



Memorandum

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Date: March 27, 2013

Subject: I-95/I-64 Overlap Study – Comment Resolution

The following documents Kimley-Horn and Associates' (KHA) response to FHWA's comments dated April 30, 2012 regarding the I-95/I-64 Overlap Study Draft Report in the City of Richmond and Henrico County, Virginia. Please find our responses (*italicized*) to your comments below.

Note: These questions & comments are in chronological order, not order of importance. Also, a number of these are editorial in nature, asked with the understanding that this report will be provided to others who were not part of the study group (thus, need to ensure clarity); I didn't comment on minor typos or grammar issues if it was clear anyway.

Response:
Minor typos and/or grammar issues have been resolved.

1. I need to note that I reviewed the report but not all of the Appendices; I will presume for now that the information is as represented, but please provide a hard copy of all of the appendices (since there were over 20, I did not open & review all of them, and did not print all that I opened).

Response:
A hard copy of the Appendix will be provided as requested.

2. Pages 6 & 7, Tables 4, 5, & 6: Not sure I follow what number of Measurements means. Is that the number of vehicles checked? At first glance, it looks like we have a lot of people going from section G to H on interstate.

Response:

- *Measurements refers to the total number of vehicles recorded entering an origin. "Measurements" has been revised to "Sample Size" in Tables 4 – 6 to better clarify what the data represents. The percentages refer to the number of vehicles matched from that origin to a given destination.*
- *Vehicles traveling between origins G and H are utilizing Belvidere Street not the interstate.*

3. Page 7: What are the conclusions from this information? Not found here or elsewhere in report. I don't remember this from during the Study, but this appears to show a big demand for people to use the Interstate to travel very short distances (e.g., section D to E and G to H).

Response:

Additional text summarizing overall trends deduced from the origin/destination data has been included in Section 2.2 as requested.

4. Page 9, Table 7: I don't see much Destination info. What does this tell us? If explained elsewhere, please reference.

Response:

The capture rates (percent of vehicles matched from one origin to a specific destinations) were low. The major take away from this is that most vehicles originating on a study ramp (in a 12-hour period, from 6:30 AM to 6:30 PM) has an ultimate destination outside of the study area and that they utilize the interstate system to get there. This additional text was added to the report as requested.

The following notes were added to Table 7 to provide clarity of the information presented:

- *Blank cells indicate no data was matched between origin-destination points*
- *The percentage highlighted in orange represents the percentage of the total captured from an origin that was not matched to any destination.*

5. Page 10, regarding the use of 45 mph as a measure for speed differentials: I'm not sure that 45 mph is that much of an attention getter; is this just how yall chose to write it up, or was it really just under 45 mph (like more than 40 but less than 45)? There was no stop-&-go traffic, even on I-95 NBL between I-64 and Chamberlayne, and on I-64 EBL approach to I-95?

Response:

As requested, the underlined text was added to clarify that the speeds summarized in Figures 6 through 9 were averaged over the 2-hour peak period. "Figures 6 through 9 summarize the average weekday AM (7 – 9 AM) and PM (4 – 6 PM) peak period speeds during 2010 at various locations throughout the study corridor."

*The following text was added to the report (Section 2.3) to clarify how the ranges in speed were determined. "The ranges in speed shown in **Figures 6 through 9** were determined based on Exhibit 11-15 from the 2010, Highway Capacity Manual. This figures indicates speeds on facilities with a free flow speed of 55 MPH begin to decline to 50 MPH or less under congested conditions when the volume-to-capacity ratio is greater than 0.80. Based on this, a range of 0 to 45 MPH was determined to represent the slowest condition indicated in red on **Figures 6 through 9**. Speed data was not available on I-195 within the study area."*

6. Page 12, Figure 5: a somewhat minor point, but probably need an I-95 logo/ shield and one for I-64 to the south and to the east, as in this graphic those routes sort of look like every other road.

Response:

Figure 5 has been revised as requested.

7. Page 13, Figure 6: a somewhat minor point, but need a more striking color contrast of 0 to 45 vs. 45 to 50 mph. More importantly, do we have the data to break it down further within the 0 to 45 bracket? See also #5....What I am trying to say is, it's bad to have 42 mph traffic where one expects it to be 60mph, but it's much worse if it is say 22 mph.

Response:

*Figure 6 has been revised to use more contrasting colors between speed ranges as requested. The following text was added to the report (Section 2.3) to clarify how the ranges in speed were determined. "The ranges in speed shown in **Figures 6 through 9** were determined based on Exhibit 11-15 from the 2010, Highway Capacity Manual. This figures indicates speeds on facilities with a free flow speed of 55 MPH begin to decline to 50 MPH or less under congested conditions when the volume-to-capacity ratio is greater than 0.80. Based on this, a range of 0 to 45 MPH was determined to represent the slowest condition indicated in red on **Figures 6 through 9**. Further breakdown of speed data into slower ranges was not conducted because the data was provided as an average over the 2-hour peak periods, raw speed data was not provided. Speed data was not available on I-195 within the study area."*

8. Page 16, Figure 9: the section around MM 78 to south of MM 77 appears to show both Light & Moderate; is that the case or is it meant to show light for NB and severe for SB?

