SR-241 Interchange Design

Final Design Report

May 30, 2009

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SR-241 at Portola Parkway Interchange Design

Executive Summary

Prepared For
The California Department of Transportation

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EXECUTIVE SUMMARY (G. THOMPSON/M. BELTRAN)

The SR-241 Toll Road is a major freeway connecting the Inland Empire and Orange County in Southern California. In the past year, the City of Irvine has approved plans for a large scale residential, commercial, and industrial development in Planning Area 6 (PA6) located in north Orange County. This new development will be an integral part of the City of Irvine in future years.

Currently, PA6 is not developed and there is no direct access from the area to a major freeway. Portola Parkway is currently the only road through PA6 and will be expanded to serve as the main arterial through the development. For this reason, the City of Irvine along with the California Department of Transportation feels it necessary to build an interchange at Portola Parkway and the SR-241 opening access to and from PA6 to the rest of Southern California. Full traffic flows are expected to occur by the design year, 2035.

ZOT Engineering working with client consultant, Tetra Tech, is committed to provide a design that holds to all standards and values of the City of Irvine, and complies with all safety and design requirements laid out in the California Department of Transportation Highway Design Manual. They have considered three alternative concepts in the initial part of the design phase and have prepared a 30% design report evaluating each alternative and the benefits and disadvantages of each. Things such as cost, safety, and capacity, environment, and innovation were all taken into consideration in deciding to complete the design for the roundabout interchange (Alternative 3).

Once the alternative selection was complete, ZOT Engineering proceeded to refine the roundabout design. Synchro analysis was conducted first to assess the need for additional lanes, as well as to check the ideal phasing for the intersections. ZOT Engineering concluded that no further modifications are required and that protected left
turns for the adjacent intersections would be ideal. An refinement made to the initial design was to add a tangent area immediately entering the ramps on the northeast ramps, in order to facilitate the super elevation transition.

Along with the in-depth analysis of our original design, many additional aspects were taken into account. ZOT Engineering also completed striping, traffic signal (including loop detector placement), super elevation, and curb returns (drainage consideration) plans. In addition, the layout, contour and grading plans were refined to reflect the changes made. All of these considerations were added to the budget and the overall cost of the interchange design.

Final design of the interchange is completed and bidding for the project will begin June 1, 2009. Construction is set to begin July 6, 2009 and will be completed by the April 22, 2011. Total Cost for the project, including contingency, has been estimated at approximately $52.1 million.
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I. PURPOSE (G. THOMPSON, P. WANG)

1.1 Purpose of Project

The purpose of the project is to work in conjunction with the California Department of Transportation (Caltrans) to develop and build an interchange system for the SR-241 and Portola Parkway crossover, as well as the two adjacent intersections directly north and south of the roundabouts. The interchange is located in Irvine, Orange County, California (Caltrans District 12). Currently there is no access to/from the highway at Portola, the main transportation corridor through and for the City of Irvine’s Planning Area 6 (PA6). With the newly accepted, large-scale development planned for PA6, access to Southern California’s highway system will be necessary for local residents and businesses. Considering the development is not completed, current traffic flows are not heavy. ZOT Engineering expects heavy traffic flows to occur at our design year of 2035. Without an intersection in place in the upcoming years, traffic flow to and from the PA6 development will be severely limited.

ZOT Engineering is committed to working with the City of Irvine and The California Department of Transportation’s goals, expectations, and priorities.

1.2 Purpose of Report

The purpose of the report is to analyze three different alternatives and design specific details for the recommended design. After comparing in a number of categories, ZOT Engineering recommends the roundabout interchange. This design includes new signalized intersections at the northern and southern counterparts to the roundabouts along Portola Parkway. This report shows the level of service of these intersections after taking into account current and future traffic volumes. Utilizing Synchro 7.0, ZOT Engineering has simulated the current and future LOS for intersections in this design. ZOT Engineering has also optimized the signal timings for the best level of service. Items included in this report that should be noted:

- Cost Estimate
- Striping
- Traffic Signal Plans
- Superelevation
- Curb Return Grading
II. EXISTING SITE CONDITION (G. THOMPSON)

2.1 Specific Site Location

Planning Area 6 (PA6) consists of approximately 2,400 acres in the foothills of the Cleveland National Forest located in northern Orange County, California. It is bounded by: Planning Area 3 to the north, Highway 133 to the west, and Planning Area 5 to the south and east. The El Toro Marine Corps Air Station previously occupied land to the south of PA6. Portola Parkway runs East-West through the center of Planning Area 6. SR-241 runs East-West and serves as the northern boundary for the proposed residential/commercial development of PA6. The proposed interchange will expand upon the current underpass of Portola Parkway at SR-241 located at the North-East corner of the PA6 development. The nearest interchanges to Portola on SR-241 are Alton Parkway (approx 1.5-mile to the south) and Highway 133 interchange (approx 2-mile to the north).

2.2 Topography

The majority of PA6 resides on foothills and is not flat terrain. This is especially true in the North East section where the proposed interchange is to be built. This will increase grading as well as cut/fill costs. However, since SR-241 and Portola are already in existence much grading has already been done.

2.3 Land Uses

The proposed interchange at SR-241 and Portola will mainly serve the adjacent new development at PA6. This will include a significant amount of residential, recreational, and local/regional commercial uses. Housing developments, shopping centers, and recreational facilities will all be located off of Portola throughout PA6. The land surrounding PA6 is mostly undeveloped. Land north of the 241 is set aside for preservation. Land immediately south is currently mostly agricultural save a few newly developed residential communities. While the land to the north of 241 will remain undeveloped, by our design year 2035 ZOT Engineering anticipates not only PA6 being developed but also most of the surrounding areas.
III. TRAFFIC SUMMARY (G. THOMPSON)

3.1 Traffic Impact

The proposed interchange will grant open access of Planning Area 6 (PA6) to the rest of Southern California via the network of private, state, and interstate freeways. Immediate and local communities and cities include Irvine, Tustin, Orange, and Newport Beach to the west, Lake Forest and Mission Viejo to the South, and the Inland Empire to the North via SR-241. Traffic flows will increase in both directions along the SR-241 and connection freeways including the I-5, I-405, SR-261, CA-133, and CA-91. The greatest traffic impact will occur on Portola Parkway and SR-241 which will both see significant increases in flows.

There will be little to no impact on adjacent interchanges at CA-133 to the north and Alton Parkway to the south due to the large distance from Portola Parkway.

3.2 Current/Future Traffic Flows

Currently there is minimal traffic flow on Portola Parkway through PA6 because it is located in an undeveloped area. Traffic Flows on SR-241 are also low because it is a privately owned and operated toll road. ZOT Engineering is aware that as the adjacent land becomes developed there will be a significant increase of traffic in the next 30 years. Although details will not be included, all highway and arterial capacities will be sufficient to meet the anticipated traffic demand in the year 2035. ZOT Engineering has prepared tables of both current and projected traffic flows:

Figure 1: Current Year (Year 2004) Traffic Data SR-241 (Tetra Tech, 2008)

<table>
<thead>
<tr>
<th>Direction</th>
<th>From/To:</th>
<th>AADT</th>
<th>Peak Hour Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>AM</td>
</tr>
<tr>
<td>SB</td>
<td>CA-133 to Alton Parkway</td>
<td>34,380</td>
<td>2,077</td>
</tr>
<tr>
<td>NB</td>
<td>Alton Parkway to CA-133</td>
<td>35,850</td>
<td>2,760</td>
</tr>
</tbody>
</table>
### Figure 2: Future Year (Year 2035) Traffic Data SR-241 (Tetra Tech, 2008)

<table>
<thead>
<tr>
<th>Direction</th>
<th>Location</th>
<th>AADT</th>
<th>Peak Hour Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>AM</td>
<td>PM</td>
</tr>
<tr>
<td>SB</td>
<td>N. of Portola Pkwy Off-Ramp</td>
<td>53,250</td>
<td>2,742</td>
</tr>
<tr>
<td></td>
<td>Portola Pkwy Off-Ramp</td>
<td>9,780</td>
<td>795</td>
</tr>
<tr>
<td></td>
<td>S. of Portola Pkwy Off-Ramp</td>
<td>43,470</td>
<td>1,947</td>
</tr>
<tr>
<td></td>
<td>Portola Pkwy On-Ramp</td>
<td>4,260</td>
<td>194</td>
</tr>
<tr>
<td></td>
<td>S. of Portola Pkwy On-Ramp</td>
<td>47,730</td>
<td>2,142</td>
</tr>
<tr>
<td>NB</td>
<td>S. of Portola Pkwy Off-Ramp</td>
<td>51,300</td>
<td>3,286</td>
</tr>
<tr>
<td></td>
<td>Portola Pkwy Off-Ramp</td>
<td>5,460</td>
<td>435</td>
</tr>
<tr>
<td></td>
<td>N. of Portola Pkwy Off-Ramp</td>
<td>45,840</td>
<td>2,850</td>
</tr>
<tr>
<td></td>
<td>Portola Pkwy On-Ramp</td>
<td>6,840</td>
<td>422</td>
</tr>
<tr>
<td></td>
<td>N. of Portola Pkwy On-Ramp</td>
<td>52,680</td>
<td>3,272</td>
</tr>
</tbody>
</table>

### 3.3 Level of Service (LOS)

As shown in the figure below, SR-241 between CA-133 and Alton currently operates at LOS B (AM) and LOS C (PM) in the SB. In the NB direction from Alton to CA-133, SR-241 currently operates at LOS C (AM) and LOS B (PM). Future LOS will be studied in closer detail with the chosen alternative as part of the final design report. ZOT Engineering will assume that alternatives will provide similar levels of service in the design year 2035 and will not be a factor in selecting a final design. Also, testing flows for a “no build” alternative is irrelevant to the scope of this project since having the interchange will generate traffic flows and without the interchange, PA6 would not have direct access to the freeway system.

### Figure 3: Mainline Freeway LOS Summary (Tetra Tech, 2008)

<table>
<thead>
<tr>
<th>Direction</th>
<th>From/To:</th>
<th>2004 Existing Peak HR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>AM</td>
</tr>
<tr>
<td>SB</td>
<td>CA-133 to Alton Parkway</td>
<td>B</td>
</tr>
<tr>
<td>NB</td>
<td>Alton Parkway to CA-133</td>
<td>C</td>
</tr>
</tbody>
</table>
IV. DESIGN CRITERIA (G. THOMPSON, H. HUANG)

4.1 California Department of Transportation Highway Design Manual (Jan. 2007)

All interchange components/geometry including ramp speed limit, lane width, turning radius, super elevation, and stopping sight distance are designed to meet all safety and design criteria laid out in the California Department of Transportation Highway Design Manual (HDM). Chapters 200 and 500 were heavily referenced for the design.

4.2 Design Checklist

ZOT Engineering referred to a comprehensive design checklist for the development of geometric plans given by the California Department of Transportation. This list served as a quick reference guide to make sure all HDM design criteria were met. (For the full copy of the checklist, please see the Appendix).

4.2 Americans with Disabilities Act of 1990

The Americans with Disabilities Act is a civil rights law that prohibits discrimination based on disability. ZOT Engineering complied with the Americans with Disabilities Act by providing access ramps at crosswalks. Pedestrian push buttons will be placed close to the access ramps to assure pedestrian with ample crossing time.

4.4 Environmental Issues

ZOT Engineering has hired a consultant to look into environmental concerns and documentation necessary to build the proposed interchange. Things such as:

- Biological impact to plants and animal species
- Air Quality impact
- Water Quality Impact
- Visual Impact

Have all been taken into consideration and will not be affected by the construction of the proposed interchange. All necessary documents such as the environmental checklist have been filed and we have met all requirements of California Environmental Quality Act and the National Environmental Policy Act.
4.5 California Department of Transportation Standard Plans (May 2006)

Lighting and traffic signal poles, traffic signal face pole mountings, the controller cabinet, and pavement markings and traffic lines are standards specified in Caltrans Standard Plans. The traffic signal poles will a mast arm is designed with one additional case load from proposed case load for future additions. The wind velocity considered is 100 mph (California Department of Transportation, 2006).

4.6 Manual on Uniform Traffic Control Devices (Dec. 2007)

Required pavement marking type, color, line pattern, and line width complies with the Manual on Uniform Traffic Control Devices. Chapter 2B is mainly used in the striping plan. The chapter details the required striping for centerlines, edge of pavement, and transverse lines.

4.7 California Department of Transportation Signal and Lighting Design Guide (Jan. 2004)

All traffic signal placements conform to the California Department of Transportation Signal and Lighting Design Guide. The illustrations of the preferred placement are heavily used in the traffic signal design. Placement of the signal faces are based on the number of lanes for each movement (California Department of Transportation, 2004).
V. VIABLE ALTERNATIVE 1: TYPE L-2 SPREAD DIAMOND INTERCHANGE

5.1 Description (H. Huang)

Type L-2 interchange is one of the simplest form of interchange. It has the ability to adapt a wide range of traffic volumes (California Department of Transportation, 2007). In this alternative, the interchange has the basic Type L-2 ramp configuration with some modifications. The design incorporates some features of L-13, single-point, interchange into the design. Free right turn is a basic feature of a typical L-13 interchange (California Department of Transportation, 2001). The design uses the free right turn to move the traffic more efficiently. The right-turning traffic will not need to wait for opposing traffic to turn. Auxiliary lanes are included to improve the efficiency of the intersection.

