal	16.0	B

Notes:
1. Average delay is reported for the worst approach at one-way stop intersections. LOS F is not substandard unless a signal warrant is met.
2. Bold indicates substandard intersection level of service.

I would expect to see the effects of Closure on LOS with 2030 traffic volumes in this section

[Those who favored the Partial Underpass raised concerns about the Traffic Study, however the Majority feels the work presented was professional and persuasive and that the mitigations presented will sufficiently address the impacts highlighted in the report. In addition, the Minority raised the issue that further analysis might find a need for additional mitigations, which would then lead to increased costs, but the Majority considers this argument speculative and not likely to be significant. It should be noted that the Minority XCAP members found no fault with the traffic consultant's work on the Charleston/Meadow crossings.](#)

Commented [13]: This section added by Dave and Larry for XCAP review

Commented [14]: Several folks raised issues about the traffic analysis – including the time line horizon, the need for large roundabout, what bike infrastructure might be needed based on LOS.

Commented [un15]: Majority needs to verify language

An enhanced experience for cyclists and pedestrians

The Churchill/Alma intersection experiences a sizable amount of bicycle and pedestrian traffic, especially during the weekdays. Given the proximity to Palo Alto High School, hundreds of high school students travel to and from campus through this intersection.²¹ It also serves as a connection from points north and Stanford University, for both pedestrians and cyclists.

As it stands currently, neither traffic nor the train are separated from cyclist or pedestrian traffic. This pattern creates a hazardous condition that has seen many accidents over the years²², and is only poised to worsen as Caltrain electrifies its trains and they travel faster and, over time, more often.

²¹ Draft Traffic Impact Study Report, Churchill Ave Closure, dated August 7, 2019, by traffic consultants TJKM, Appendix XX, page 33: https://connectingpaloalto.com/wp-content/uploads/2020/09/Draft-Traffic-Impact-Study-Report_Churchill-Ave-Closure_TJKM-report_Aug-7-2019.pdf. Through their daily traffic counts, they saw approximately 258 cyclists on the days they gathered data. Note that this count was only in the AM, as their PM counts were after students had ended school 2-3 hours before, and thus would not have been seen during their PM count time.

²² See Chapter 4, Safety.

By fully separating bicycle and pedestrian traffic from both vehicular traffic and the train, we can create a safer and more enhanced crossing condition for cyclists and foot traffic in and near Churchill Ave. Proposed mitigations at Embarcadero and Alma also address shortcomings in the current bicycle and pedestrian paths there. These should include improvements relating to the areas around Embarcadero at Alma, including Kingsley, High, and Emerson at Embarcadero as defined by The Neighborhood Traffic Safety and Bicycle Boulevard (NTSBB) Projects.²³

Minority Opinions

Insert Dissenting opinion section here (which includes Tony's viaduct):

(NOTE: THIS SECTION NEEDS INPUT FROM PHIL/KEITH/NADIA)

Commented [16]: This is part of Tony's dissenting opinion. Recall he wanted viaduct as first choice but got no support.

Areas for Future Study

XCAP members noted many items for future exploration. These are:

1. Embarcadero and other traffic mitigations would need to be explored further to produce solutions to the satisfaction of affected neighborhoods. This includes, but not limited to:
 - a. LOS impacts on affected intersections at El Camino Real.
 - b. Solutions for bike and pedestrians at those same intersections.
 - c. Ensure that all safety concerns are addressed.
 - d. Addressing Paly student drop off which currently occurs at unsafe points in/around the Embarcadero underpass.
2. Bike/pedestrian options need further refinement and study, including but not limited to:
 - a. Homer like bike/pedestrian underpass at/near Churchill.
 - b. Widening of Option 2, through the use of areas currently taken up by sidewalk and landscaping.
 - c. Further study on alternative locations for the bike/pedestrian crossing, like at Seale or Kellogg.
3. XCAP members would also like to see further study on the Partial Underpass to see if viability can be achieved.
4. Clarity from Caltrain on what Right of Way can be used for this project.
5. Researching freight trains' use of Caltrain tracks and whether this operation can end, which will affect permissible grades and vertical curve transition lengths.
6. Explorations into phasing of the project.
7. Researching alternative entrances to Town and Country.
8. Exploration into a viaduct over Embarcadero, but at reduced and diminishing height at the Churchill intersection.