Response:

Figure 9 indicates light congestion in the northbound direction and moderate congestion in the southbound direction between MM 78 and MM 77. The width of the line indicating travel time index results on Figures 10 and 11 (formerly Figures 9 and 10) was increased to improve visibility of the results. In addition, more contrasting colors were used to reflect the different TTI ranges.

9. Page 18, last paragraph of section 1.7.1: Are yall saying that peak hour factors were redundant because you input all 24hours of counts for each 15 minute interval, for each movement?

Response:

Yes, volumes were coded in to VISSIM in 15-minute periods for the peak periods modeled as stated in section 2.4.1 (formerly numbered section 1.7.1).

10. Page 21, Section 1.7.3: If the ramp percentage was 30% at Bryan Park, shouldn't we list those study ramps here, even though they were calculated not direct counted? I see why we would want to have the computations in the Appendix, but why aren't the results shown here along with the mainline? Didn't the heavy ramps factor into the decisions on this study?

Response:

Ramp peak hour heavy vehicle percentages (Table 13) have been added to section 2.4.3 (formerly section 1.7.3) as requested.

11. Page 21, Section 1.7.4: OK not to balance completely, but could we give an example, tell how far off we are? Section 2.1 talks about calibrating the model without really mentioning balancing the volumes per se.

Response:

As requested, Tables 14 and 15 have been added to reflect the difference between the 2011 existing balanced and unbalanced peak hour volumes as a result of the iterative balancing process. Similar tables for 2022 and 2035 traffic volumes have been added to Appendix E: Peak Hour Calculations.

12. Page 21, Section 1.7.4: Shouldn't this refer the reader to Figures 11 to 16?

Response:

Yes, Figures 12 through 17 have been crossed referenced as noted. Figure numbers have been revised to account for the inclusion of additional figures.

13. Page 21, section 1.8: Suggest shifting this to top of page 28; text & graphics would be less disjointed.

Response:

Text has been relocated from page 22 (formerly page 21 in the draft report) to page 32 (formerly page 28 in the draft report) as suggested.

14. Page 29, 1st sentence: In order to know how important it is that 60% of the crashes occur during these two 4-hour time frames (i.e., 60% of the crashes within 33.3% of the time), don't we need to know what percentage of the ADT occurs in that 8 hours?

Response:

As requested, Table 18 (formerly Table 15) has been revised to clarify the intent of the peak hour crash summary information.

15. Page 29, Table 15: Why do we focus on the 4 hour peak periods here, when everywhere else we are focused on the two peaks of one-hour each? The PM one of 6 to 10 is completely outside the peak hour of 4:30 to 5:30. Doesn't that render this irrelevant to our volume considerations?

Response:

The ranges in time were general in nature to identify the percent of peak hour crashes (an indication of congestion) versus non-peak hour crashes.

16. Page 30, figures 21 & 22: If we could have the fixed object off road be the same color on both of these, it would be clearer & really jump out at the reader that we have one kind of problem on I-64 & I-95, but a different problem on I-195 (both directions).

Response:

Crash type colors in Figures 17 through 22 (figures and page numbers have been updated since the last draft of the report) on page 34 have been revised to be consistent across figures as requested.

17. Page 31, 1st paragraph: Says that segments with more crashes than the average crash density plus two standard deviations are considered to be hot spots; is this the same as the critical crash density for the charts? I couldn't find that defined anywhere, and I was having trouble understanding how so many of the crashes were below that line.

Response:

Yes, critical crash density was defined as the average crash density plus two standard deviations. Histogram segments with a crash density higher than this was defined as a crash hot spot location. Clarification was added to the report.

18. End of page 38 & top of page 39: duplicate text from bottom of page 38.

Response:

Duplicate text has been removed.

19. Page 39, Table 18: Why was Chamberlayne skipped, when the turbulence between the system interchange & that off-ramp in the NBL is so pronounced? Were you considering it as a combination with Belvidere, and if so, how was that distance measured?

Response:

Table 21 (formerly Table 18) has been revised to include the spacing between I-64 WB and the off-ramp to Chamberlayne Parkway. Distances shown in Table 21 were measured gore to gore. The following note was added to Table 21 "Distance between interchanges was measured ramp gore to ramp gore."