5.2 Benefits (A. Verdin)

Benefits for the intersection consist of a spread design, allowing for future expansion without the need of increasing the right of way. Loops can be added within the ramp design. The off-ramps maximize sight distance and minimize intersection cross slope because of its large sweeping length. Through the length, one is able to design flatter grades and the ability to have a large turnout bay (California Department of Transportation, 2007). The L-13 or single point interchange characteristics that have been integrated into this alternative leads to increased efficiency of the L-2 design as the free right turn bay allows the alternative to process higher traffic flows. The design allows for improved signal progression due to one less signal as it processes the right turns freely and can provide longer distances to signals improving queue storage. With the free right turn, the design also provides fewer driving conflicts creating a safer intersection. Also, with the large size of the interchange and multiple lanes on the arterial roadway, it allows for closely spaced intersections.
5.3 Disadvantages (A. Verdin)

The right turn lane provided in the design is not optimal for bicycle and pedestrian safety because visibility is decreased and traffic does not stop at these points. The design also creates a necessity for wide intersections which make it difficult for bicycles and pedestrians to clear the intersection. Due to its size, there will be increased structural costs to support the left-turn movements to and from the ramps. The spread of the diamond design has a large initial right of way cost due to the large amount of land that the interchange will occupy. The wide intersection creates the necessity for longer clearance times (yellow and all-red) than standard-sized intersections creating more loss times. Additionally, signing and striping is needed to direct drivers through the wide intersections due to the longer crossing distances (Portland Institute Transportation Engineers, 2007).
VI. VIABLE ALTERNATIVE 2: TYPE L-9 PARTIAL CLOVER LEAF INTERCHANGE (M. BELTRAN/W.K. HUANG)

6.1 Description

A second interchange design considered is the L-9, Partial Cloverleaf, Interchange. This interchange provides two loop on-ramps in addition to four diamond style ramps. The North-East side contains the loop on-ramp access for northbound traffic along Portola Parkway, as well as the SR-241 westbound off-ramp. The North-West side has the second SR-241 westbound on-ramp. The area south of the SR-241 is laid out the same way, with the southbound access to the eastbound SR-241 and the off-ramp on the South-West side, and the second SR-241 SB off-ramp on the southeastern quadrant.

6.2 Benefits

This interchange is ideal in instances where traffic volumes are high, especially for the turning movements, as it provides separate on-ramps from Portola Parkway for the northbound and southbound directions. This design also eliminates the left turning movements going onto the freeway, since northbound and southbound traffic can transition onto the freeway by merging from the outside lanes. Because left turning movements are eliminated, the design allows for a two-phase signalized intersection, when signalized (California Department of Transportation, 2007). The off-ramps will both be signalized and accommodate separate left and right turn signalization in order to minimize queuing delay. All on-ramps are two-lane with ramp metering to allow for large volumes while regulating density of the freeway.

6.3 Disadvantages

The main issue with this alternative is the amount of land use involved. The looped on-ramps have large radii for comfortable turning and to provide adequate acceleration onto the freeway. The interchange accommodates three ramps for each direction (along SR-241 westbound and SR-241 eastbound) which means high grading and right-of-way costs are to be expected. A modification has been made to the design in attempt to mitigate the costs. The North SR-241 westbound and the South SR-241 eastbound on-ramps entrances have been designed closer to the freeway itself. This eliminates a significant amount of right-of-way as well as providing a longer period of decision time for the driver to decide whether or not to take the freeway.
VII. VIABLE ALTERNATIVE 3: ROUNDABOUT TYPE INTERCHANGE (J. ZAMORA, P. WANG)

7.1 Description
This alternative would construct two roundabout intermediaries for the four proposed off/onramps to the SR-241 toll road. The north roundabout will have a three lane roundabout with four directions of incoming traffic and four directions of outgoing all going counter-clockwise from the plan view. The south roundabout will be a two lane roundabout for lower volumes of traffic for the off ramp and on ramp of the SR-241 eastbound ramp. The roundabout interchange accommodates traffic flow in one direction around a circular island. Roundabouts follow newer design guidelines provided by Tetra Tech. This alternative is a fairly new concept to our firm, but ZOT Engineering always strives to show new innovative alternatives to allow a variety of options.

7.2 Benefits
One of the benefits of having roundabouts at the end of the on ramps and off ramps would be reduction of traffic conflicts. A typical signalized intersection has twenty conflict points where vehicles will have delay due to the signalization of the intersection. In the case of a typical roundabout interchange, traffic conflicts are reduced to eight. This design reduces delay times by allowing vehicles to move quicker through the intersection as they yield to oncoming traffic versus stopping and waiting for their thru movement to turn green. Also not having to place signals, loops, and other polls and equipment in the area greatly reduces the cost of building a roundabout versus a signalized intersection. The roundabout interchange also has the capacity to handle high traffic volumes. We have designed a three lane roundabout for high traffic volumes on the North SR-241 westbound off ramp and on ramp.
7.3 Disadvantages

There is a concern that as a new concept in Southern California, those roundabouts might cause confusion for drivers who have never experienced a roundabout prior and do not understand how it functions. Extra signage may need to be incorporated into the roundabout implementation such as not driving next to large semi-trucks as they take up two lanes. Another issue that would cause confusion to drivers would be that most roundabouts do not have arrows pointing the direction of traffic flow as this is usually assumed to be the direction the incoming road is turning into the roundabout. Unfortunately, this may not be the issue with this location, so it is highly encouraged by our team that with this alternative there is need to approve striping the roundabouts with arrows pointing the direction of traffic flow. Also a concern would be that people feel a need to stop at the yield sign either not reading it or assuming that you have to stop. As a result, there may be an increase amount of rear end collisions at the entrances to the roundabout.
VIII. ALTERNATIVES COST SUMMARY (G. THOMPSON, H. HUANG)

Below are the cost summary tables used to estimate the total project cost for each alternatives. Section XIV: Cost Summary includes all specific costs for the recommended alternative. The greatest cost for each alternative was the right of way acquisition.

**Figure 4: Cost Summary for Viable Alternative 1: L-2 Interchange**

<table>
<thead>
<tr>
<th>Item/Task</th>
<th>Item #</th>
<th>Unit</th>
<th>Cost/Unit</th>
<th>Amount</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contour Grading (Cut)</td>
<td>197003</td>
<td>m$^3$</td>
<td>$35.00</td>
<td>6214.92</td>
<td>$217,522.20</td>
</tr>
<tr>
<td>Contour Grading (Fill)</td>
<td>197003</td>
<td>m$^3$</td>
<td>$35.00</td>
<td>7899.86</td>
<td>$276,495.10</td>
</tr>
<tr>
<td>Asphalt/Pavement</td>
<td>390104</td>
<td>TONN</td>
<td>$280.00</td>
<td>15772.49</td>
<td>$4,416,297.20</td>
</tr>
<tr>
<td>Right of Way</td>
<td>N/A</td>
<td>ft$^2$</td>
<td>$35.00</td>
<td>1097742.89</td>
<td>$38,421,001.15</td>
</tr>
<tr>
<td>Retaining Wall (Structural Concrete)</td>
<td>510060</td>
<td>m$^3$</td>
<td>$230.00</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Signalized Intersection</td>
<td>N/A</td>
<td>EA</td>
<td>$120,000.00</td>
<td>2</td>
<td>$240,000.00</td>
</tr>
<tr>
<td>Utility Relocation</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Add 20% Contingency</td>
<td>N/A</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$8,714,263.12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>$52,285,578.77</strong></td>
</tr>
</tbody>
</table>

*Source: http://sv08data.dot.ca.gov/contractcost/

**Figure 5: Cost Summary for Viable Alternative 2: L-9 Interchange**

<table>
<thead>
<tr>
<th>Item/Task</th>
<th>Item #</th>
<th>Unit</th>
<th>Cost/Unit</th>
<th>Amount</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contour Grading (Cut)</td>
<td>197003</td>
<td>m$^3$</td>
<td>$35.00</td>
<td>7566.55</td>
<td>$264,829.25</td>
</tr>
<tr>
<td>Contour Grading (Fill)</td>
<td>197003</td>
<td>m$^3$</td>
<td>$35.00</td>
<td>18916.07</td>
<td>$662,062.45</td>
</tr>
<tr>
<td>Asphalt/Pavement</td>
<td>390104</td>
<td>TONN</td>
<td>$280.00</td>
<td>15452.29</td>
<td>$4,326,641.20</td>
</tr>
<tr>
<td>Right of Way</td>
<td>N/A</td>
<td>ft$^2$</td>
<td>$35.00</td>
<td>1921336.21</td>
<td>$67,246,767.35</td>
</tr>
<tr>
<td>Retaining Wall (Structural Concrete)</td>
<td>510060</td>
<td>m$^3$</td>
<td>$230.00</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Signalized Intersection</td>
<td>N/A</td>
<td>EA</td>
<td>$120,000.00</td>
<td>2</td>
<td>$240,000.00</td>
</tr>
<tr>
<td>Utility Relocation</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Add 20% Contingency</td>
<td>N/A</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$14,548,060.05</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>$87,288,360.30</strong></td>
</tr>
</tbody>
</table>

*Source: http://sv08data.dot.ca.gov/contractcost/
As it is clear from the above figures, there is a significant cost increase for alternative two due to the large right of way costs. This gives significant advantage to the other two alternatives when comparing costs. Since the costs for alternatives one and three are similar it will be important to use other criteria to distinguish them and select an alternative for the final design.

![Image](image-url)
IX. RECOMMENDED DESIGN ALTERNATIVE: ROUNDABOUT INTERCHANGE (M. BELTRAN, G. THOMPSON, A. VERDIN)

In choosing an alternative for the final design, ZOT Engineering has taken the following into strong consideration:

- Costs
- Safety
- Capacity
- Environmental Impact
- Innovation

Below is a chart evaluating and comparing the three viable alternatives studied:

Figure 7: Viable Alternatives Comparison Chart

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Diamond Interchange Design</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L-2</td>
</tr>
<tr>
<td>Intersection Capacity</td>
<td>Medium</td>
</tr>
<tr>
<td>Adjacent Intersection Spacing</td>
<td>High</td>
</tr>
<tr>
<td>Cross Street Vehicle/ Conflicting Traffic</td>
<td>High</td>
</tr>
<tr>
<td>Traffic Safety</td>
<td>Low</td>
</tr>
<tr>
<td>Pedestrian/Bicycle Accommodation</td>
<td>Medium</td>
</tr>
<tr>
<td>Construction Cost</td>
<td>Medium</td>
</tr>
<tr>
<td>Right-of-Way Cost</td>
<td>Medium</td>
</tr>
<tr>
<td>Total Costs</td>
<td>$52,300,000</td>
</tr>
</tbody>
</table>

Based on all considerations ZOT Engineering has selected to use Alternative 3: Roundabout Interchange as their recommended design for the SR-241 and Portola Parkway Interchange. We feel that the increased safety and capacity at a decreased price is a great use of resources. Also, because roundabouts are not common yet in the United States, this will give the City of Irvine a chance to be unique, innovative, and ahead of the curve. Adding prestige to the city is a welcomed side benefit of this selection.
X. SYNCHRO SIMULATION (P. WANG, M. BELTRAN)

Level of service (LOS) represents a qualitative ranking of the traffic operational conditions experienced by the users of a facility under specified roadway, traffic, and traffic control (if present) conditions. In addition, LOS is a qualitative indication of operating conditions as presented by various traffic parameters such as delay, speed, and volume to capacity ratio. Current practice designates six (6) levels of service ranging from A to F, with LOS A representing the best operating conditions and LOS F representing the worst.

ZOT Engineering used Synchro 7.0 to analyze the LOS for the roundabouts and adjacent intersections. This is done to make sure the designed roadway does not need additional lanes. The analysis concludes that no further design modifications are needed in the design.

The 2035 traffic flows were provided in a report by Tetra Tech (2008). Adjustments were made to reflect PA6. The report was for a fully developed area in Riverside. ZOT Engineering believes that PA6 will not be fully developed by 2035, so our flows are about 50% of the report.

The LOS determined by Synchro is summarized by Figure 8. Since the roundabout is not signalized, the reported LOS is the ICU (intersection capacity utilization) LOS. The ICU LOS measures the capacity of the intersection. The range is A-H with A being the best ranking.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>LOS (Protected Left Turns)</th>
<th>LOS (Permitted Left Turns)</th>
<th>LOS (Lead-Lag Left Turns)</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Intersection</td>
<td>D</td>
<td>F</td>
<td>D</td>
</tr>
<tr>
<td>South Roundabout</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>North Roundabout</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>North Intersection</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
</tbody>
</table>

The results show that the south intersection will have LOS F when it is a permitted left. This indicates that a protected left is needed. Synchro shows a left turn bay of 200 ft to be adequate for the future 2035 traffic flows. ZOT Engineering compared the level of service between a protected left and a lead-lag left to see if there will be an additional benefit having Lead-Lag timing. The results show that there is not a significant difference between them. In
general, Lead-Lag phasing will benefit those intersections with higher left-turning movements in one direction when compared to the opposing direction. Because the turning volumes across all the intersections do not vary significantly, the lead-lag phasing would not be the ideal choice for these intersections. ZOT Engineering concludes that the two adjacent intersections will be signalized with a protected left. The Synchro simulation shows that there will not be a significant amount of queue at the intersections. There will not be any backup onto the freeway.

There seems to be a limitation in the animation of roundabout in Synchro. When cars are in the roundabout, they will use only one lane. Sometimes, cars will merge together in the roundabout and break away after the roundabout. This may be due the roundabout being available fairly recent addition to Synchro. ZOT Engineering has contacted Tetra Tech for assistance, but the same problem occurs on their roundabouts. For the most part, it is not too much of a concern because the cars merging together in the same lane would be almost equivalent in behavior as those same cars in the separate lanes. For this reason, the limitation will not affect our overall analysis.
XI. STRIPING DESIGN (H. HUANG, W.K. HUANG)

Due to the installation of the interchange system, portions of Portola Parkway will need restriping. Crosswalks will be installed at the intersection following the roundabout for pedestrian crossing. The proposed striping plan will conform to the Manual on Uniform Traffic Control Devices (MUTCD), 2007. Any pavement details will refer to the typical detail from the California Department of Transportation Standard Plans (2006).

11.1 Traffic Lines

Since the roundabouts have more than a single lane, guide lines are proposed to maintain safety. Figure 10 shows the guide lines for the southern roundabout. The lines will help lead the drivers in and out of the roundabout. The striping plan will specify the line type detail used.

General striping for the project will follow the required striping in the MUTCD. Broken dashed lines separating lanes will change to solid lines 100 ft to the limit line. A solid white line will separate the lanes and the shoulder.

Figure 10: Detail of Guide Lines in Roundabout
11.2 Pavement Markings

To aid the drivers with the unfamiliarity of the roundabout, pavement markings are proposed at the limit line and in the roundabout. Figure 11 shows the pavement markings for the northbound, southern roundabout. “Yield” markings are placed to tell the drivers there is no need to make a complete stop at the roundabout. Directional arrows at the limit line provide the driver information as to the movement of the lane. Within the roundabout, further directional arrows are placed to inform the movement of the lane. This is done to help improve the safety of the roundabout.

