XCAP Approved Traffic Questions & Proposed Work

Questions are those compiled as of the January 22, 2020 XCAP Meeting.

1. Can we add a private lane for that small strip of Kingsley between Alma and Embarcadero? If we can add 4 lanes there as on/off ramp for Alma there, there seems to be room to add an additional lane to the benefit of the residents there. (Dave)
   
   *A private lane is not necessary. Please see the attached conceptual design for the intersection the shows the existing driveway access can stay essentially as-is.*

2. Is there space for two-way cycle tracks on both sides of Embarcadero east of the underpass? (Megan)
   
   *No. The current design is for one-way cycle tracks/bike lanes. One on each side.*

3. How and when will we know if the light at Kingsley results in queues that impact driveways on Embarcadero in a manner that results in the need to take those properties? (Megan)
   
   *The new light at Kingsley would not require the acquisition of any right-of-way or properties.*

4. Could a right-hand-turn lane be added on Embarcadero heading west at the El Camino light if we want to maintain bike/ped improvements? (Megan)
   
   *There isn’t room to add a right-turn lane and a second left turn lane. The current design concept is to add a second left turn lane. See the attached diagram.*

5. Can you confirm that the ramp southbound from Oregon Expressway to Alma misses the proposed light on Alma or is gated by the light? Concern is queuing backing up Oregon. (Megan)
   
   *The ramp from Oregon Expressway to southbound Alma would not be controlled by the signal. Please see the attached concept diagrams.*

6. The traffic simulations only modeled peak hours using Caltrain numbers. However, Caltrain intends to expand all day service. If trains now increase to peak hour-levels all day long, can we predict whether we may have multiple peak hour times throughout the day in the future? (Nadia)
   
   *Traffic volume also peaks during the same hours as peak Caltrain service. Expanded all-day Caltrain service would not correspond to traffic peaks, so impacts would be less than shown in the traffic simulations because the volume of cars at non-peak hours is fewer than peak hours.*
7. Why did Hexagon disagree with the previous consultant that there would be impacts to Middlefield / Embarcadero? (Nadia)

The previous consultant assumed that there would be an increase in traffic on Middlefield accessing Embarcadero with the closure of Churchill. However, the Streetlight origin-destination data show that almost all Churchill traffic originates west of Middlefield. There are other streets that can be used to access Embarcadero from that neighborhood if Churchill were closed. These include Webster, Cowper, and Waverly, although only Waverly is signalized. Hexagon assumed most neighborhood traffic would access Embarcadero via Waverly.

8. What would a viaduct do to traffic in the Churchill area and how could any potential inducement be mitigated?

The effect of the viaduct would be to eliminate the gate down time. During the gate down time, Alma traffic receives a green light. Without the train interruptions, it would be possible to give more signal green time to the movements that cross the tracks. These are primarily right and left turns on and off Alma. Hexagon would expect to see slight decreases in traffic on Embarcadero, between El Camino Real and Alma, and slight increases on Churchill between El Camino Real and Alma. We would not expect to see much cut-through traffic added to Churchill through the neighborhood because we would expect the 8 -8:45 AM through traffic prohibition left intact.

Similar question for Mike Price’s idea at Churchill – how would it impact traffic and how could any inducement be mitigated?

Mike Price’s idea would serve the heaviest movements that cross the railroad tracks, so the traffic redistribution impacts would be similar to the viaduct.

Could some mitigations proposed from the closure be coupled with Mike Price idea to help with potential inducement?

Inducement would mean less traffic on Embarcadero and more traffic on Churchill, so the closure mitigations would not apply. The closure mitigations are intended to serve the increased traffic that would occur on Embarcadero with closure. Mike Price’s idea would not serve all turning movements, so there would be some traffic redistribution, although substantially less than closure. Whether any “off-site” improvements would be necessary with Mike Price’s idea is subject to further analysis.

9. Can trucks/buses turn on Kingsley?

Yes. See the attached diagram.

Turn seems very tight? (Nadia) Can we make Kingsley a "no truck" road?

That would not be necessary. Emergency vehicles also need to use the road so the design must accommodate them.

10. What is the LOS (seconds of delay in the AM and PM) of the new Kingsley / Embarcadero light in 2030? (Megan)

Please see the table below. Because of the LOS E in 2030, Hexagon has revised the design at Alma/Embarcadero/Kingsley (see attached figure) to maintain LOS D in 2030.
11. Do we have a way to measure pedestrian connectivity? Do any metrics exist? (Megan)
   
   *We do not understand what this question means.*

12. When you explain percent increases for intersections, it would be helpful to understand them relative to the current totals so we know how many more cars above today? (Nadia)
   
   *Please see the table below.*

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Peak Hour</th>
<th>With Existing Volume</th>
<th>With 2030 Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Avg. Delay (sec.)</td>
<td>LOS</td>
<td>Avg. Delay (sec.)</td>
</tr>
<tr>
<td>Embarcadero Road &amp; Kingsley Avenue</td>
<td>AM</td>
<td>22.0</td>
<td>C</td>
</tr>
<tr>
<td>New Signal</td>
<td>PM</td>
<td>22.7</td>
<td>C</td>
</tr>
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</table>