Commented [17]: Larry tells me that he and Tony will work on this section and will provide soon. 1-19-2021

²³ The Neighborhood Traffic Safety and Bicycle Boulevard (NTSBB) Projects
https://www.cityofpaloalto.org/gov/depts/trn/bicycling_n_walking/ntsbb.asp

9. Induced traffic should be modeled in the case of options, the Viaduct and Partial Underpass, which could see an increase in flow of traffic due to grade separation.

Future Outreach Opportunities

While the XCAP process was open to the public, there was minimal outreach to interested stakeholders because the City staff wanted to do outreach. This situation, coupled with the many pandemic distractions, caused many in the community to not participate in XCAP's Churchill design and eventual decision.

Palo Alto has an incredibly rich bike/ped community and we should collaborate with community members to leverage their insights to improve all future designs. We recommend that further outreach about the Churchill crossing should include the following groups:

People whom the City should liaise with:

- Palo Alto Unified School District (PAUSD)
- Palo Alto High Students
- Palo Alto High School PTSA
- Safe Routes to School team
- City/School traffic liaison committee
- Palo Alto Pedestrian and Bicycle Committee (PABAC) and other bicycle-advocacy organizations
- Stanford University
- Town & Country Village management and merchants
- Palo Alto Chamber of Commerce
- Palo Alto Neighborhoods (PAN)
- Adjacent neighborhood associations
- Castilleja school administration and students
- Caltrain
- [Union Pacific Railroad \(or future short line operator\)](#)

Public Opinion

Community opinions originated mainly from:

1. Residents in/around the Churchill intersection, living on Churchill and on Alma Street.
2. Residents living on Mariposa Ave.
3. Residents of the Southgate neighborhood.
4. Residents of the Professorville neighborhood.
5. Residents living on Embarcadero Rd.

Refer to Appendix XX for detail on their comments.

From: [Nadia Naik](#)
To: [Expanded Community Advisory Panel](#)
Cc: [Wilson, Sarah](#)
Subject: Fwd: Suggestions to improve XCAP report
Date: Sunday, January 31, 2021 10:13:58 PM

CAUTION: This email originated from outside of the organization. Be cautious of opening attachments and clicking on links.

Forwarding to XCAP email to ensure it gets in the record.

----- Forwarded message -----

From: Kerry Yarkin <kya.ohlone@gmail.com>
Date: Sun, Jan 31, 2021 at 8:57 PM
Subject: Suggestions to improve XCAP report
To: <greg@brail.org>, <philburton.pagradecrossings@gmail.com>, <tony@carrasco.com>, <inyoungcho0@gmail.com>, <LKlein40@gmail.com>, <nadianaik@gmail.com>, <dshen.nopa@gmail.com>, <cari@caritempleton.com>

January 31, 2021

To XCAP Committee Members:

I have not attended any recent XCAP Meetings, until last week's meeting, January 27, 2021. At the point where XCAP voted on the different alternatives I assumed (incorrectly) that the Reports and Feedback to City Council would be a straight forward, objective report. I was dismayed listening and reading the XCAP Summary and Report. I recommend that you have some outside readers and staff write an Executive Summary that represents the hearings and work the XCAP did to arrive at a decision. I have a few additional general comments.

There is much of the report dedicated to the COVID pandemic and its effects on the recommendation. The data and recommendations were based on the information at the time. It is not the Committee's purview to comment on unknowns such as Presidential Election, drop in transit agency ridership, PAUSD involvement, and City revenue. On page 2 of Executive Summary, there is a statement about unknowns which "has resulted in high level of uncertainty leading to further difficulty in making firm decisions" is not objective.