![Figure 11: Detail of Roundabout Pavement Markings](image)

11.3 Crosswalk

Four alternatives are looked at: no build, L-shaped, pelican crossing, and diagonal crossing. Cost is not considered with the selection of the alternative because difference in cost is minimal compared to the overall project cost. The main considerations are pedestrian serviceability and vehicle lost time.

The first alternative is the no build alternative. The pedestrians will not be allowed to cross the intersection. This will provide zero serviceability to the pedestrians. Portola Parkway is a major roadway in PA6 and not letting pedestrians cross will seriously limit accessibility for the pedestrians. This alternative will provide the lowest vehicle lost time compared to the other alternatives because there will be fewer phases the vehicles need to stop.

The second alternative is a L-shaped pedestrian crossing. Figure 12 shows the L-shaped configuration. In this alternative, some pedestrians are served. Pedestrians from the top-left, top-right, and bottom-right corner can cross the intersection. Pedestrians from the bottom-left corner will not be able to crossing. This means those pedestrians will need to back-track to
another intersection to cross. This alternative may be considered if pedestrians are mostly on one side of the roadway, but the land use around the project’s intersections show fairly equal pedestrian volumes on both side of the roadway. The vehicle lost time is higher compared to the no-build alternative, but lower compared to next alternatives.

![Figure 12: L-Shaped Pedestrian Crossing](image)

The third alternative is a 4-Way pedestrian crossing. Figure 13 illustrates the crossing. This alternative will allow pedestrians from any of the four corners to cross. All pedestrian volumes will be served. A drawback of this alternative occurs when pedestrians want to cross diagonally, two pedestrian phases. This increases the vehicle lost time. Vehicle lost is higher compared to the previous alternatives, but the last alternative may be potentially higher.

![Figure 13: 4-Way Pedestrian Crossing](image)

The final alternative is the diagonal pedestrian crossing. An illustration is shown in Figure 14. Like the third alternative, all pedestrian volumes are served. In this design, pedestrians wanting to cross diagonally only require one phase. This design is useful if pedestrian volumes are high. In PA6, that is not the case. Vehicle lost time is the highest of the four alternatives.
After comparing the four alternatives, the 4-Way pedestrian is selected. It is the most cost-effective in terms of lost time and serviceability. The following table, Figure 15, illustrate the pros and cons of each alternative.

**Figure 15: Crosswalk Alternatives Comparison Chart**

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<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No-Build</td>
</tr>
<tr>
<td>Vehicle Lost Time</td>
<td>Mid-Low</td>
</tr>
<tr>
<td>Serviceability</td>
<td>None</td>
</tr>
</tbody>
</table>
XII. TRAFFIC SIGNAL PLAN (J. ZAMORA, P. WANG, W.K. HUANG, H. HUANG)

ZOT Engineering has been asked to provide a traffic signal design for the two adjacent intersections. All design follows California Department of Transportation Standard Plans (2006) and California Department of Transportation Signal and Lighting Design Guide (2004).

12.1 Signal Head Location and Pole Type

The location of the signal head follows the Caltrans Signal and Lighting Design Guide. It is determined by the number of through lanes and the number of left turning lanes (Caltrans, 2004). An additional signal head is also mounted on the pole for the through or left movement (which one depends on the location of the pole). The pole type is standard from the Caltrans Standard Plan (2006). A wind velocity of 100 mph is considered. The proposed signal pole will have a plus one designed case load. All the design signal poles have three case loads, so the proposed poles can handle four case loads. A case load is the number of objects hanging on the mast arm.

12.2 Loop Locations

The loop placements follow Caltrans standards. The location of the advanced loops is determined by the speed of the roadway, 45 mph. ZOT Engineering has designed the advanced loops to be placed 270 ft from the limit line. The advanced loops will be assigned as one group for extension of green. The loops at the limit line will be grouped by each lane. These detectors will detect presence of vehicles. The left turning lanes will have two groups, one to detect presence and one for extension. Figure 16 shows the location of the loop detectors. The loops at the limit line are placed 10 ft edge-to-edge.

Figure 16: Illustration of the Placement of the Loops Detectors
12.3 Phase Diagram

Both the north and south intersections have the same phase diagram. Figure 17 shows the phase diagram. The dashed lines represent pedestrian crossing.

![Phase Diagram](image)

Figure 17: Phase Diagram for the Two Signalized Intersections

12.4 Conductor and Pole Schedule

The pole schedule provides the detail for each pole. The signal and pedestrian head mounting is standard to Caltrans Standard Plan (2006). The lighting is assumed to have a 12 ft mast arm and 200W H.P.S luminaire.

The conductor schedule provides the content of each conduit. The number of signal cables, conductors, and loop wires are shown for each run. For location of the run, see the traffic signal design drawings in the appendix (Sheet T-1 and T-2). The conduit is made sure to be less than 26% filled to allow any possible future additional conductors.
12.5 Access Ramps

Following closely with Americans with Disabilities Act, 1990 (ADA Standards), ZOT Engineering included access ramps for all directions and made sure pedestrian push buttons are close to the ramps. Figure 18 shows the curb ramp detail. It is standard in Caltrans Standard Plans (2006) Plan No. A88A.

![Figure 18: Curb Ramp Detail](image1)

12.6 Curb Returns

In order to prevent ponding at the corners of each sidewalk, the curbs are analyzed to see how the water is flowing. The elevations from beginning of curb radius (BCR) to the end of curb radius (ECR) are plotted to see if the slope will be higher enough for the flow. If unable to create enough flow, a storm drain must then be installed at the landing zone. The project does not have any curbs that will need a storm drain installed. Figure 19 provides illustration of the curb analysis.

![Figure 19: Drainage Consideration](image2)
XIII. SUPERELEVATION (A. VERDIN, W.K. HUANG)

The off and on-ramps for the Roundabout require superelevation transitions to lessen the centrifugal forces and maintain traction at optimal speeds for traffic to progress. The superelevation design used the current HDM Section 200, with a strong emphasis on Table 202.2 and Figure 202.5A. The North off-ramp contained two curves, C1 and C2, and the on-ramp contained one large curve C3. The South end contained one curve on both the on-ramp and off-ramp. All ramps and their respective superelevation rates are shown in the tables below (Figure 20). The axis of rotation for the design was the centerline of the roadway, with equal space between the left and right end of shoulders. Where superelevation was not into effect, standard crown rates of 2% were used. The Superelevation Transitions with their respective profiles are in the Appendix.

Curve C1 for the North side of the design followed non-standard design due to the short curve length of 75.04', rendering it insufficient to provide the necessary runoff lengths and superelevation rate of 12%. According to Caltran’s Highway Design Manual, Section 202.5 (3), in cases of short curve radiiuses or lengths, the highest possible superelevation rate and transition length should be used. There is a limitation that the cross slope of the curve must not exceed 6% per 100 ft. With this into consideration, Curve C1’s superelevation was manipulated to meet the maximum comfortable speed without feeling any discomfort from the centrifugal force.

<table>
<thead>
<tr>
<th>North Curves</th>
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<td>C1*</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>C2</td>
<td>11%</td>
<td></td>
</tr>
<tr>
<td>C3</td>
<td>12%</td>
<td></td>
</tr>
</tbody>
</table>

*Non-standard design

<table>
<thead>
<tr>
<th>South Curves</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Curve</td>
<td>Superelevation Rate</td>
<td></td>
</tr>
<tr>
<td>C1</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>C2</td>
<td>6%</td>
<td></td>
</tr>
</tbody>
</table>

Figure 20: Superelevation Rates
XIV. FINAL COST SUMMARY (G. THOMPSON, H. HUANG)

Below is the final cost estimate table for the roundabout interchange design. This cost has been updated from the original estimate of $43,400,000 to $52,100,000. For the preliminary cost estimates please refer to Section VIII.

Updated cost considerations include two signalized intersections, pavement striping and marking, and a 10% contingency. Intersection costs were lump summed and estimate to be $200,000. This includes all signals and lighting fixtures, detectors, cabinets and wiring. The intersection estimate was provided by our client consultant, Seri Park.

<table>
<thead>
<tr>
<th>Item/Task</th>
<th>Item #</th>
<th>Unit</th>
<th>Cost/Unit</th>
<th>Amount</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contour Grading (Cut)</td>
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<td>m³</td>
<td>$35.00</td>
<td>1127.29</td>
<td>$39,455.15</td>
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<tr>
<td>Contour Grading (Fill)</td>
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<td>m³</td>
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<td>14801.56</td>
<td>$518,054.60</td>
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<tr>
<td>Asphalt/Pavement</td>
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<td>TONN</td>
<td>$280.00</td>
<td>17068.49</td>
<td>$4,779,177.20</td>
</tr>
<tr>
<td>Right of Way</td>
<td>n/a</td>
<td>ft²</td>
<td>$35.00</td>
<td>1087643.99</td>
<td>$38,067,539.65</td>
</tr>
<tr>
<td>Retaining Wall (Structural Concrete)</td>
<td>510060</td>
<td>m³</td>
<td>$230.00</td>
<td>Not Applicable</td>
<td>N/A</td>
</tr>
<tr>
<td>Signalized Intersection</td>
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<td>2</td>
<td>$400,000.00</td>
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<td>Utility Relocation</td>
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<td>-</td>
<td>Not Applicable</td>
<td>N/A</td>
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<td>Paint Traffic Stripe</td>
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<td>EA</td>
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<tr>
<td>Add 10% Contingency</td>
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<td>LS</td>
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<td>-</td>
<td>$4,735,269.34</td>
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<td>TOTAL COST</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$52,100,000.00</td>
</tr>
</tbody>
</table>

*Source: http://sv08data.dot.ca.gov/contractcost/

A 10% contingency is added to the subtotal for any delays in the project. The value was provided by our client consultant, Seri Park. The contingency takes into account of the slow current economic climate.
XV. TENTATIVE PROJECT/CONSTRUCTION SCHEDULE (G. THOMPSON, A. VERDIN)

ZOT Engineering has prepared an up to date timeline for the work completed, as well as a preliminary construction schedule which can be referenced in its entirety in the Appendix Section. The 100% design has been completed, which includes SYNCHRO analysis, interchange signal design, signing and striping, curve data, and superelevation with their respective duration. The project is ready for its last review and it is ready to be listed. The bidding period will open for one month followed by the construction period. Construction is set to be completed by the April of 2011. Below is a summary of the project schedule:

- Alternative Design Period (3 Months)
  - 30% Design
- Final Design (3 Months)
  - Completed May 30, 2009
- Bidding Period (1 Month)
  - To begin June 1, 2009
- Construction Period (20 Months)
  - To begin July 6, 2009
- Project Completion
  - April 22, 2011

After the contract has been awarded, ZOT Engineering will serve as a consultant and provide any necessary construction support till the completion of the project.
XVI. ACKNOWLEDGEMENTS

ZOT Engineering would like to acknowledge the following people for their help and support throughout the design process. We appreciate them very much!

- Seri Park, PH.D, Tetra Tech
- Professor M.G. McNally, UC Irvine
- Professor Stephen G. Ritchie, UC Irvine
- Pierre Auza, Teaching Assistant
XVII. LIST OF REFERENCES


Tetra Tech. (March 24, 2008). *For Interchange Improvements to Interstate 10 at Tippecanoe Avenue and on Tippecanoe Avenue/Anderson Street*

XVIII. APPENDIX

18.1 Alternative Design Plans and Specs
   18.1.1 Alternative 1: Type L-2 Plans (H. Huang, A. Verdin)
   18.1.2 Alternative 2: Type L-9 Plans (M. Beltran, W.K. Huang)
   18.1.3 Alternative 3: Roundabout Plans (J. Zamora, P. Wang)

18.2 Detail Specs
   18.2.1 Striping Plan (H. Huang)
   18.2.2 Traffic Signal Plan (M. Beltran, A. Verdin, P. Wang, J. Zamora, W.K. Huang)
   18.2.3 Curb Return Plan (J. Zamora, P. Wang)
   18.2.4 Superelevation Plan (A. Verdin, W.K. Huang)

18.3 Construction Schedule

18.4 Design Checklist

18.5 Project Log

18.6 Email Correspondence Records
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
PROJECT PLANS FOR CONSTRUCTION ON
STATE HIGHWAY
IN ORANGE COUNTY
AT ROUTE 241 AND PORTOLA AVE
TO BE SUPPLEMENTED BY STANDARD PLANS DATED MAY 2006
TYPE II ALTERNATIVE INTERCHANGE
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<th>Δ</th>
<th>L (ft)</th>
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<td>266.75</td>
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<tr>
<td>3</td>
<td>85</td>
<td>29'49'35.09''</td>
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<td>22.64</td>
</tr>
</tbody>
</table>
See Sheet 05
Match Line Sta. 821+50

RAISED MEDIAN

See Sheet 04
Match Line Sta. 206+00

TYPE VI ARROW

END OF SIDEWALK

See Sheet 10
Match Line Sta. 811+00

TYPE VI ARROW

RAISED MEDIAN

See Sheet 02
Match Line Sta. 211+50

STRIPING
SCALE: 1"=50'

S-03
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<th>DETAIL OF MARKING</th>
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<th>8&quot; SOLID WHITE</th>
<th>12&quot; SOLID WHITE</th>
<th>12&quot; ARROWS AND WORDS</th>
<th>TYPE D * TWO-WAY YELLOW</th>
<th>TYPE G * ONE-WAY CLEAR</th>
<th>TYPE H * ONE-WAY YELLOW</th>
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</thead>
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<td>SF/FT</td>
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**STRIPING QUANTITIES**

NO SCALE

SQ-01
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<th>#</th>
<th>Task Name</th>
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DESIGN INFORMATION BULLETIN NUMBER 78-02

Department of Transportation
Division of Design
Office of Geometric Design Standards

DESIGN CHECKLIST
FOR THE DEVELOPMENT OF GEOMETRIC PLANS

APPROVED BY:

__________________________
KEKOA ANDERSON
SERI PARK
DESIGN CHECKLIST
FOR THE DEVELOPMENT OF GEOMETRIC PLANS

DATE: January 2009

DIST-CO-RTE-PM/PM: 12-Ora-241-25.3/27.3
SOURCE No. – EA: 12-448100
Description: SR 241-Portola Rd. Interchange
Engineer: Z.O.T. Engineering

Disclaimer Statement.
This checklist is NOT to be used as a substitute for the Highway Design Manual (HDM) and intentionally does not address all design policies, procedures, and standards (mandatory, advisory, procedural, permissive, etc.) discussed in the HDM.