20. Page 40, section 1.9.2: Does not say anything about the 12' being 12 usable feet; note that if that shoulder is adjacent to a positive barrier, we have to add at least 1', or 2' if high truck percentage, to the 12' measured width to ensure that we have 12 usable feet (think about having to change a tire on the passenger side with guardrail at 12' from edge stripe; that's why we usually figure we need to have a physical 14' in order to have 12' that is actually functioning as a shoulder). I think we talked about this at one of the meetings.

Response:

Additional text has been added to Section 2.6.2 noting the desire to have 14 feet shoulders to account for the impacts of barrier and heavy vehicles on effective shoulder width.

21. Page 43, section 2.2.2: This repetitively refers to level of service D or better; can we clarify that we are focusing on equivalents for LOS E & F to illustrate the point at which we begin to approach unstable flow (if indeed that is what is meant)? As currently written, it infers that LOS D is an automatically acceptable LOS for this area (FHWA policy is that, except in highly developed urban areas [and only the part around Broad Street would be that], we should always strive for LOS C and only accept D when we can show that LOS C is not practicable.)

Response:

The following sentence was removed:

"LOS D is generally considered to be the minimum acceptable level of service by most agencies for design and evaluation purposes."

...and replaced with the following text:

“Level of service D or worse was used to identify locations with the greatest need for improvement for which study efforts were focused.”

22. Page 64, section 5.1: Why are the Short Term Improvements relegated to Appendix R? It is just one sheet; why couldn't we include them in the body of the report?

Response:

As requested the Short-term improvement table has been removed from Appendix R and included in the body of the report (Table 33, Section 6.1).

23. Appendix R: Does this include ALL of the non-geometric improvements from within the Short-Term group? Doesn't appear to include everything that was discussed the last time this was on our agenda.

Response:

Yes, notes from the meeting when these were discussed were reviewed and include all the short-term improvements discussed.

24. Page 64, Section 5.2: The SYIP Projects don't appear to line up completely with the ones on the list the last time we met. Specifically:

- a) Looks like all the non-geometric SYIP made it in, but they are not a subset, rather they are mixed in with the others, which I find confusing (but maybe I am the only one).
- b) Much more importantly, what happened to the Lane Shift for NB and the Lane re-designation/ reduction/ whatever for SBL at Bryan Park? Why were these cut? Am I forgetting something or were yall hoping I wouldn't notice? I am most seriously disappointed. It didn't even make it to Long Term. Please explain why those two were removed.

Response:

- a) *Yes, the geometric and non-geometric SYIP projects are included in the same section of the report. Rather than renumber all of the figures this section remains as is.*
- b) *Central Region operations did not support the two lane shift improvements discussed; therefore, they were removed. The original concept has been included in Appendix S including documentation of the reasons it was eliminated as an improvement.*

25. Page 73, SYIP #7 at Franklin Street: Why was the Passenger Loading Zone improvement deleted? I know Travis asked for it to be, but why? Without it, it would appear that the SB rights get no improvement.

Response:

Loading zone improvement was removed at the request of the City of Richmond since Franklin Street falls within the City's jurisdiction. The original concept has been included in Appendix S including documentation of the reasons it was eliminated as an improvement.

26. Page 73, SYIP #7: What about moving the cross-walk? Didn't we talk about that?

Response:

City of Richmond was not in favor of relocating the existing crosswalks therefore, they were removed. The

original concept has been included in Appendix S including documentation of the reasons it was eliminated as an improvement.

27. Page 73, SYIP #7: What about the small volume of NB lefts which take up 30% of the cycle; we had talked about possibly eliminating that movement in order to have the cycle time to accommodate the peds without exacerbating the off-ramp queuing situation.

Response:

City of Richmond was not in favor removing the NB lefts at this location; therefore, the recommendation was removed. The original concept has been included in Appendix S including documentation of the reasons it was eliminated as an improvement.

28. Page 79, Long Term #6, Braided Ramps: the graphic in Appendix T looks the same as when last we met (28th Feb.2012), but I thought we were going to:

- a) show the slip ramp with acceleration lane and two receiving lanes on the ramp;
- b) color code, or show some way, where the NB off movement to Broad is still included, but is re-directed.

Response:

- a) Long-term #5 (formerly #6) has been revised to show the slip ramp.
- b) Long-term #5 (formerly #6) has been revised to show the re-directed northbound I-95 movement to Broad Street.

29. Page 86, Table 33: If we show a Build travel time that is greater than the No Build (presuming the target Audience is still reading at this point), it is going to be a hard sell. Is there another way to evaluate it, or is this maybe not as good an idea as we thought?

Response:

Travel time was determined to be the best metric to measure the operational impacts of the proposed improvements. Section 7.1 VISSIM Analysis – Six-year Improvement Projects explains why travel time was selected and what challenges there were interpreting results from the 2022 and 2035 VISSIM models. The models were modeling over capacity conditions and therefore not sensitive enough to reflect travel time improvements due to the three spot improvements (SYIP 3, 4, and 5) shown in Table 35.