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Memorandum

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|---------|---|------|---|
| To | Christina Jaworski, VTA | Page | 1 |
| CC | | | |
| Subject | Validation of CMP Intersections For Capitol LRT EIS | | |
| From | Dennis Belluomini | | |
| Date | April 8, 2013 | | |

Dear Ms. Jaworski,

This memo outlines the analysis results of four CMP intersections along the study corridor of the Capitol Expressway LRT EIS; comparing the latest CMP data of 2012 to that in the report prepared in 2010.

Hourly traffic volumes on all streets vary from day to day due to a variety of reasons. Drivers may vary their route from day to day and there may be unexpected delays along the roadway which results in drivers passing through an intersection at a different time on one day compared to another day.

Data for the EIS was collected in 2009 and there is concern that the 2012 traffic volumes would differ significantly, affecting the traffic study results. A comparison table showing the PM peak hour volumes used in the EIS report and the 2012 data is presented in Table 1. Only PM volumes are presented as the CMP Monitoring Report only shows PM peak hour information. In addition, the 2012 volumes were analyzed based on the corresponding intersection configurations and the results presented in Table 2 in comparison with the EIS.

Capitol Expressway/Capitol Avenue

Compared to the 2009 data, the total intersection volume increased slightly (about 5%) in 2012 as presented in Table 1. There is an increase in the northbound and eastbound volume for this intersection. However, northbound is the non-critical direction during the PM peak hour. Therefore, there is capacity on this approach to accommodate the increased traffic. Similarly, the eastbound approach can accommodate an increase of 70 vehicles an hour which translates to an arrival rate of less than 2 vehicles per minute. There is an increase in the southbound (prevailing PM direction) through volume which increase is less than 10% and is not expected to adversely impact the intersection LOS. The westbound left turn, which has three turning lanes, has an increase of 100 vehicles in the PM peak hour which translates to an additional 1.5 cars per lane per cycle length. As shown in Table 2, the intersection LOS changed from D to D- due to a slight increase in the delay, but is still within the acceptable level. As such, the analysis result for the Capitol Expressway/Capitol Avenue intersection under 2012 condition is considered similar to the 2010 report.

Capitol Expressway/Story Road

Compared to the 2009 data, the total intersection volume increased by about 10% in 2012 as presented in Table 1. Even though the largest increase in the number of vehicles is in the southbound through direction, it is still less than the southbound through volume at Capitol Avenue. The eastbound through direction increased by 196 vehicles which equates to about 4 vehicles per lane per signal cycle. This

could increase the average delay at the intersection, but not to a significant amount. The eastbound right turning traffic has the greatest increase (about 37%) for any direction at this intersection. But this movement is a "free right turn" due to a "pork chop" island which does not require this traffic movement to pass through the signalized intersection. In addition, while unmarked, the right turn lane is approximately 550' in length and can handle this volume of traffic during the PM peak hour. The intersection LOS changed from D- to E+ due to a slight increase in the overall delay, but it is still within the acceptable level as presented in Table 2. As such, the analysis result for the Capitol Expressway/Story Road intersection under 2012 condition is considered similar to the 2010 report.

Capitol Expressway/Tully Road

Compared to the 2009 data, the total intersection volume increased by less than 1% in 2012 as presented in Table 1. Most approaches at the Capitol Expressway/Tully Road intersection experienced a decrease in traffic volume except the northbound and southbound through movement and the eastbound and westbound right turns. The through movement increases are not expected to adversely impact the intersection LOS as there were non-critical movements in the 2010 report. The two right turns movements are exclusive right turns that can accommodate an increase of about 50 vehicles in one hour. As presented in Table 2, the intersection LOS remained at D with a slight improvement in the delay. As such, the analysis result for the Capitol Expressway/Tully Road intersection under 2012 condition is considered similar to the 2010 report.

Capitol Expressway/Quimby Road

Compared to the 2009 data, the total intersection volume decreased by almost 15% in 2012 as presented in Table 1. Most approaches at this intersection have a decrease in volume except the northbound and southbound through movement and the northbound right turn. The northbound through movement increase of 23 vehicles would not significantly impact the intersection LOS as it is not a critical movement in the 2010 report. The northbound right turn is an exclusive right turn and it can accommodate the increase of 73 vehicles. The southbound through traffic volume at this intersection is the lowest of the four study intersection while maintaining the same number of through lanes as the other intersections. The increase in the southbound through volume is therefore not expected to significantly impact the intersection LOS. As presented in Table 2, the intersection LOS improved from F to D. The EIS analysis is therefore considered to be conservative.