INSTRUCTIONS

- This checklist should be used during the development of the geometric plans for highway projects. To properly use this checklist for a project, the pages prior to this page are to be removed and this page is to be used as a coversheet.

- This checklist is to be used in conjunction with the Sixth Edition of the Highway Design Manual (HDM), Design Information Bulletin (DIB) 77, DIB 79, and DIB 82.

- References to the pertinent HDM sections are shown in brackets following the question.

- The following abbreviations and format are used in this checklist –
  M = Mandatory Design Standard; HDM Reference in bold text
  A = Advisory Design Standard; HDM Reference text in italics.

- Some items in the checklist may not apply to every project.

- Questions in Section 1.1 answered with “no” require an explanation in the space below the question and, if deviations from mandatory or advisory standards result, the appropriate approvals are to be obtained and the engineering documented appropriately.

- Design features or elements that deviate from mandatory standards require approval of the Chief, Division of Design. This approval authority has been delegated to the Design Coordinators, except those in Chapters 600 thru 670, which have been delegated to the Chief, Office of Pavement Design. [M: Index 82.2(1)]

- The authority to approve exceptions to advisory standards has been delegated to the District Directors. [A: Index 82.2(2)]

- The remaining design standards listed are permissive and engineering decisions related to them should be documented in the project history files.
1.0 Basic Design Criteria

These Design Standards and Criteria are to be established prior to Geometric plan development.

1.1 Design Speed and Sight Distance Criteria

M: Topic 101 and Topic 201

HDM Index 101.1 should be read before selecting a design speed. Design speed selection will affect sight distance, vertical alignment, horizontal alignment, and other requirements. Projects with multiple roadways will require multiple entries.

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<th>Proposed Design Speed for project:</th>
<th>Ramps vary from 50-35 mph</th>
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<td>1)</td>
<td>Minimum Design speed for this type of facility (See Topic.101.2):</td>
<td>Ramps vary from 50-35 mph, Tippecanoe 45mph, Portola 45 mph</td>
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<td>2)</td>
<td>Design Speed of roadway segment prior to project:</td>
<td>Ramps vary from 50-35 mph, Tippecanoe 45mph, Portola 45 mph</td>
</tr>
<tr>
<td>3)</td>
<td>Design Speed of roadway segment after project:</td>
<td>Ramps vary from 50-35 mph, Tippecanoe 45mph, Portola 45 mph</td>
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<tr>
<td>4)</td>
<td>If an existing facility, what is the posted speed (mph)?</td>
<td>35 mph</td>
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<td>5)</td>
<td>If an existing facility, what is the operational speed (85th percentile or some other observed value)?</td>
<td>Less than 25 mph</td>
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<td>6)</td>
<td>Does the Design Speed meet or exceed the minimum Design Speed? [M: Index 101.1, Index 101.2 and Table 101.2] and [A: Index 101.1]</td>
<td>YES</td>
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<tr>
<td>7)</td>
<td>Does the Design Speed meet or exceed the posted and operational speeds?</td>
<td>YES</td>
</tr>
<tr>
<td>8)</td>
<td>Is the Design Speed within 10 mph of the roadway segments before and after the project?</td>
<td>Yes (but to be determined)</td>
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<tr>
<td>9)</td>
<td>Do the Design Coordinator, Design Reviewer, and District Traffic Unit concur with the selected design speed?</td>
<td>TBD</td>
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<tr>
<td>10)</td>
<td>Has the Design Speed been discussed and concurred with by the Local Agency Representative on the Project Development Team (as</td>
<td>Not Yet</td>
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<tr>
<td></td>
<td>applicable)?</td>
<td>Are the Design Speeds documented in an engineering report, such as a Project Study Report (PSR) or Project Report (PR)?</td>
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<tr>
<td>-----</td>
<td>--------------</td>
<td>-----------------------------------------------------------------------------------------------------------------</td>
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<tr>
<td><strong>12)</strong></td>
<td></td>
<td><strong>applicable)?</strong> Are the Design Speeds documented in an engineering report, such as a Project Study Report (PSR) or Project Report (PR)?</td>
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</table>
1.2 Design Period (See Index 103.2)

1. What is the Design Period for this project? **20** years after construction completion; which is assumed to be **2029**

Note: Do not base solely on the year for which forecasted traffic is readily available.

2. If a period other than 20 years is selected (except for Safety, RRR, or operational improvement projects), have the following individuals concurred and approved? **N/A**
   a. Design Coordinator
   b. District Director

3. The Design Year is **2029**.

1.3 Design Capacity (See Index 102.1)

What level of Service (LOS) is to be maintained over the Design Period? List the various highway facilities and their LOS below. State the basis for the selected value.

- Highway Facility (Mainline, ramp, local road, etc.); Design Year/LOS
  - a. Local Facilities (Intersections) – C and D
  - b. Mainline D and F

1.4 Pedestrian facilities (See Index 105)

1. Have suitable pedestrian facilities been provided for anticipated pedestrian demand that is based on existing and projected land uses? **YES**

2. Are these facilities fully accessible? (See Design Information Bulletin 82 for details.) **YES**

3. Where sidewalks are planned on over crossing structures, has an area been provided for future sidewalks where they are not now warranted? (See Index 105.1 (4)) **N/A**

1.5 Design Vehicle Selection (See Index 404.2)

In accordance with Index 404.2, determine which Design Vehicle is to be used as the basis of intersection design. The designer must first determine if each highway facility within the project site is on the “National Network” created by the Surface Transportation Assistance Act (STAA) of 1982. Indicate one of the following:

- STAA ☑ California ☐, Bus ☐

1.6 Storm Water Management (See Index 110.2)

1. Have temporary and permanent storm water control measures been appropriately considered and/or incorporated into the project? **To be included, but is not yet.**

2. Has a Storm Water Data Report been prepared? **Yes, but not approved yet.**

3. Have costs and right of way needs been addressed for the storm water best management practices? **Not yet, but will be.**
1.7 Fencing
Have acquired access rights been controlled with fencing or other means?
[M: Index 104.4 and Index 702.(1)] Will be.

2.0 Geometric Design Criteria
These Design Standards and Criteria are to be incorporated into the project’s Design.

2.1 Vertical Alignment
1. Sight Distance Criteria:
   a. Is the project devoid of sustained downgrades steeper than 3% and longer than 1 mile? If not, has the Stopping Sight Distance been increased by 20%, and then, used to design the affected highway segment? [A: Index 201.3] YES
   b. Does each crest vertical curve provide the required Stopping Sight Distance? YES
   c. On two-lane highways, does each crest vertical curve provide adequate passing sight distance where it is economically feasible to obtain it? [M: Index 201.1 and Table 201.1] N/A
   d. At each sag in grade, does the length of vertical curve provide headlight sight distance? [M: Index 201.1 and Table 201.1]; (Also see Index 201.5 and Figure 201.5) YES
   e. If no, has lighting been considered as mitigation? (See Index 201.5) N/A
   f. On freeways and expressways, is decision sight distance provided at lane drops and at off-ramp noses? [A: Index 201.7] YES

2. Grade Standards:
   a. Does the entire profile grade comply with the maximum grades specified in Table 204.3? [M: Index 204.3] YES
   b. Does the profile grade exceed the minimum grades of 0.5% for snow country and 0.3% at other locations? [A: Index 204.3] YES
   c. Do ramp grades comply with the maximum grades? [A: Index 204.3 and Index 504.2 (5)] YES

3. Vertical Curve Criteria:
   a. Do the lengths of the vertical curves equal or exceed: YES
      1) 10V, if the Design Speed is ≥ 40 mph and A is ≥ 2%? [A: Index 204.4] YES
      2) 200 feet, if design speeds are< 40 mph or A is < 2%? [A: Index 204.4] YES
   b. On 2-lane highways, are the crest vertical curves less than ½ mile in length? (See Index 204.4) YES
4. Climbing Lane Requirements:
   a. If the profile grade has sustained upgrades exceeding 2% where the total rise exceeds 50 feet, has the need for a climbing lane been investigated? (See Index 204.5 (2) and Figure 204.5) N/A
   b. If determined to be necessary, has the Headquarters Traffic Liaison reviewed the design of the climbing lane? (See Index 204.5(3)) N/A
   c. Is decision sight distance (See Table 201.7) provided at climbing lane drops on freeways? [A: Index 204, 5 (2)] N/A

5. Structure Grade Lines:
   a. Have the structure depth, falsework depth and vertical clearance requirements been provided for in the profile design? [M: Index 204.8 and Table 204.8] Yes, controlled by SR-241.
   b. Where grade lines are depressed under structures, has the sag been designed at a location to avoid conflicts between the structure footings and the drainage facilities? (See Index 204.8(3)) N/A
   c. Where the grade line on a bridge is constant or tangent, is the grade 0.3% or greater? (See Index 204.8 (4)) N/A
   d. Where the grade line on a bridge includes a vertical curve, is there a fall of at least 0.05 foot per station and does the stated minimum grade (See Index 204.8 (4)) extend for a length of no more than 100 feet? YES
   e. Is the falsework vertical clearance over open traffic lanes at least 15 feet? [M: Index 204.8 (5)] N/A

6. Local Roads:
   a. Do the local roads within the State Rights of Way with connections to freeways or expressways satisfy State highway design Standards except for shoulder width? [M: Index 204.1] YES
   b. Do the local roads without connections to freeways or expressways satisfy AASHTO vertical alignment standards (or local standards that exceed AASHTO)? [M: Index 204.1] YES

2.2 Horizontal Alignment
   1. Do all the curve radii exceed the minimum values listed in Table 203.2 for the appropriate Design Speed? [M: Index 203.2 and Table 203.2] YES
   2. Is the minimum Stopping Sight Distance provided at each horizontal curve? [M: Index 203.1]; Also, (See Figure 201.6 and [M: Index 201.1 and Table 201.1] YES 188.81>>150 SSD @ 25 mph.
   3. If the curve length is less than 10 degrees, is the curve length 800 feet or greater? (See Index 203.4) YES
   4. Is the curve length on 2-lane roads between 500 feet and ½ mile? (See Index 203.4) YES
   5. Where compound curves are necessary, is the shorter radius, R1, at least two-thirds the
longer radius, R2 (When R1 < 1000 feet)? On one-way roads does the larger radius follow the smaller radius? [A: Index 203.5] **YES**

6. Is the intervening tangent between reversing curves long enough to accommodate the standard superelevation transition runoffs? [A: Figure 202.5] if not, is it at least long enough for the 6% maximum per 100 feet rate of change? [A: Index 203.6] When feasible, is 400 feet of tangent length provided at a minimum? (See index 203.6) **YES**

7. On Freeways and expressways, is Decision Sight Distance provided at the lane drops and noses? [A: Index 201.7] **YES**

8. For local facilities, within the State Right of Way, with no connection to an access controlled facility, does the horizontal alignment conform to AASHTO standards [M: Index 203.1] or local agency standards that exceed AASHTO standards? [A: Index 203.1] **N/A**

9. For freeways and expressways, are 5000-foot and 3000-foot minimum radius curves used on the mainline in rural and urban areas respectively? (See Index 203.2) **N/A**

### 2.3 Alignment Consistency

1. Is the variance in Design Speed between successive curves less than 10 mph? (Applicable only when a curve’s Design Speed is less than that speed “selected” for the project.) [A: Index 203.3] **N/A**

2. Does each horizontal curve which is located at the end of a long tangent and/or steep downgrade meet or exceed the Design Speed of the previous curve? [A: Index 203.3] **YES**

3. Are the horizontal and vertical alignments coordinated such that the horizontal curves are not “hidden” behind crest vertical curves? (See Index 203.3) **YES**

4. Where horizontal and vertical curves are superimposed at sags in grade, or summits in mountainous or rolling terrain, is the Design Speed of the horizontal curve at least equal to the Design Speed of the vertical curve? If not, is the horizontal curve Design Speed no more than 10 mph less than the estimated or measured running speed of the approach roadway? [A: Index 204.6] **N/A**

### 2.4 Superelevation

1. Has the superelevation rate specified in the Highway Design Manual been used for all horizontal curves? [M: Table 202.2] **YES**

2. Is a superelevation rate of 8% or less used where snow and ice conditions prevail, typically above elevations of 3000 feet? [M: Table 202.2] **N/A**

3. On rural 2-lane roads, is the standard superelevation rate carried across the full width of the traveled way and shoulders, except on transitions? [A: Index 202.2] **N/A Urban Area**

4. Has adverse superelevation been avoided in;
   a. The gore area of exit ramps which “curve back” to parallel the mainline facility? **YES**
   b. Warping street or ramp surface areas for drainage? (See Index 202.3) **YES**

5. For undivided highways, has the axis of rotation been selected to improve perception of
curves (i.e. on desert highways) and to avoid drainage pockets at superelevated highway sections (which usually occur in flat terrain)? (See Index 202.4 (1) N/A

6. Is the superelevation transition designed in accordance with the diagram and tabular data shown in Figure 202.5? [A: Index 202.5(1)] YES

7. Where standard superelevation transition is not attainable (restrictive situations), has the rate of change of the Cross slope been limited to 6% per 100 feet? [A: Index 202.5 (3)] N/A

8. Have the profiles for the edge of traveled way and shoulders been plotted to identify irregularities resulting from the interaction of the super transition and the vertical alignment of the roadway? Have the irregularities been eliminated by introducing smooth curves? Have Transitions located near grade sags and crests been checked for flat spots? (See Index 202.5) YES

9. Does two-thirds of each superelevation runoff length occur on the tangent which precedes or follows the curve, and does one-third occur within the curve? [A: Index 202.5] YES

10. Are the superelevation transitions for the project avoiding the bridges? (See Index 202.5(4)) N/A

11. Are the superelevation transitions for compound curves, if used on the project, designed in accordance with Figure 202.6? [A: Index 202.6] N/A

12. Do the superelevation rates on the local streets and roads that are within the State Rights of Way, with or without connection to State facilities, conform to AASHTO standards [M: Index 202.7]; or, local agency standards that exceed AASHTO standards? [A: Index 202.7] N/A

13. Are there horizontal curves, with radii of 10,000 feet or greater, where the combination of flat grades and superelevation transitions result in locations where surface water is allowed to concentrate on the pavement? (See Index 202.2 and Index 831.4 (5)) N/A