Much data was discussed from the AECOM traffic studies. There should be a paragraph with information about AECOM, what type of consulting company they are and why they were chosen to do the traffic studies, how much money was spent on these studies. I see nothing in the XCAP Summary about this.

Under Decisions and Recommendations for Churchill Ave, I was thoroughly confused

about the Churchill recommendations and options. Please summarize the options and votes. It might be useful to use the Rail Fact Sheet put out by City Staff to clearly describe the Churchill Closure with Mitigations.

Thank you for your hard work,
Kerry Yarkin

From: [Bhatia, Ripon](#)
To: [Expanded Community Advisory Panel](#)
Cc: [Wilson, Sarah](#); [Kamhi, Philip](#)
Subject: Minor Edits/Correction to Traffic Study Report prepared by Hexagon
Date: Tuesday, February 2, 2021 1:08:15 PM
Attachments: [Pages 47-50 from Traffic-Analysis-Report Churchill-Meadow-and-Charleston-Grade-Separation RB-02-01-21.pdf](#)

Good Afternoon XCAP members,

Please note that based on brief discussion with the XCAP Chair, we have corrected the notes listed under Table 4, 5, and 6 of Page 47, 49, 50 (footnote 2 of table 4, footnote 1 of table 5, and footnote 1 of Table 6) to clarify a conflicting statement in the traffic report.

Let us know should you have any concerns. Thank you for your cooperation.

Best Regards,



CITY OF
**PALO
ALTO**

Ripon Bhatia | Senior Engineer
Office of Transportation
250 Hamilton Avenue, Palo Alto, CA 94301
T: 650.329.2269 | **E:** Ripon.Bhatia@CityofPaloAlto.org

Please think of the environment before printing this email – Thank you!

The TJKM study determined that the closure of the Churchill Avenue railroad crossing would create significant impacts at eight of the study intersections. Hexagon disagrees with two of the impacts, but agrees that the following six intersections and would experience unacceptable levels of service as a result of the reassigned traffic under existing conditions and under future year 2030 traffic conditions (see Table 4):

1. Alma Street/Lincoln Avenue
2. Alma Street/Embarcadero Road
3. Alma Street/Kingsley Avenue
4. El Camino Real/Embarcadero Road (CMP)
5. El Camino Real/Oregon Expressway-Page Mill Road (CMP)
6. Alma Street/Oregon Expressway

**Table 4
Churchill Closure – Impacted Intersection Levels of Service**

#	Intersection	Peak Hour	Traffic Control	Churchill Closure					
				Existing		Existing		Year 2030	
				Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS
1	Alma St & Lincoln Ave	AM	One-Way	>=50	F	>=50	F	>=50	F
		PM	Stop	>=50	F	>=50	F	>=50	F
2	Alma St & Embarcadero Rd	AM	One-Way	>=50	F	>=50	F	>=50	F
		PM	Stop	>=50	F	>=50	F	>=50	F
3	Alma St & Kingsley Ave	AM	One-Way	>=50	F	>=50	F	>=50	F
		PM	Stop	>=50	F	>=50	F	>=50	F
4	El Camino Real/Embarcadero Rd*	AM	Signal	60.3	E	>80	F	>80	F
		PM		67.0	E	>80	F	>80	F
5	El Camino Real/Oregon Expwy-Page Mill Rd*	AM	Signal	72.9	E	>80	F	>80	F
		PM		66.4	E	>80	F	>80	F
6A	Alma St & Oregon Expwy WB Off Ramp (Oregon Av)	AM	One-Way	>=50	F	>=50	F	>=50	F
		PM	Stop	>=50	F	>=50	F	>=50	F
6B	Alma St & Oregon Expwy EB Off Ramp	AM	One-Way	>=50	F	>=50	F	>=50	F
		PM	Stop	>=50	F	>=50	F	>=50	F

Notes:
1. *CMP Intersection.
2. Average delay is reported for the worst approach at one-way stop intersections.
3. Bold indicates substandard intersection level of service.

Mitigation Measures

Potential mitigation measures were identified for the intersections that were shown to be impacted as described below.