Conclusion

Three of the four CMP intersections have a slight increase in the total intersection traffic volume and one has a decrease in the total intersection volume. These changes in volume at the study intersections did not substantially change the analysis results from the 2010 EIS report. The average vehicle delay at the intersections of Capitol Expressway with Capitol Avenue and Story Road increased slightly under the 2012 conditions but the LOS are still within the acceptable level. LOS at the Tully Road intersection remained the same in 2012 while the decrease in traffic volumes at the Capitol Expressway/Quimby Road intersection brought about an improvement in the LOS compared to the 2010 EIS. The latter indicates that the 2010 analysis is conservative.

Taking all this information into consideration, the 2010 EIS is still adequate in using the 2012 traffic data from the VTA's 2012 Monitoring and Conformance Data¹.

¹ The 2012 Annual Monitoring Report is scheduled to be approved by the VTA Board of Directors in June 2013.

Table 1 Comparison of 2009 and 2012 Traffic Volumes

| # | Intersection | Counts | PM | | | | | | | | | | | | |
|----------------|--|-------------------|-------------|------------|------------|-------------|------------|------------|-------------|-------------|-------------|-------------|-------------|------------|---------------|
| | | | NB | | | SB | | | EB | | | WB | | | |
| | | | L | T | R | L | T | R | L | T | R | L | T | R | Total |
| 1 | Capitol Expressway / Capitol Avenue | 2009 | 25 | 1625 | 273 | 429 | 2808 | 24 | 33 | 95 | 70 | 469 | 42 | 207 | 6,100 |
| | | 2012 | 31 | 1685 | 325 | 270 | 3003 | 9 | 64 | 111 | 92 | 572 | 76 | 157 | 6,395 |
| | | Difference | 6 | 60 | 52 | -159 | 195 | -15 | 31 | 16 | 22 | 103 | 34 | -50 | 295 |
| 2 | Capitol Expressway / Story Road | 2009 | 146 | 1189 | 133 | 832 | 2352 | 159 | 150 | 666 | 395 | 204 | 523 | 584 | 7,333 |
| | | 2012 | 119 | 1135 | 185 | 783 | 2804 | 97 | 159 | 862 | 540 | 222 | 509 | 610 | 8,025 |
| | | Difference | -27 | -54 | 52 | -49 | 452 | -62 | 9 | 196 | 145 | 18 | -14 | 26 | 692 |
| 3 | Capitol Expressway / Tully Road | 2009 | 98 | 850 | 348 | 688 | 1734 | 407 | 443 | 655 | 59 | 346 | 504 | 245 | 6,377 |
| | | 2012 | 80 | 896 | 323 | 657 | 2044 | 390 | 336 | 580 | 102 | 342 | 398 | 265 | 6,413 |
| | | Difference | -18 | 46 | -25 | -31 | 310 | -17 | -107 | -75 | 43 | -4 | -106 | 20 | 36 |
| 4 | Capitol Expressway / Quimby Road | 2009 | 755 | 974 | 483 | 842 | 1240 | 90 | 91 | 688 | 461 | 594 | 893 | 289 | 7,400 |
| | | 2012 | 356 | 997 | 556 | 784 | 1732 | 71 | 61 | 493 | 338 | 331 | 377 | 207 | 6,303 |
| | | Difference | -399 | 23 | 73 | -58 | 492 | -19 | -30 | -195 | -123 | -263 | -516 | -82 | -1,097 |
| Overall | | | -74 | | | | | | | | | | | | |

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Volume Increase
Volume Decrease

Table 2 Level of Service Comparison

| # | Intersection | Acceptable LOS | 2009 PM | | | 2012 PM | | |
|---|---|----------------|---------|-------------------|-------|---------|-------------------|-------|
| | | | LOS | Average Delay (s) | V/C | LOS | Average Delay (s) | V/C |
| 1 | Capitol Expressway / South Capitol Avenue | E- | D | 42.0 | 0.772 | D- | 53.5 | 0.884 |
| 2 | Capitol Expressway / Story Road | E- | D- | 54.3 | 0.843 | E+ | 57.2 | 0.922 |
| 3 | Capitol Expressway / Tully Road | E- | D | 49.7 | 0.618 | D | 46.8 | 0.585 |
| 4 | Capitol Expressway / Quimby Road | E- | F | 81.6 | 0.993 | D- | 54.1 | 0.679 |