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Questions About Work Feasibility

1. Can induced demand be modeled? (Keith)
   
   *Probably, but this question needs expansion. Induced demand from what? Induced demand where?*

2. Does data exist to simulate further out than 2030? Until 2050 as in Caltrain's business plan? (Megan)
   
   *Approved land use data for Palo Alto exist only to 2030. Therefore, transportation forecasts are for that year. ABAG data exists for year 2040, but that hasn’t been vetted for Palo Alto. The VTA model can be used to make forecasts for 2040 but with the understanding that Palo Alto land use may not be correct.*

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<table>
<thead>
<tr>
<th>#</th>
<th>Intersection</th>
<th>Peak Hour</th>
<th>Existing Volume</th>
<th>Churchill Closure</th>
<th>Added Volume</th>
<th>Total Volume</th>
<th>% Increase</th>
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<tbody>
<tr>
<td>1</td>
<td>Alma Street &amp; Lincoln Avenue</td>
<td>AM</td>
<td>2,283</td>
<td>-68</td>
<td>2,215</td>
<td>-3%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PM</td>
<td>2,834</td>
<td>30</td>
<td>2,864</td>
<td>1%</td>
<td></td>
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<tr>
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<td>Alma Street &amp; Embarcadero Road</td>
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<td>2,180</td>
<td>-3%</td>
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<tr>
<td></td>
<td></td>
<td>PM</td>
<td>2,795</td>
<td>30</td>
<td>2,825</td>
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<td>AM</td>
<td>2,167</td>
<td>-68</td>
<td>2,099</td>
<td>-3%</td>
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<tr>
<td></td>
<td></td>
<td>PM</td>
<td>2,740</td>
<td>30</td>
<td>2,770</td>
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<tr>
<td>4</td>
<td>El Camino Real/Embarcadero Rd</td>
<td>AM</td>
<td>4,067</td>
<td>202</td>
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<td>5%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PM</td>
<td>5,307</td>
<td>300</td>
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<tr>
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<td>El Camino Real/Oregon Expwy/Page Mill Rd</td>
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<tr>
<td></td>
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<td>Alma St &amp; Oregon Expwy WB Off Ramp (Oregon Ave)</td>
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<td>2,819</td>
<td>141</td>
<td>2,760</td>
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<tr>
<td></td>
<td></td>
<td>PM</td>
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</table>
3. Traffic mitigation on residential streets during the construction phase related to lane closures on Alma. If Palo Alto residents and other drivers from surrounding communities become frustrated with slow traffic, they will most likely use other streets, such as West Bayshore and Middlefield Road for their commute. Also, residential streets that run perpendicular to Alma and parallel to Oregon Expressway and Embarcadero, such as Channing Avenue will also see increased traffic. Therefore, is it feasible for the traffic study to include how some of these residential streets will be affected during the construction phase? (Pat)

There has been no analysis of traffic impacts during construction, but it could be done.

4. Is it possible to show network delay estimates and what is the best way to represent how they would impact the system. (For example, even after closure and mitigations, El Camino/Page Mill and El Camino/Embarcadero will continue to fail – how will that make the system worse?) (Nadia)

The transportation demand model can be used to study network-wide operations. It is not clear exactly what the commenter wants to see.

Work Requests

How much would each cost?

1. Impact of eight (8) trains per direction per peak hour in 2027

The simulation can be run with any number of trains. The cost is about $2,000 per scenario.

2. Traffic impacts of the new alternatives (Price and Alexis plans)

a. Price plan without Embarcadero mitigations

This has been studied. This plan would function well, although there would be some diversions that haven’t been studied.

b. Price plan with Embarcadero mitigations

This needs to be studied. The Embarcadero mitigations may or may not be needed. This study is in our scope of work.

c. How expensive is it to do both (a) & (b)?

This is in our scope of work.

3. LOS (average delays) for completed grade separation intersections including multimodal LOS (including bike and pedestrian delays) if possible:

a. Churchill / Alma with viaduct

This is in our scope of work.

b. Churchill / Alma with closure

This has been done. Please see the results below.
c. Meadow / Alma with trench, tunnel, hybrid, or viaduct
   *This is in our scope of work but hasn’t been finished.*

d. Charleston / Alma with trench, tunnel, hybrid, or viaduct
   *This is in our scope of work but hasn’t been finished.*

e. Meadow / Alma with Alexis plan
   *This has been run and it works. Details to come.*

f. Charleston / Alma with Alexis plan
   *This has been run and it works. Details to come.*

g. Churchill / Alma with Price plan
   *This has been run and it works. Details to come.*

4. Expected queue lengths and number of cars that can queue at the Kingsley light as part of the mitigated Churchill closure$^9,10,11$

   *The simulation has been run for Kingsley/Embarcadero, as well as for Kingsley/Alma, Lincoln/Alma, Embarcadero slip ramp/Alma, and Churchill/Alma. The attached figures show snapshots of the queuing at Kingsley/Embarcadero. Queues on Kingsley would fit given four lanes on Kingsley. Embarcadero has not been simulated. Therefore, we cannot say how long queues would be on Embarcadero. Simulating Embarcadero would cost around $20,000.*