Alma Street Intersections (# 1, 2 and 3)

With the closure of Churchill Avenue, some traffic would be rerouted to Embarcadero Road. However, the connections for some of the turning movements between Alma Street and Embarcadero Road are circuitous. Traffic from Alma Street that wants to head west on Embarcadero Road must use Lincoln Avenue to Emerson Street. The amount of traffic going “around the block” to access Embarcadero from Alma would increase by 157 vehicles during the AM peak hour and 97 vehicles during the PM peak hour. Due to the close spacing, intersections 1, 2 and 3 could be mitigated as a group with the following recommendations (see Figures 8). These improvements are different from the mitigations identified in the TJKM report.

- Restrict the intersection of Alma Street/Lincoln Street to right-in/right-out only movements.

- Divert left-turning traffic off of Lincoln Avenue by adding a left-turn lane to the Embarcadero Road slip ramp to facilitate left-turns onto Alma Street.
- Install traffic signals at the Alma Street/Embarcadero Road slip ramp and Alma Street/Kingsley Avenue with one controller.
- Install a traffic signal at the Embarcadero Road/Kingsley Avenue intersection to allow left-turns from Kingsley Street onto westbound Embarcadero Road.
- Provide a 75 to 100-foot left-turn pocket on southbound Alma Street at Kingsley Avenue.
- Provide two northbound travel lanes on northbound Alma Street at Kingsley Avenue.

Providing two northbound travel lanes on Alma Street at Kingsley Avenue would require widening of the Alma Street bridge over Embarcadero Road, as the existing width of the bridge can only accommodate three travel lanes on Alma Street. Widening would require extensive modification or potential replacement of the existing bridge structure. No additional right-of-way is needed on Alma Street, south of Embarcadero Road.

These improvements would provide a direct connection between Alma Street and Embarcadero Road. Diverted traffic from southbound Alma Street (157 AM peak hour trips and 97 PM peak hour trips) would not have to use local streets to access Embarcadero Road. In addition, existing traffic on northbound Alma Street (approximately 70 vehicles during the AM peak hour and 75 vehicles during the PM peak hour) would no longer have to go around the block (Lincoln to Emerson) to travel west on Embarcadero. This traffic on Alma would make a right-turn at Kingsley and a left-turn at the proposed traffic signal at Embarcadero Road.

With the proposed improvements, the analysis shows that intersections 1, 2 and 3 would operate at acceptable levels of service during the AM and PM peak hours under existing (see Table 5) and Year 2030 traffic volumes (see Table 6).

Note that Figure 8 show a conceptual design of potential improvements at the Embarcadero Road and Alma Street interchange. If this project were to be pursued, many design details would need to be worked out with regard to maintaining access to existing residential driveways on Embarcadero Road, Kingsley Street, High Street, and the Embarcadero slip ramp.

El Camino Real & Embarcadero Road (Intersection 4)

The analysis showed that at the CMP intersection of El Camino Real/Embarcadero Road, significant traffic impacts would occur due to reassigned traffic. It is recommended that an additional westbound left-turn lane and a northbound right-turn lane be provided along with signal optimization at this intersection (see Figure 9). With these improvements, the intersection of El Camino Real and Embarcadero Road would operate at acceptable LOS E during both peak hours under existing and Year 2030 traffic volumes.

El Camino Real & Page Mill Road/Oregon Expressway (Intersection 5)

At the CMP intersection of El Camino Real/Oregon Expressway-Page Mill Road, the traffic analysis identified significant traffic impacts due to reassigned traffic. The report recommended a westbound right-turn lane from Oregon Expressway to northbound El Camino Real along with optimizing the signal timing (see Figure 10). With these improvements, the intersection would operate at acceptable levels of service during the AM and PM peak hours under existing conditions. Under Year 2030 traffic conditions, the analysis shows that the intersection would continue to operate at unacceptable LOS F with the proposed improvements. However, the intersection delay during both

the AM and PM peak hours is projected to be lower than the intersection delay without these improvements.