2.5 Geometric Cross Section

1. Basic Roadway Widths/Number of Lanes:

   a. Do the proposed number of lanes provide adequate capacity and LOS for the Design Hourly Volume based on the methodology discussed in Topic 102? YES Traffic Report, SYNCHRO analysis

   b. For projects which include the construction or reconstruction of local streets and roads--

      1) If the local facility is a Federal-aid route, does the proposed width conform to AASHTO standards? (See Index 308.1) YES

      2) If not a Federal-aid route, does the proposed cross section match the local agency standard, or the width of the adjoining (existing) section? (See Index 308.1) N/A

      3) Has the State highway undercrossing span length been designed to accommodate the future requirements of the local facility? (See Index 208.1(2)(b)) YES Traffic Report
4) Where a local facility crosses over or under a freeway or expressway, but has no connection to the State facility, does the minimum cross section conform to AASHTO standards or local agency standards? [M: Index 308.1] and [A: Index 308.1] YES

Is the minimum width of all 2-lane overcrossing structures at least 28 feet curb to curb? [M: Index 308.1] N/A

5) Where a local facility crosses over, or under, a freeway or expressway and connects to the State facility, does the minimum cross section meet the standards for a conventional highway with the exception that the outside shoulder with shall match the approach roadway, but not be less than 4 feet? [M: Index 308.1] N/A

At such locations, is the minimum width of the 2-lane overcrossing structure 40 feet curb to curb? [M: Index 308.1] N/A

6) Are the shoulders at least 5 feet wide, if curbs with a 2-foot gutter pan are proposed? [A: Index 308.1] YEA

2. Traffic Lane and Shoulder Widths and Cross Slopes:

a. Are all basic motor vehicle lanes 12 feet wide? [M: Index 301.1] YES

b. On new or reconstructed highways, is the traveled way cross slope 2%? [M: Index 301.2] YES

c. On resurfacing and widening projects, is the traveled way cross slope between 1.5% and 3% and does it match the existing? [M: Index 301.2(b)] YES

d. Is the maximum algebraic difference in cross slope --

1) 6% or less between adjacent lanes of opposing traffic for rehabilitation and widening projects? [A: Index 301.2] YES

2) 4% or less between adjacent lanes of opposing traffic for new construction? [M: Index 301.2] YES

3) 4% or less between same direction traffic lanes of divided roadbeds? [A: Index 301.2] YES

4) 8% or less between the traveled way and shoulder? [A: Index 301.2] YES

e. On resurfacing projects, has the entire paved shoulder and traveled way been resurfaced where bicycle traffic is not prohibited? [M: Indices 625.1(1), 635.1(1), and 645.1(1)] N/A

f. Are the shoulder widths --

1) As specified in Table 302.1 provided? [M: Index 302.1] N/A

2) Consistent with the minimum widths required for bicycle usage? [M: Index 1003.2 and Index 1003.3] and (See Index 303.2) N/A
g. Do the shoulders to the right, on normal tangents, slope away from the traveled way at 2 to 5%? [M: Index 302.2] YES

For additional drainage capacity (See Index 307.2) --
- 2-lane highways with 4 foot shoulders and dike, the cross slope may be increased to 7%.
- 2-lane highways with 2 foot shoulders and without dike; use 2% cross slope. If dikes are used, the cross slope may be increased to 9%.

h. On divided cross sections, do the shoulders to the left slope -- N/A
- In the plane of the traveled way when the median is paved? [M: Index 302.2] YES
- At 2% away from the traveled way when the median is depressed? [M: Index 302.2] N/A
- At 2% away from the traveled way for separate roadways? [M: Index 302.2] N/A

i. Do the lane drops and the lane width reductions for the through lanes have a minimum length of WV? [A: Index 206.3] N/A

3. Median Standards:
   a. Are the minimum median widths provided, based on facility and land use? [M: Index 305.1] and [A: Index 305.1] YES
   b. Has the median width been selected to provide the standard shoulder width and horizontal clearance to overcrossing structure columns? [M: Table 202.1 and Index 309.1(3)] YES
   c. Is the use of curb in the median in compliance with the restrictions of Topic 303 and Index 405.5(1)? [A: Index 303.1 and Table 303.1] YES
   d. Do the median openings comply with requirements in Index 405.5? YES

4. Bridges and Grade Separations (Also see Section 2.5.1.b of this DIB):
   a. At a minimum, does the clear width of each bridge equal the width of the approach roadway (traveled way and paved shoulders)? [M: Index 208.1] YES
   b. Where a bridge is constructed on a 2-lane highway to replace an existing bridge, is the clear width at least 32 feet when the ADT is less than 400 vehicles or 40 feet when the ADT is greater than 400 vehicles? [M: Index 208.1 (1)(a)] N/A
   c. Where the approach shoulder width is less than 4 feet, is the minimum offset on each side 4 feet? [M: Index 208.1(1)(b)] N/A
   d. Is the cross slope on all of the structures the same as that of the roadway that approaches them? [M: Index 208.2, Index 301.2 and Index 302.2] YES
   e. Are the bridge medians 36 feet wide or less decked over? [A: Index 208.3] N/A
   f. If the surrounding land use, both existing and future, indicates the need for sidewalks on the bridges, are they provided? (See Index 208.4) N/A
g. Are embankment end slopes at open ended structures no steeper than 1 ½:1? (See Index 208.5) **N/A**

h. Has protective screening been provided along new overcrossing structure sidewalks in urban areas? [A: Index 208.10(2)] **N/A**

5. Side (Cut & Fill) Slopes:
   a. Have slopes steeper than 4:1 been approved by the District Landscape Architect? (See Index 304.1(b)) **Future task.**
   b. Has the District Stormwater Coordinator concurred with the project’s erosion control plans? (See Index 304.1(b)) **Future task.**
   c. Have slopes steeper than 2:1 been approved by District Maintenance? (See Index 304.1 (c)) **N/A No slope steeper than 2:1.**
   d. On new construction, widening, or other slope modifications, are embankment slopes 4:1 or flatter? [A: Index 301.1(a)] **YES**
   e. Is a uniform catch point of at least 18 feet used in light grading areas where normal slopes catch less than 18 feet from the edge of shoulder? [A: Index 304.1] **YES**
   f. Where appropriate, ha snow removal been considered in slope design? (See Index 304.1) **N/A no snow area.**
   g. Is there a minimum clearance of at least 10 feet between all of the right of way lines and the catch points for the cut/fill slopes (See Index 304.2 for specific conditions)? **FUTURE TASK**
      When feasible, is 15 feet provided? **FUTURE TASK**
   h. Is all slope benching and cut widening designed in accordance with Index 304.3 and the Geotechnical Design Report? (See Indices 113.1, 304.1(c), and 304.3) **FUTURE TASK**
   i. Have the contour grading plans been prepared? Are the slopes rounded? (See Index 304.4) **FUTURE TASK**
   j. Are “steps” designed into the cut slopes to encourage revegetation from native plants? (See Index 304.5) **N/A**

6. Frontage Roads:
   a. For urban areas--
      1) Is the cross slope between adjacent lanes of opposing traffic 6% or less for rehabilitation and widening projects? [A: Index301.2] **N/A No frontage road.**
      2) Is the cross slope between adjacent lanes of opposing traffic 4% for new construction? [M: Index 301.2] **N/A**
      3) Is the width of outer separation 9See Figure 307.4) at least 26 feet? [A: Index 310.2] **N/A**
      4) Is the minimum paved width of two 12-foot lanes with 4 foot outside shoulders provided? [M: Index 310.1] **N/A**
   b. For rural areas --
      1) Is the minimum paved width of 24 feet provided? [M: Index 310.1] **N/A**
2) Is the width of outer separation at least 40 feet, or 26 feet if in mountainous terrain? [A: Index 310.2] N/A

7. Right of Way:
   a. If the project requires right of way acquisition, have future project needs and the ability to meet all design standards, without exceptions, been taken into consideration during the establishment of the new right of way lines for this project? N/A
   b. Have stormwater storage and treatment features been incorporated into the project? Are they within the right of way? N/A

8. Clearances:
   a. Horizontal --
      1) Have all fixed objects within the Clear recovery Zone (CRZ) been eliminated, moved, shielded, or redesigned to be made yielding? [A: Index 309.1] YES
      2) Has the minimum horizontal clearance (i.e., standard shoulder width, but not less than 4 feet) been provided to fixed objects, either shielded or unshielded, within CRZ? [M: Index 309.1 and Index 1102.2] YES
      3) Have the horizontal Stopping Sight Distance requirements been met where it is planned to use the minimum horizontal clearance to barriers, walls, or cut slopes? [M: Index 309.1] YES
      4) Where Noise Barriers are located 15 feet or less from the ETW, has the Noise Barrier been placed on a safety shape barrier? [M: Index 1102.2] N/A
      5) In areas without curbs, has safety shaped barrier face been incorporated into ant retaining, pier, or abutment wall that is 15 feet or less from the edge of traveled way? [A: Index 309.1] N/A
      6) For bridge deck widening projects, has the District Permit Engineer provided the minimum width of roadway openings between temporary K-rail? (See Index 309.1(3)) N/A
      7) Have approach railings been provided at ends of bridge railings exposed to approach traffic? [M: Index 208.10(7)] N/A
   b. Vertical --
      1) Is the minimum vertical clearance for all major structures provided? [M: Index 309.2(1) and Index 309.5(1)] YES
      2) Is the vertical clearance to pedestrian overcrossings 2 feet greater than the standard clearance provided for major structures on the facility? [M: Index 309.2(2)] N/A
      3) Do all sign structures have a minimum vertical clearance of 18 feet? [M: Index 309.2(2)] N/A
      4) If the project is on the Rural Interstate and Single Routing in Urban Areas subset of the Interstate Highway System, are minimum vertical clearances provided [M: Index 309.2(3) and Figure 309.2] or has the Federal Highway Administration (FHWA) reviewed and the Military Traffic Management Command Traffic Engineering Agency (MTMCTEA) approval been
obtained? N/A

5) If Federal-aid funding is to be used, are all structures within the Federal-aid participation limits? (See Index309.2(5)) N/A

6) Are all the vertical clearances a minimum of 23 feet over Railroad facilities that handle freight cars? [A: Index 309.5(1)] N/A

7) If the existing vertical clearance is to be modified, has the Regional Permit Manager been involved in the decision? (See Indices 309.2(4) and 204.8(5)) N/A

c. Tunnels --
Have the minimum horizontal and vertical clearances been provided?
[M: Index 309.1, Index 309.2, and Index 309.3] and [A: Index 309.1] N/A

d. Elevated Structures --
Have the minimum lateral clearances between highway structures and buildings or other highway structures been provided? [M: Index 309.4] N/A

e. Falsework –
1) Has Table 204.8 been used to determine the traffic opening widths needed through falsework? [A: Index 204.8(5)]** N/A

** Requires District Director’s approval and design Coordinator’s concurrence

2) Where temporary K-rail is used to protect the falsework, has space (2 feet minimum) been provided for its deflection? (See Index 204.8(5)) N/A

3) Has a minimum vertical clearance of 15 feet been provided for the falsework? [M: Index 204.8(5)] N/A

f. Airway – Highway --
1) When construction is planned near an Airport or Heliport (civil or military), have the clearance requirements been met or exceeded? (See Topic 207) N/A

2) If applicable, have the procedures for submitting the clearance date been followed? (See Index 207.3) N/A

g. Railroad --
1) Have the Public Utilities Commission (PUC) clearances between railroad and grade separated or parallel highway structures been provided? [M: Index 309.5] and [A: Index 309.5] N/A

2) If a Railroad is involved, or is in the vicinity of the project, has the Railroad and PUC granted project approval? (See Index 309.5(4)) N/A

2.6 At-Grade Intersections

1. Has the Design Year traffic data been developed from recent counts (for projects involving revisions to the existing intersection), or from traffic forecasts (for the new intersections)? Has truck, pedestrian, and bicycle usage been taken into consideration during the development of the traffic data? YES

2. Based on accepted capacity analysis methodology, does each intersection provide adequate capacity to handle peak period traffic demands? *** YES Traffic Report
*** Note: An operational analysis by the District Traffic Unit is required. The analysis method shown in Topic 406 is useful to approximate intersection capacity.