5. Traffic impacts of Churchill closure on residential streets after mitigation$^{12,13}$:

   a. If Park Blvd were reopened at Peers Park
      *This is not under consideration.*

   b. Local streets of Professorville
      *It is unlikely that the streets in Professorville, other than Emerson, would be affected by the closure of Churchill. It is most likely that students and parents in Professorville are using Embarcadero to access the high school. Potential increased traffic on Emerson can be addressed with the new signal at Kingsley. Refer to previous questions and answers related to this.*
6. Additional traffic counts
   a. Bike and pedestrian routes and traffic counts at Churchill and Embarcadero\textsuperscript{14,15}

   The diagram below (from the traffic study) shows the pedestrian and bike volume on Churchill. The counts show the highest hours between 7-9 AM and 406 PM. Pedestrian and bike counts on Embarcadero would cost around $1,000.

   ![Traffic Diagram]

   b. The intersection of Embarcadero / El Camino\textsuperscript{16}

   Below are the car counts and bike/ped counts for Embarcadero/El Camino

   ![Intersection Diagram]

7. Animations of uncleearable queues at Churchill (cost?)\textsuperscript{17}

   This could be done. The cost would be about $2,000.

8. Collision history data for Churchill and Embarcadero areas\textsuperscript{18}

   This would need to come from City staff.

9. Please include in the footnotes what calibrations were done in VISSIM (Nadia)

   VISSIM was calibrated to the traffic counts and queue lengths. Traffic volume per minute can be adjusted in VISSIM to get the simulation to match the observed queue lengths.
10. Please provide network delay diagrams for all impacted areas. (Nadia)

   Hexagon does not know what this means.

Answered Questions and Those Not for the Traffic Consultant

1. Are trucks currently allowed on Churchill? What restrictions, if any, are there on roads in the area impacted by any mitigations proposed for Churchill closure? (Nadia)
   a. Inyoung says that they are allowed on Churchill with no restrictions

2. During public comments, folks made reference to cars dropping off kids on the Embarcadero slip road and walking to PALY. Do we know of any other areas used as unofficial drop off/ pick up sites that need to be addressed? Can PAUSD provide us information on that? (Nadia)

3. How can the Alma Road bridge on Embarcadero be widened? Do we have more information about whether there will be a replacement or seismic retrofit needed that might impact the proposed widening? (Nadia)

1 Can we re-run the Churchill closure model but with 8 trains per direction by 2027 rather than 6 per Caltrains most recent plan? (The group at the last meeting)

2 Can we study traffic with Elizabeth’s designs? (Dave)

3 Now that we are starting to study on Mike Price’s idea, can we study traffic effects? (Dave)

4 I am most concerned about traffic on Churchill between El Camino and Alma if access to Alma is open. It is my guess that given the existing congestion there, that little stretch of road will completely fill up with cars and that traffic lights will not be able to empty that road fast enough. The residents on that street already have experienced negative impacts due to what congestion exists today. (Dave)

5 What’s the LOS and delays at the Churchill light with the Viaduct, closure, or Price plan complete? (Megan)

6 It would seem worthwhile to get more details on traffic patterns in South PA at Meadow and Charleston. Haven’t heard much about traffic down there in a long time. (Dave)

7 Do we have LOS/delay data for Meadow / Charleston such that we can estimate 2030 No Build vs Alternative delay differences? Or does it not matter because it’s the same for every alternative -- except perhaps Elizabeth’s? (Megan)

8 We need multi-modal LOS numbers – not just cars. Same for system wide impacts from the proposed mitigations. (Nadia)

9 Can we find out more about queuing on Kingsley and if it would back up onto Alma? (Keith)

10 How many cars can queue along Kingsley? When showing turn lanes that allow for queuing, please indicate number of cars that fit in the turn pockets, etc. (Nadia)

11 Can we get some more information about what queues might look like at the Kingsley/Alma light? And at T&C and El Camino if that light exists? Is there enough queueing space in the single lane in the underpass heading east? (Megan)

12 Can we model traffic effects if Park Blvd were to be reopened at Peers Park? (Dave)

13 Can we model traffic effects in local streets of Professorville after mitigations at Embarcadero? (Dave)

14 Can we include a map (similar to traffic counts map) showing bike ped data for Churchill and similar data for the area around the Embarcadero road area targeted for bike improvements and traffic mitigations? (Nadia)

15 We need better diagrams showing ped/bike routes and the proposed mitigations – we need equal treatment of both bike and ped routes in terms of diagrams. (Nadia)

16 Please provide traffic data for the intersection of Embarcadero/El Camino (how many go North, South, East, West at that intersection, turning movements, etc.). (Nadia)

17 Gary Black mentioned being able to do animations to show delays. Animations showing the unclearable queues for Churchill would be particularly useful. (Nadia)

18 You mentioned crashes not included in the data - please provide a map showing collision points (all modes) within the areas around Churchill and those that are near the mitigations areas being proposed to ensure we understand where we have current “hot spots” for accidents. (Nadia)
The following pages contain the Diagrams Referenced in the Answers