Alma Street & Oregon Expressway (Intersections 6A and 6B)

The traffic analysis identified significant impacts to the intersections of Alma Street/Oregon Expressway with the reassignment. The analysis determined that these intersections currently meet the peak hour signal warrant and recommends traffic signals at both the on and off ramps (see Figure 11). With the proposed traffic signals at both the ramp locations, the intersections of Alma Street and Oregon Expressway are projected to operate at acceptable LOS C or better during both peak hours under existing and Year 2030 traffic conditions.

Table 5
Churchill Closure – Mitigated Intersection Levels of Service under Existing Conditions

#	Intersection	Peak Hour	Churchill Closure - Existing Conditions					
			No Improvements			With Improvements		
			Traffic Control	Avg. Delay (sec.)	LOS	Traffic Control	Avg. Delay (sec.)	LOS
1	Alma Street & Lincoln Avenue	AM	One-Way	>=50	F	One-Way	5.7	A
		PM	Stop	>=50	F	Stop	21.1	C
2	Alma Street & Embarcadero Road	AM	One-Way	>=50	F	Signal	4.8	A
		PM	Stop	>=50	F		3.0	A
3	Alma Street & Kingsley Avenue	AM	One-Way	>=50	F	Signal	13.3	B
		PM	Stop	>=50	F		18.3	B
4	El Camino Real/Embarcadero Rd*	AM	Signal	>80	F	Signal	67.1	E
		PM		>80	F		61.1	E
5	El Camino Real/Oregon Expwy-Page Mill Rd*	AM	Signal	>80	F	Signal	72.5	E
		PM		>80	F		73.5	E
6A	Alma St & Oregon Expwy WB Off Ramp (Oregon Ave)	AM	One-Way	>=50	F	Signal	6	A
		PM	Stop	>=50	F		6.7	A
6B	Alma St & Oregon Expwy EB Off Ramp	AM	One-Way	>=50	F	Signal	17.9	B
		PM	Stop	>=50	F		16.0	B

Notes:

1. Average delay is reported for the worst approach at one-way stop intersections.
2. Bold indicates substandard intersection level of service.

**Table 6
Churchill Closure – Mitigated Intersection Levels of Service under Year 2030 Conditions**

#	Intersection	Churchill Closure - Year 2030 Conditions						
		Peak Hour	No Improvements			With Improvements		
			Traffic Control	Avg. Delay (sec.)	LOS	Traffic Control	Avg. Delay (sec.)	LOS
1	Alma Street & Lincoln Avenue	AM	One-Way	>=50	F	One-Way	14.4	B
		PM	Stop	>=50	F	Stop	15.2	C
2	Alma Street & Embarcadero Road	AM	One-Way	>=50	F	Signal	4	A
		PM	Stop	>=50	F	Signal	3.6	A
3	Alma Street & Kingsley Avenue	AM	One-Way	>=50	F	Signal	13.0	B
		PM	Stop	>=50	F	Signal	14.8	B
4	El Camino Real/Embarcadero Rd*	AM	Signal	>80	F	Signal	73.6	E
		PM	Signal	>80	F	Signal	76.2	E
5	El Camino Real/Oregon Expwy-Page Mill Rd*	AM	Signal	>80 (120.3)	F	Signal	>80 (91.8)	F
		PM	Signal	>80 (108.4)	F	Signal	>80 (92.7)	F
6A	Alma St & Oregon Expwy WB Off Ramp (Oregon Ave)	AM	One-Way	>=50	F	Signal	7.8	A
		PM	Stop	>=50	F	Signal	9.1	A
6B	Alma St & Oregon Expwy EB Off Ramp	AM	One-Way	>=50	F	Signal	24.9	C
		PM	Stop	>=50	F	Signal	21.5	C

Notes:

1. Average delay is reported for the worst approach at one-way stop intersections.
2. Bold indicates substandard intersection level of service.