3. Upon review of each intersection, have the following geometric features been eliminated or minimized --
   a. Inadequate Stopping and Corner Sight Distance? **YES**
   b. Steep grades? **YES**
   c. Inappropriate Traffic Control? **YES**
   d. Curves within the intersection? **YES**

4. Are skewed intersections greater than 75 degrees (90 degrees preferred)? [A: Index 403.3] and (See Figure 403.3) **N/A**

5. Is striping used in lieu of curbs to delineate islands adjacent to high-speed traffic? (See Index 405.4(2)) **N/A**

6. If curbs must be used, have mountable types been considered? (See Index 405.4(2)) **YES**

7. Truck Turn Templates:
   a. Has the STAA truck turn templates been used in the design of all interchanges (I.E., ramp intersections) and intersections on the National Network and on Routes leading to and from designated service and terminal routes? [A: Index 404.3(2)] **YES**
   b. Has the California truck turning template been used in the design of all intersections not on the National Network? [A: Index 404.3(3)] **YES**

8. Sight Distance Requirements:
   a. Is Corner Sight Distance provided at each unsignalized public road intersection? [A: Index 405.1(2)] **N/A**
   b. Where restrictive conditions exist at public road intersections, does the measured Corner Sight Distance equal or exceed the Stopping Sight Distance? [M: Index 405.1(2)(b)] **N/A**
   c. During the determination of Corner Sight Distance, was a minimum of 10 feet plus the shoulder width of the major road, but not less than 15 feet, used for driver setback? [M: Index 405.1(2)(a)] **N/A**
   d. For private road intersections, does the measured Corner Sight Distance equal or exceed the Stopping Sight Distance? [M: Index 405.1(2) (c)] **N/A**
   e. At intersections where a State highway route turns or crosses another State highway, is Decision Sight Distance provided? [A: Index 405.1(3)] **N/A**
   f. Where grades exceed 3% and are longer than 1 mile, and there are high truck volumes on the crossroad, or where the intersection is skewed, was consideration given to increasing the Corner Sight Distance values? (See Index 405.1(2)(a)) **N/A**

9. Channelization
   a. Has the District Traffic Unit determined, or concurred with, the need for a separate left-turn lane? (See Index 405.2(1)) **TBD**
b. Have both double left-turn lanes been considered at signalized intersections on multilane highways where the left-turn demand exceeds 300 vehicles per hour? (See Index 405.2(3)) TBD

c. Are both single and double left-turn lanes at least 12 feet wide each? [M: Index 405.2(2)(a)] TBD

d. Do the approach taper and deceleration lane designs meet or exceed the minimum lengths recommended (See figure 405.2A and Table 405.2B)? Has storage length been considered (See Indices 405.2(d) and 405.2(e))? Reduced lengths (See Figures 405.2B and 2C) may be acceptable in urban areas where constraints exist, speeds are moderate, and traffic volumes are relatively low. YES

e. Has the District Traffic Unit determined, or concurred with, the need for a two-way left-turn lane (TWLTL)? Is the lane 14 feet wide but not less than 12 feet wide? [M: Index 405.2(4)] TBD

f. Does the design for all of the right-turn lanes satisfy the same requirements discussed above in 9a and 9d for left-turn lanes? YES

g. Are the right-turn lanes at least 12 feet wide? Is the shoulder width adjacent to any right-turn lane at least 4 feet? [M: Index 405.3(2)(a)] YES

h. At the off-ramp terminals, are “free” right turns avoided? If not, is an acceleration lane provided, a minimum of 200 feet in length, or lane addition provided on the local street, and no left turn movements within 400 feet? [A: Index 504.3(3)] and (See Index 405.3(3)) YES

i. Do traffic islands conform to the guidance in Index 405.4? N/A

10. Is curb use consistent with the Design Speed and location of the facility? [A: Index 303.1 and Table 303.1] YES

Where Design Speeds are greater than 35 mph in urbanized areas with curbed medians, are 2 foot left shoulders provided? [M: Index 302.1, Note 4] YES

11. Are median openings spaced at least 1,600 feet apart? Have median openings within 300 feet of an access opening or street intersection been shifted to be directly opposite such intersections? [A: Index 104.5 and Index 405.5(2)] N/A

12. Have emergency passageways been located where Decision Sight Distance is available? [A: Index 405.5] YES

13. On Expressways

Expressways

Are access openings spaced at least ½ mile from either public road intersections or other private road access openings that are wider than 30 feet? [A: Index 205.1] Is Stopping Sight Distance provided? [M: Index 205.1] N/A

14. Do urban driveway designs meet the width, spacing, and surfacing requirements of Design Information Bulletin 82, the District’s permit drawings, and the construction details of the Standard Plans? N/A

15. For driveways on frontage roads or on rural highways, do the proposed driveway widths accommodate the turning radius of the Design Vehicle for the driveway? (See Index 205.4 and Topic 407) N/A
16. Has the District Encroachment Permit Unit been consulted with and provided comments on the driveway(s) construction details and their consistency with City or County design standards, as appropriate? (See Index 205.4) N/A

17. Does the intersection design take into account the non-motorized travelers that will be using the facility and their safety? Have the needs of the pedestrians and bicyclists been determined and balanced with the interests of the motorized travelers? (See indices 401.5 and 401.6) N/A

18. Curb Ramps:
   a. To comply with the Americans with Disabilities Act (ADA), all new or altered pedestrian facilities (See DIB 82) are to comply with ADA standards. Does the project comply with DIB 82? (See Index 105.3) YES
   b. For new constructions, are two ramps proposed at each corner? [A: Index 105.4(2)] YES
   c. Are ramps and/or curb openings provided at midblock crosswalks and where pedestrians cross curbed channelization or median islands? (See Index 105.4(2)) YES

19. Do public road intersections comply with Figure 405.7? Has the proper corner radii been selected? (See indices 405.7 and 405.8) YES

2.7 Interchange Design Criteria
1. Are the minimum Interchange (I/C) spacing requirements satisfied by the design? [M: Index 501.3 and DIB 77] YES
2. Has the FHWA been requested to conceptually approve new I/Cs and modifications to existing i/Cs on the interstate highway system? (See Project Development Procedures Manual Chapter 27 – Article 5 and DIB 77) TBD
3. Are all traffic movements provided for at each proposed local street I/C so as to minimize the possibility of wrong-way movements? In other words, have isolated ramps and partial interchanges been avoided? [A: Index 502.2] YES
4. At freeway-to-Freeway (F-F) I/Cs, does the sign route (and major traffic volume) move to the left? (See Index 502.3(1)) N/A
5. Has F-F I/Cs been reviewed to determine if any turning movements are so minimal that they need not be provided for? If such movements are identified, have they been discussed with the Design Reviewer, Design Coordinator, and Traffic Liaison? (See Index 502.3(2)(c)) N/A
6. Do all loop connectors have radii in the range of 159 feet to 200 feet as measured to the left edge of traveled way (ETW) or the outer most lane of multilane facilities? (See Index 502.3(2)(e)) YES
7. Do all direct connectors have minimum radius of 850 feet? A radius of at least 1,150 feet is desirable. (See Index 502.3(2)(e)) YES
8. Has each I/C design been reviewed by the Design Reviewer, Design Coordinator, and Traffic Liaison? (See index 503.2) Future task
9. Has Decision Sight Distance been provided at all Freeway exits and branch connectors? [A: Index 504.2(4)(a)] **YES**

   Has the minimum Decision Sight Distance of 600 feet been provided at secondary exits on Collector Distributor (C-D) roads? [A: Index 504.2(4)(a)] **YES**

10. Is the maximum ramp profile grade 8% or less? A Maximum grade of 9% is allowed on descending entrance ramps (except loops) and ascending exit ramps. The 1% steeper grade should be avoided on descending loops. **YES** (See Index 504.2(5)) and [A: Index 404.3]

11. Is the maximum profile grade on F-F direct connections 6%? [A: Index 504.4(3)] **N/A**

12. Is the vertical curve beyond the nose of each freeway exit designed to provide a minimum 50 mph Stopping Sight Distance? [A: Index 504.2(5)(a)] **YES**

13. Does the on-ramp profile approximately parallel the mainline profile for at least 100 feet prior to the inlet nose to provide visibility that facilitates merging? **YES** (See Index 504.2(5)(b))

14. For ascending off-ramps joining a crossroad, if the ramp ends in a crest vertical curve, does the last 50 feet of ramp have a profile grade of 5% or less? [A: Index 504.2(5)(a)] **N/A**

15. For descending off-ramps, is the sag vertical curve length at the ramp terminal at least 100 feet? [A: Index 504.2(5)(a)] **N/A**

16. At overcrossing I/Cs, do all the ramps intersect the crossroad where the profile grade is 4% or less? [A: Index 504.3(3)] **YES**

17. For left-turn maneuvers from an off-ramp at unsignalized ramp intersections, is the 7 ½ second sight distance criteria shown in Figure 504.3J provided? [A: Index 504.3(3)] **N/A Signalized Intersection-Depends on Which Design.**

18. Is a minimum of 400 feet (500 feet is preferred) provided between each ramp intersection and the adjacent local street intersection? [M: Index 504.3(3)] and [A: Index 504.3(3)] **Yes**

19. At freeway entrances and exits, is 5% the maximum algebraic difference in pavement cross slope between adjacent traffic lanes, or between a traffic lane and the adjacent gore area? [A: Index 504.2(5)] **YES**

20. Where ramps have a curve radii less than 300 feet with a central angle greater than 60 degrees, have they been widened for trucks in accordance with Table 504.3A? [M: Index 504.3(1)(b)] **N/A**

21. Does each Freeway entrance and exit ramp, excluding HOV “drop” ramps, connect to the right through traffic? HOV “drop” ramps may enter and exit the Freeway from the median [M: Index 504.2(1)] **YES**

22. Does each entrance and exit design conform to the requirements of Figures 504.2A and 504.2B (single lane), and Figure 504.3L (two lane entrances and exits), and/or Figure 504.4 (diverging branch connections)? **YES** [M: Index 903.5(1) and Index 904.3(1)] and [A: Index 504.2(2) and Index 107.1]

23. Has the need for an auxiliary lane to facilitate the merging of trucks been considered where the physical and traffic conditions cited in Index 504.2(5)(b) are present? [A: Index 504.2(5)(b)] **N/A**
24. Where a cut slope restricts the standard Decision Sight Distance to an exit ramp, and cut widening is not feasible, has an auxiliary lane been provided in advance of the exit? [A: Index 504.2(3)] N/A

25. Has a design Speed of 50 mph been provided at the exit nose of ramps or branch connections? [A: Index 504.2(4)(a)] YES

26. Prior to the first curve of a Freeway exit, has the standard deceleration length, “DL” been provided in accordance with Figure 504.2B? Has “DL” been provided for the first curve after the exit from a C-D road? [M: Index 504.2(2)] and [A: Index 504.2(2)] YES

27. Where the exit ramps are preceded by or located on sustained and significant downgrades, has additional “DL” distance been provided (See AASHTO Policy on Geometric Design of Highways and Streets (Green Book) – 2001 4th Edition; page 848)? N/A

28. If the exit nose is located downstream of the 23 feet dimension, is the maximum paved width between the mainline and ramp shoulder edges 20 feet? [A: Index 504.2(2)] YES

29. Is the Design Speed at the inlet nose consistent with the approach alignment? For branch connections, or diamond ramps with a high-speed alignment, is the Design Speed at the inlet nose at least 50 mph? [A: Index 504.2(4)(b)] YES

30. Is the design Speed on each branch connection a minimum of 50 mph? [A: Index 504.4(2)] YES

31. Regardless of the horizontal curve radius used, does the vertical alignment of each branch connection provide a Stopping Sight Distance consistent with the speeds of the approaching vehicles? [A: Index 504.4(2)] YES

32. Does the design for each ramp terminus provide for a minimum Design Speed of 25 mph? [A: Index 504.3(1)(a)]

When a “through” movement is provided at the ramp terminus, is the ramp Design Speed at least equal to the Design Speed of the facility for which the through move is provided? [A: Index 504.3(1)(a)] YES

33. On a single lane ramp where additional lanes are provided near the entrance ramp intersection, is the lane drop accomplished over a distance equal to WV? Is the lane dropped on the right? [A: Index 504.3(5)] YES

34. Where the length of any single-lane ramp exceeds 1,000 feet, has widening or two lanes to permit passing been considered? [A: Index 504.3(5)] YES

35. Excluding ramp metering retrofit projects, is the lane drop taper on a two-lane entrance ramp equal to 50:1? (See Index 504.2(2)) and [A: Figure 504.3L] YES

36. Where Design Year traffic volumes exceed 1,500 equivalent passenger cars per hour, has two-lane exit ramp been provided? [A: Index 504.3(6)] YES

37. Has a 1,300-foot length of auxiliary lane been provided prior to each two-lane exit ramp? [A: Index 504.3(6)] YES

38. Where the Design Year volumes range between 900 to 1,500 vehicles per hour (vph), has a single lane exit been designed with provisions for the addition of a second lane and a standard auxiliary lane? [A: Index 504.3(6)] YES
39. Is there at least 1,000 feet between successive on-ramps, or if less than 1,000 feet, is there an auxiliary lane between the ramps which is carried beyond the second entrance ramp? [A: Index 504.3(9)] YES

40. Is there at least 1,000 feet between successive exit ramps from Freeways and Expressways? Also, is there at least 600 feet between successive exit ramps from C-D roads? [A: Index 504.3(10)] YES

41. Are curbs avoided on the high side of ramps or in exit ramp gore areas? (See Index 504.3(11)) YES

42. On Freeway-to-Freeway connectors:
   a. Where the Design Hourly volume (DHV) exceed 1,500 equivalent passenger cars per hour (pcph), has more than one lane been provided? [A: Index 504.4(6)] N/A
   b. Where the DHV ranges between 900 and 1,500 pcph, has a single lane bee proposed with provisions for additional lanes? [A: Index 504.4(5)] N/A
   c. Have single lane connectors that are longer than 1,000 feet been widened to two lanes with a minimum or 5-foot shoulders to facilitate passing? [A: Index 504.4(5)] N/A
   d. Are the lengths of all lane drop tapers not less than WV? [A: Index 504.4(7)] N/A

43. Are merging and diverging branch connections designed in accordance with Figures 504.3L and 504.4, respectively? [A: Index 504.4(6)] N/A

44. At all branch merges has a 2,500 foot length of auxiliary lane been provided beyond the merge of one lane of the inlet? [A: Index 504.4(6)] YES

45. At a diverging branch connection (See Figure 504.4), has a 2,500-foot length of auxiliary lane been provided in advance of the exit? [A: Index 504.4(6)] N/A

46. Where the weaving distance between successive entrance and exit ramps is less than 2,000 feet (See Figure 504.2A), has an auxiliary lane been provided between these ramps? [A: Index 504.5] Need to Know Distance between Successive Entry/Exit

47. Have the basic number of lanes been maintained through each local I/C? [A: Index 504.6] YES

48. Where a reduction in mainline traffic volume is sufficient to warrant a decrease in the basic number of lanes, is the lane drop located beyond the influence of the I/C, at least ½-mile from the nearest inlet or exit nose, and does the lane drop occur on the right lane on a tangent with a straight or sag profile? (See Index 504.6) N/A

49. Have the weaving sections:
   a. In urban areas been designed for LOS C-D? [A: Index 504.7] YES Per Traffic Report, mainline freeway is mostly LOS F.
   b. In rural areas been designed for LOS B-C? [A: Index 504.7] N/A

50. On Mainline Freeway lanes, is the weaving length defined in Figures 504.2A and 504.2B at least 1,600 feet? And had an additional 1,000 feet been added for each additional lane to be crossed by weaving vehicles? [A: Index 504.7] To be Defined

51. Has ramp metering been discussed with the District Traffic Unit? (See Index 504.3(2)) YES
52. Where multi-lane ramps are metered, is the lane drop taper past the meter limit line:
   a. 50 to 1 or greater? **YES**
   b. 30 to 1 or greater? [A: Index 504.3(2)(d)] N/A
   c. 15 to 1 or greater? [M: Index 504.3(2)(b)] N/A

53. Have access rights been acquired along I/C ramps to their junction with the nearest public road? At these junctions, does the access control extend at least 50 feet beyond the end of the curb return, ramp radius, or taper? [M: Index 504.8] **YES**

54. For new construction, does the access control extend 100 feet beyond the end of curb return or ramp radius in urban area and 300 feet in rural area, or as far as necessary to ensure that entry onto the facility does not impair operational characteristics? [A: Index 504.8] **YES**

Does Freeway fencing or equivalent access controls extend to the limit of legal access control? [A: Index 701.28(1)] N/A

55. Have access rights been acquired on the opposite side of the local road from ramp terminals? [A: Index 504.8] **YES**

2.8 Utilities

1. Do the existing utility facilities that are to remain, or are to be relocated in access controlled Freeways and Expressways: Have a formal exception granted from the Chief of the Headquarters Division of Design for any existing or proposed longitudinal or facility encroachments (for example: poles, aerial lines, manholes, vaults, pull boxes, etc.)? **TBD**

2. Do all utilities within the project limits comply with the “Policy on High and Low Risk Underground Utility Facilities within the Highway Right of Way” (See the Project Development Procedures Manual – Appendix LL)? If not, has a formal exception been granted from the Chief of the Headquarters Division of Design for variances to the High and Low Risk Underground Utilities Policy? **To do in the future.**

3. Before a project can be certified as Ready to List (RTL) for advertising, the Project Engineer must certify that the project conforms to the “Policy on High and Low Risk Underground Utility Facilities within the Highway Right of Way”, has the “Project Engineer’s Certification of Utility Facilities” been completed? (See the Project Development Procedures Manual – Appendix LL) **YES**
ZOT Engineering (T4) Project Log – Winter Quarter

4:00pm – 5:00pm - Monday, Jan 5 2009
• Roll Call
  o Jorge Zamora, Mark Beltran, Greg Thompson, Andy Verdin, Philip Wang, Quenton Huang, Henry Huang.
• Discussion
• Assignments
• Accomplishments

3:30pm – 5:00pm - Tuesday, Jan 6 2009
• Roll Call
  o Jorge Zamora, Mark Beltran, Greg Thompson, Andy Verdin, Philip Wang, Quenton Huang, Henry Huang.
• Discussion
• Assignments
• Accomplishments

4:00pm-5:00pm - Monday, Jan 12 2009
• Roll Call
  o Jorge Zamora, Mark Beltran, Greg Thompson, Andy Verdin, Philip Wang, Quenton Huang, Henry Huang.
• Discussion
• Assignments
• Accomplishments

3:30pm – 5:00pm - Tuesday, Jan 13 2009
• Roll Call
  o Jorge Zamora, Mark Beltran, Greg Thompson, Andy Verdin, Philip Wang, Quenton Huang, Henry Huang.
• Discussion
• Assignments
• Accomplishments

4:00pm-5:00pm - Monday, Jan 19 2009
• Roll Call
  o Jorge Zamora, Mark Beltran, Greg Thompson, Andy Verdin, Philip Wang, Quenton Huang, Henry Huang.
• Discussion
• Assignments
• Accomplishments

3:30pm – 5:00pm - Tuesday, Jan 20 2009
• Roll Call
Jorge Zamora, Mark Beltran, Greg Thompson, Andy Verdin, Philip Wang, Quenton Huang, Henry Huang.

- Discussion
- Assignments
- Accomplishments

4:00pm-5:00pm - Monday, Jan 26 2009
- Roll Call
  - Jorge Zamora, Mark Beltran, Greg Thompson, Andy Verdin, Philip Wang, Quenton Huang, Henry Huang.
- Discussion
- Assignments
- Accomplishments

3:30pm – 5:00pm - Tuesday, Jan 27 2009
- Roll Call
  - Jorge Zamora, Mark Beltran, Greg Thompson, Andy Verdin, Philip Wang, Quenton Huang, Henry Huang.
- Discussion
- Assignments
- Accomplishments

4:00pm-5:00pm - Monday, Feb 2 2009
- Roll Call
  - Jorge Zamora, Mark Beltran, Greg Thompson, Andy Verdin, Philip Wang, Quenton Huang, Henry Huang.
- Discussion
- Assignments
- Accomplishments

3:30pm-5:00pm - Tuesday, Feb 10 2009
- Roll Call
  - Jorge Zamora, Mark Beltran, Greg Thompson, Philip Wang, Quenton Huang, Henry Huang.
- Discussion
  - Reviewed alignments and profiles in AutoCAD Civil 3D.
- Assignments
  - Formatted project log
  - Start work on alignments and profiles for our next meeting with our client.
- Accomplishments
  - Refined alternative AutoCAD dwg’s.
  - Compiled project log from our group and client meetings.
Tuesday, March 31, 2009 – 5:15 PM-6:30 PM
Roll Call: Henry Huang, Andy Verdin, Quenton Huang, Mark Beltran, Jorge Zamora, Philip Wang, Greg Thompson, Seri Park
Discussion: Kickoff Meeting with Client Consultant (Dr. Seri Park of Tetra Tech Engineering)
Focus on SYNCHRO and the next two intersections for this quarter
For the counts, use the report and scale it down
Should work together for SYNCHRO (four intersections)
Try to optimize the LOS in SYNCHRO
Look at the traffic volume and set the network configuration
Assume intersections are under Caltrans standards
Deliverables: Report, SYNCHRO Report, Plans (more in detail)
Not going to do drainage
First thing that needs to figure out is the land configuration
For super elevation, draw the figures
Notify Seri if we need to use SYNCHRO at Tetra Tech
Assignments:
Come up with traffic counts
How we derived it
Get a good understanding of SYNCHRO
Set up the SYNCHRO file with the lane configuration
Give the file to Seri prior to the next meeting
Accomplishments
Set up the scope for this quarter

Monday, April 6, 2009 – 12:00 PM-1:30 PM
Roll Call: Henry Huang, Greg Thompson
Discussion: Teach some basic AutoCAD commands to Greg
Basic Key Functions
Basic Commands
Draw Line
Draw Arc
Pan
Move
Rotate
Mirror
Fillet
Offset
Extend and Trim
Adding a External Reference to the Drawing
Setting the Scale in the Viewpoint
Rotating the Viewport in Paperspace
Assignments:
None
Accomplishments
Help Greg Understand AutoCAD

Monday, April 6, 2009 – 2:00 PM-3:30 PM
Roll Call: Henry Huang, Andy Verdin, Quenton Huang
Discussion: General PM Meeting

How to divide up the work
Intersection Signal
Group 1: Andy, Phil, Mark
Group 2:Quenton, Jorge, Greg
Henry will oversee the two groups
Henry will work on striping
Andy started working on super elevation already

Alternatives for some Sections? To What Degree?
Layout: Different improvements (with on build) compared with cost and LOS
Striping: How pedestrian crossing is striped
Traffic Signal: Stop Sign vs. Traffic Signal
Signal timing? (Permitted Left, Protected Left, Lead-Lag)

Preliminary Schedule of Deadline
SYNCHRO: 4/7
Traffic Signal: 4/22
Striping: 5/15
Final: 5/22

Other Topics Discussed
Henry will go to lecture tomorrow to pick up PDR for the group

Wednesday, April 8, 2009 – 5:00 PM-6:30 PM
Roll Call: Henry Huang, Andy Verdin
Discussion: Edited the SYNCHRO file
Scaled the volumes to be 40% of the reported volume
Edited the lane configuration
Assignments
After receiving feedback from Seri, modify the file
Accomplishments
Completed initial SYNCHRO with lane configuration and volumes file

Monday, April 13, 2009 - 2:00 PM- 3:00 PM
Roll Call: Henry Huang, Andy Verdin, Quenton Huang
Discussion: Further SYNCHRO discussion, add storage lengths
Assignments:
Add shoulders to CAD drawing
Accomplishments: Prepare things to discuss at 5:00PM meeting with CC

Monday, April 13, 2009 – 5:00 PM-6:30 PM
Roll Call: Mark Beltran, Quenton Huang, Andy Verdin, Philip Wang, Henry Huang
Discussion: SYNCHRO questions, signing and striping,
Assignments:
Send Seri: CAD drawing of roundabout, updated SYNCHRO file, and background image from Greg.
Come up with estimates and quantities for Signing and Striping using Excel file.
Label CAD file with details on sign/stripe.
Finish before Thursday.
Accomplishments: Figure out how to merge lanes. Lane configurations.

Thursday, April 16, 2009 – 5:15 PM-6:30 PM
Roll Call: Andy Verdin, Mark Beltran, Quenton Huang, Philip Wang, Henry Huang, Jorge Zamora

Discussion:
- edited SYNCHRO file
- intersection signal design packet
- Signing and striping
- Where to put power and service box

Assignments:
- choose phasing
- MUST HAVE PHASE DIAGRAM ON THE PLANS
- Cabinet placement (do not block pedestrians 5 ft from curb)
- Bring detail of intersection
- Don’t lose signal and lighting design guide

Thursday, April 23, 2009 5:15PM-6:45PM

Roll Call: Andy Verdin, Mark Beltran, Quenton Huang, Philip Wang, Henry Huang, Jorge Zamora, Greg Thompson

Discussion:
- Tech Memo with Dr. Ritchie
- Traffic Signal Loads
- Left-turn light detail
- +1 to loads to account for future signs
- Pedestrian crossing
- Pull box—group detectors to one pull box; signal pole has its own pull box
- Connect all pull boxes to the master pull box in front of the controller cabinet
- Master pull box to controller has traffic info and power
- Pull box #6 usually with signal box

Assignments:
- design for mast-arm loads (pole type)
- Phasing with pedestrian
- Pole schedule – fill out pole type
- Put in signal heads
- Put in conduits
- Loop Assignment
- Conduit fill after putting in Excel spreadsheet

Thursday April 30, 2009 5:00PM-6:00PM

Roll Call: Andy Verdin, Mark Beltran, Philip Wang, Henry Huang, Wei Kung Huang

Discussion:
- intersection design continued
- missing poles and signals heads
- all detector conduits merge to one

Assignments:
- fix left turn signal and add closer straight signal on smaller poles
- finish putting in schedule and labeling into CAD
- change pole schedule and detectors to reflect changes
- give back packets Seri gave us at the end of the quarter

Monday May 4, 2009 3:00PM-5:00PM
Roll Call: Andy Verdin, Henry Huang, Wei Kung Huang, Philip Wang
Discussion
- FDR outline
- Tech Memo next Thursday May 14, 2009

Assignments:
- Finish all traffic signaling by Thursday
- Pole and Conduit Schedules
- Label CAD
- 2 through loops
- Extra through traffic signal heads

Thursday May 7, 2009 5:00PM-5:40PM
Roll Call: Mark Beltran, Wei Kung Huang, Philip Wang, Greg Thompson, Henry Huang, Andy Verdin, Jorge Zamora
Discussion:
- Traffic Signaling costs
- Pedestrian Ramps missing
- Profile check for drainage
- Excel file with BCR, ECR and L
- Plan sheet with in-grade and out-grade
Assignments:
- Tech Memo next Thursday
- Add pedestrian curb ramps
- SimTraffic Sumulations

Thursday May 14, 2009 5:00PM-6:00PM
Roll Call: Mark Beltran, Andy Verdin, Greg Thompson, Philip Wang
Discussion:
- curve profile
- tech memo
- Presentation and final report
- Cost estimates
- Superelevation
Assignments:
- Superelevation diagram
- Bring all the plans for next Thursday
- Add ramp and distances
- Cost estimates
Hi everyone,

Hope everyone is having a great spring break. Can everyone email the PMs your schedule and any other potential conflicts (work or meetings) so we can set up a time to meet?

-Henry

Hey Henry,

I should know within a few days about a potential job. I will let you know for sure when I have a better idea what my weeks will look like. Right now any time after 5 or 6 any weekday works. Wednesday I have another meeting at 7:30.

If I am not working I will be free all day Tuesday and Thursday after 10:00am.

-Greg

Hi Professor Park:

I just want to get a head start for this quarter. First off, we chose the roundabout interchange. I want to know what we are designing this quarter and whether a design needs to be finished before another can start. The presentation is on Saturday May 30, so we have about eight weeks.
Theses are the designs I remember (from the top of my head) you showing us:

- Traffic Signal (Since it is a roundabout, we are going to assume this is a special case where the city wants to design the next intersection from the roundabout. That way, it will be a simple 90 degrees intersection)
- Striping
- Signage
- Drainage?
- Utility
- Lighting?

Sincerely,

Henry Huang

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**Subject:** RE: CEE 181 Project  
**From:** "Park, Seri" <Seri.Park@tetratech.com>  
**Date:** Wed, March 25, 2009 11:47 pm  
**To:** "huanghc@uci.edu" <huanghc@UCI.EDU>

Hi Henry,
Thank you for the email. How was the presentation?

What you wrote is what we will do during next quarter. We need to finish things in hurry.
So let's have the kick off meeting as well as the initial design frame meeting next week.
I remember we said on Monday at 5:00. Am I right?

See you guys soon!!!

Seri

---

**Subject:** Re:  
**From:** mbeltran@uci.edu  
**Date:** Thu, March 26, 2009 12:53 am  
**To:** huanghc@uci.edu  
**Cc:** mbeltran@uci.edu (less)  
gthompso@uci.edu  
jazamora@uci.edu  
rainfallmelon@gmail.com  
andyverdin@gmail.com  
wkhuang@uci.edu

Hey, my schedule's gonna be kinda rough, but here goes:

Monday: Before 10am and after 10pm  
Tuesday: 5-8pm  
Wednesday: Before 10am and after 2
Thursday: After 5pm
Friday: 6:30-8 (potentially 2-8, depending on if my work needs me on Fridays)
Sat: Free
Sunday: After 12pm

Sorry, my schedule kinda sucks. I'm finishing up my Management Courses, and I have Dance practice at 8pm Tuesdays and Thursdays.

I mentioned it before too, but I'm gonna be in Hawaii for the ASCE Conference from 4/1-4/8.

Lastly, if you guys deliberate on different tasks, I would like to be working on the signal design if we have one. I've worked with them for work, and would like to get a more thorough understanding of them (conduit scheduling and such). Of course, that's all up to you three. I will see you guys on Tuesday at 5!

- Mark

Subject: RE: CEE 181 Project
From: huanghc@uci.edu
Date: Fri, March 27, 2009 11:12 am
To: "Park, Seri" <Seri.Park@tetrtech.com>

Hi Professor Park:

The presentation went very well. The professors really liked the roundabout design. They could not stop asking questions about it. Also, they liked how we had three different alternatives.