Impacts to University Avenue

University Avenue is located approximately one mile north of the Alma Street and Churchill Avenue intersection. During the peak hours, University Avenue is more congested than the parallel arterials of Embarcadero Road and Oregon Expressway. Figure 12 shows that University Avenue at Woodland Avenue typically is operating at LOS F during the PM peak hour compared to LOS E on Oregon Expressway and LOS D/E on Embarcadero Road near to US101. Due to the existing congestion on University Avenue, trips from the potential Churchill closure much more likely would be rerouted to Embarcadero Road or Oregon Expressway. The potential Churchill Avenue closure is not likely to impact traffic operations along University Avenue.

From: [Inyoung Cho](#)
To: [Bhatia, Ripon](#)
Cc: [Expanded Community Advisory Panel](#); [Wilson, Sarah](#); [Kamhi, Philip](#)
Subject: Re: Minor Edits/Correction to Traffic Study Report prepared by Hexagon
Date: Tuesday, February 2, 2021 9:47:27 PM

CAUTION: This email originated from outside of the organization. Be cautious of opening attachments and clicking on links.

Ripon,

You can not modify the document at this point without XCAP member feedback since XCAP are reviewing the documents together.

Please revert back and we need to discuss what you want to change during the XCAP meeting. Thanks.

Nadia,

Please stop modifying the document with XCAP input. We are reviewing together.

Cheers,
Inyoung

On Tue, Feb 2, 2021 at 1:08 PM Bhatia, Ripon <Ripon.Bhatia@cityofpaloalto.org> wrote:

Good Afternoon XCAP members,

Please note that based on brief discussion with the XCAP Chair, we have corrected the notes listed under Table 4, 5, and 6 of Page 47, 49, 50 (footnote 2 of table 4, footnote 1 of table 5, and footnote 1 of Table 6) to clarify a conflicting statement in the traffic report.

Let us know should you have any concerns. Thank you for you cooperation.

Best Regards,



CITY OF
**PALO
ALTO**

Ripon Bhatia | Senior Engineer

Office of Transportation
250 Hamilton Avenue, Palo Alto, CA 94301
T: 650.329.2269 | E: Ripon.Bhatia@CityofPaloAlto.org

Please think of the environment before printing this email – Thank you!

From: [Inyoung Cho](#)
To: [Bhatia, Ripon](#)
Cc: [Expanded Community Advisory Panel](#); [Wilson, Sarah](#); [Kamhi, Philip](#)
Subject: Re: Minor Edits/Correction to Traffic Study Report prepared by Hexagon
Date: Tuesday, February 2, 2021 9:49:35 PM

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250 Hamilton Avenue, Palo Alto, CA 94301
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Please think of the environment before printing this email – Thank you!

From: [Nadia Naik](#)
To: [Inyoung Cho](#)
Cc: [Bhatia, Ripon](#); [Expanded Community Advisory Panel](#); [Wilson, Sarah](#); [Kamhi, Philip](#)
Subject: Re: Minor Edits/Correction to Traffic Study Report prepared by Hexagon
Date: Wednesday, February 3, 2021 9:41:28 AM

Hi Inyoung,

Thanks for your email. The XCAP report was not edited by Ripon or me or anyone related to these data table updates.

In working with Dave, Keith, and Phil, a question came up about whether the data tables notes conflicted with what was bolded in the tables. I asked Ripon to confirm/explain what the bolding represented in the Traffic Report tables.

Ripon consulted with Gary Black of Hexagon and Gary agreed that the information was unclear and had conflicting language. Apart from raising the question to Ripon, I had no part in the editing: Gary Black gave his edits to Ripon, and Ripon distributed them to XCAP. For your reference, the notes in questions are in Table 4, Table 5 and Table 6. Ripon will present the edits during today's meeting, XCAP will discuss them fully, and the updated Traffic Report will be made publicly available to all and updated on the website.

Again, the updated data tables have NOT been added to the report, so the main XCAP report has not been modified outside of what was agreed to last week.

We continue to follow the same model we have had for weeks: any and all edits are subject to discussion, review, and agreement by the group before the report is finalized.

Nadia

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