I thought the meeting is going to be on Tuesday at 5. If you need it to be on Monday, I can ask my group if they will have any conflicts. Do you prefer Monday over Tuesday?

-Henry

Subject: RE: CEE 181 Project
From: "Park, Seri" <Seri.Park@tetrtech.com>
Date: Fri, March 27, 2009 12:56 pm
To: "huanghc@uci.edu" <huanghc@uci.edu>

Henry,
Tuesday is fine too. Let's stick to the original plan. BTW, can we make it at 5:15?

Then see you on Tuesday!
Hope that you are enjoying Spring Break.

Seri
Hi Professor Park:

No problem.

-Henry

Hi Professor Park:

I forgot to ask if you will be explaining to us as to what do we need to do for each design. We are not really sure how to design these details.

-Henry

Henry,
I will go through with you guys. It will be more challenging I guess :p

See you soon.

Seri

Hello Everyone,

My schedule:

Monday: Free from 2 to 5pm
Tuesday: Free all day till 6pm.
Wednesday: Free from 2 to 5pm.
Thursday: Free all day
Friday: 8 to 10 (Enrolled Lab session) and free after 2
Saturday: Free
Sunday: Busy all day (usually go home)
Im going to be gone from Thursday, April 2, till Sunday this week for a conference I am attending so I won't be able to get anything done this upcoming weekend.

Also, can people list the time they enrolled for the lab that way we can meet at that time too.

Andy

Subject: Re:
From: "Philip Wang" <rainfallmelon@gmail.com>
Date: Sun, March 29, 2009 11:24 pm
To: "Andy Verdin" <andyverdin@gmail.com>
Cc: mbeltran@uci.edu (less)
     huanghc@uci.edu
     gthompso@uci.edu
     jazamora@uci.edu
     wkhuang@uci.edu

Damn Spring break over already. Here is my schedule. See you guys this Tuesday?

Mon - After 3
Tuesday - After 3
Wed - After 3
Thurs - After 3
Fri - After 3
Weekends - Flexible let me know a few days in advance

My lab is the Friday 8-9:20AM Lab you sure you want to meet up at 8 in the mornin?

Phil

Subject: Reminder: Meeting Tommorrow @ 5:15
From: huanghc@uci.edu
Date: Mon, March 30, 2009 4:22 pm
To: mbeltran@uci.edu (less)
     gthompso@uci.edu
     jazamora@uci.edu
     rainfallmelon@gmail.com
Cc: andyverdin@gmail.com (less)
     wkhuang@uci.edu

Hi Everyone,

Hope everyone had a great spring break. Just reminding everyone that we are meeting Seri tommorrow at 5:15.

-Henry
Looks like we might be able to use this design software for our roundabouts.


I'm thinking about calling the company and trying to see if we can get a full copy for our project. Maybe the fact that we're doing "Research" in roundabout design and part of the UC system will give us an edge with their marketing department.

Jorge

Hi PMs,

It is possible to meet on Monday. I want to start organizing the schedule so everything finishes on time. I also want to discuss how we are going to approach the project. I am free any time after 2.

- Henry

Hey everyone,

I don't have class on Monday at 12 so I'm free to meet after 12.

- Andy
Subject: Re: Meeting  
From: "Andy Verdin" <andyverdin@gmail.com>  
Date: Sun, April 5, 2009 10:01 pm  
To: huanghc@uci.edu

Hey Henry,

Yeah im fine with meeting at 2. Ill probably leave after 123 to get lunch and then head over to AIRB 2030 afterwards.

And thanks for the command list.

-Andy

Subject: Meeting  
From: huanghc@uci.edu  
Date: Sun, April 5, 2009 8:31 pm  
To: andyverdin@gmail.com

Hi Andy,

Can you meet at 2 tommorrow? Quenton has class until 2. Meeting room will be in AIRB 2030. Do you want to come 2030 beforehand? I will be helping Greg with AutoCad. Since last time was a very disoraganized, I am making a write up of some basic stuff. I'll email you the file too after I am done.

-Henry

Subject: The Basic AutoCad Stuff File  
From: huanghc@uci.edu  
Date: Sun, April 5, 2009 9:23 pm  
To: "Andy Verdin" <andyverdin@gmail.com>

Hey Andy,

Here is doc with some of the basic commands for AutoCad. Hope this helps.

-Henry

Subject: SYNCHRO 7  
From: huanghc@uci.edu  
Date: Mon, April 6, 2009 1:22 pm  
To: "R. Jayakrishnan" <rjayakri@uci.edu>

Hi Professor Jayakrishman:

I am currently in the T4 181 Group. We need to use SYNCHRO 7 for our project. It is asking me for an activation code. I dont have the code for SYNCHRO 7.

Sincerely,

-Henry Huang
Hi Professor Park:

There seems to be a problem with the SYNCHRO 7 in AIRB. It asks for an activation code. I tried contacting Professor Jay about this (I think he has a code), but he has not replied back yet. I am sorry for letting you know so late, since I assumed it was fine because a group used it last quarter.

-Henry

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I am currently out of my office with limited access to my e-mail account. I will return back on Monday April 13, 2009. Please contact Renae Ferrer at renae.ferrer@tetratech.com or at (949) 727-7099 ext.167 for further assistance.

Thank You, Seri

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Hi Renae:

I am a student in the senior design project Seri is advising. There seems to be a problem with the SYNCHRO 7 in the school lab. It asks for an activation code. I tried contacting Professor Jay about this (I think he has a code), but he has not replied back yet. Seri has said that we will be able to work at Tetra Tech if needed, but you need to know in advance.

Is it possible to setup the computers by tomorrow? I am sorry for letting you know so late, since I assumed it was fine because a group used it last quarter.

-Henry
Hi Renae:

Three of us are planning to coming at 3:30. Is that possible? We just need one computer with SYNCHRO 7. The rest of the group (four more) will come at 5:00. Can we stay after 5? How long?

Sincerely,

Henry

---

Subject: [CEE 181C] SYNCHRO Activation Key Help
From: "Andy Verdin" <andyverdin@gmail.com>
Date: Mon, April 6, 2009 2:50 pm
To: "bhagata@uci.edu" <bhagata@uci.edu> (less)
"Pierre Auza" <pmauza@yahoo.com>
Cc: "Henry Huang" <huanghc@uci.edu> (less)
"Quenton Huang" <wkhuang@uci.edu>

Hello,

We are planning on using the Trafficware SYNCHRO software 7.0 in AIRB 2030 (there is only one computer with that version) for our CEE 181C project but it currently asks for an activation key. This was not an issue last quarter. Do you happen to know where we can get the activation key so we can use the software?

Any help will be greatly appreciated.

Thank you,
Andy Verdin

---

Subject: AutoCad Doc File
From: huanghc@uci.edu
Date: Mon, April 6, 2009 3:58 pm
To: andyverdin@gmail.com (less)
gthompso@uci.edu

Attached is the file that was corrupted the first time.

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Subject: RE: SYNCHRO 7 (Seri's Advising Senior Design Group)
From: "Ferrer, Renae" <Renae.Ferrer@tetratech.com>
Date: Mon, April 6, 2009 4:47 pm
To: "huanghc@uci.edu" <huanghc@uci.edu>

I can provide a conference room for your group for 5pm-6pm (only available after
work hours), I need to locate an available work station with synchro, Seri is going
to confirm with me.

Thanks,

Renae Ferrer | Engineer's Assistant
Direct: 949.585.1267 | Main: 949.727.7099 | Fax: 949.727.7097
renae.ferrer@tetratech.com

Hi everyone,

Just a reminder that we are meeting at 5 tomorrow. Since SYNCHRO 7 is not working in AIRB (needs an activation code), we are meeting at Tetra Tech.
From the email I got back, it seems like we can only stay for an hour. We have emailed Professor Jay, Pierre, and Ankoor about this. Hopefully, this will be resolved ASAP. If the meeting place changes, I will email or text everyone.

-Henry

Subject: RE: SYNCHRO 7
From: "Park, Seri" <Seri.Park@tetratech.com>
Date: Tue, April 7, 2009 10:46 am
To: "huanghc@uci.edu" <huanghc@uci.edu>
Cc: "Ferrer, Renae" <Renae.Ferrer@tetratech.com> (less)
    "Cheng, Wen" <Wen.Cheng@tetratech.com>

Henry,
Do you still have password and login name that our company gave you? Please have that ready and come in after 5:00 to do the work. Use the computer that is in the office next to mine, Wen Cheng's. Make sure that you do log out after the run. Also make sure that you guys do things in advance.

Also, Let Renae know when you are coming. The office door closes at 5:00 and since I am out of town, I would recommend you to come little bit early.

Cheers,
Seri
Subject: RE: SYNCHRO 7
From: huanghc@uci.edu
Date: Tue, April 7, 2009 11:14 am
To: "Park, Seri" <Seri.Park@tetratech.com>

To Professor Park:

Yes, we still have the password and login. Since you are out of town, are we having a meeting this Thurs?

-Henry

Subject: [Fwd: RE: SYNCHRO 7]
From: huanghc@uci.edu
Date: Tue, April 7, 2009 11:15 am
To: andyverdin@gmail.com (less)
wkhuang@uci.edu

----------------------------- Original Message -----------------------------
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Subject: RE: SYNCHRO 7
From: "Park, Seri" <Seri.Park@tetratech.com>
Date: Tue, April 7, 2009 10:46 am
To: "huanghc@uci.edu" <huanghc@uci.edu>
Cc: "Ferrer, Renae" <Renae.Ferrer@tetratech.com>
    "Cheng, Wen" <Wen.Cheng@tetratech.com>

-----------------------------------------------------------------------
---
Henry,
Do you still have password and login name that our company gave you? Please have that ready and come in after 5:00 to do the work. Use the computer that is in the office next to mine, Wen Cheng's. Make sure that you do log out after the run. Also make sure that you guys do things in advance.

Also, Let Renae know when you are coming. The office door closes at 5:00 and since I am out of town, I would recommend you to come little bit early.

Cheers,
Seri

Subject: RE: SYNCHRO 7
From: "Park, Seri" <Seri.Park@tetratech.com>
Date: Tue, April 7, 2009 11:17 am
To: "huanghc@uci.edu" <huanghc@uci.edu>

Meeting thursday will be Ok.
5:15 right?
But i will let you know if things get changed...

Seri
<table>
<thead>
<tr>
<th>Subject</th>
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<tbody>
<tr>
<td>From</td>
<td><a href="mailto:huanghc@uci.edu">huanghc@uci.edu</a></td>
</tr>
<tr>
<td>Date</td>
<td>Tue, April 7, 2009 11:52 am</td>
</tr>
<tr>
<td>To</td>
<td>&quot;Park, Seri&quot; <a href="mailto:Seri.Park@tetratech.com">Seri.Park@tetratech.com</a></td>
</tr>
</tbody>
</table>

Hi Professor Park:

Yes, its 5:15

-Henry

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</tr>
<tr>
<td>Date</td>
<td>Tue, April 7, 2009 3:08 pm</td>
</tr>
<tr>
<td>To</td>
<td>&quot;Andy Verdin&quot; <a href="mailto:andyverdin@gmail.com">andyverdin@gmail.com</a></td>
</tr>
</tbody>
</table>

Hey Andy,

Can you ask them if we can stop by tomorrow? I don't know if we can finish in one hour.

Henry

<table>
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<tr>
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<td>From</td>
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<tr>
<td>Date</td>
<td>Tue, April 7, 2009 3:19 pm</td>
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<tr>
<td>To</td>
<td><a href="mailto:huanghc@uci.edu">huanghc@uci.edu</a></td>
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</tbody>
</table>

Yeah I'll ask them. I'll probably be able to go Thursday too to finish working on it as well so I will see what kindve access we are going to have.

-Andy

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<td>Tue, April 7, 2009 6:46 pm</td>
</tr>
<tr>
<td>To</td>
<td>&quot;<a href="mailto:huanghc@uci.edu">huanghc@uci.edu</a>&quot; <a href="mailto:huanghc@uci.edu">huanghc@uci.edu</a></td>
</tr>
<tr>
<td>Cc</td>
<td>&quot;Ferrer, Renae&quot; <a href="mailto:Renae.Ferrer@tetratech.com">Renae.Ferrer@tetratech.com</a></td>
</tr>
</tbody>
</table>

Henry,

Since I am out of town please do not stay over 1 hour. Somebody needs to be with you guys but obviously I am not available this week.

Seri

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<td>From</td>
<td><a href="mailto:huanghc@uci.edu">huanghc@uci.edu</a></td>
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<tr>
<td>Date</td>
<td>Tue, April 7, 2009 6:56 pm</td>
</tr>
<tr>
<td>To</td>
<td>&quot;Ferrer, Renae&quot; <a href="mailto:Renae.Ferrer@tetratech.com">Renae.Ferrer@tetratech.com</a></td>
</tr>
</tbody>
</table>

Hi Renae:

Can we come in again tomorrow after 5 PM?

-Henry
Hi everyone,

We are meeting at Tetra Tech tomorrow (5 PM) to continue on the SYNCHRO stuff. It is not mandatory so come if you want to.

-Henry

--- Original Message ---

Subject: RE: SYNCHRO 7
From: "Park, Seri" <Seri.Park@tetratech.com>
Date: Tue, April 7, 2009 7:06 pm
To: "huanghc@uci.edu" <huanghc@uci.edu>

Henry,
Also please keep checking with Jay about SYNCHRO. It is the best when you guys use school computer.

Thanks
Seri

--- Original Message ---

Subject: RE: SYNCHRO 7
From: "Park, Seri" <Seri.Park@tetratech.com>
Date: Tue, April 7, 2009 6:46 pm
To: "huanghc@uci.edu" <huanghc@uci.edu>
Cc: "Ferrer, Renae" <Renae.Ferrer@tetratech.com>

Henry,
Since I am out of town please do not stay over 1 hour. Somebody needs to be with you guys but obviously I am not available this week.

Seri
Henry,

Also please keep checking with Jay about SYNCHRO. It is the best when you guys use school computer.

Thanks
Seri

Hi Andy,

I think I got it to work. The flows seemed to be conserved. I tried to stick with using 40% of the existing flows. There were so movements were I needed to adjust it to make sure the flow is conserved.

-Henry

Hi Professor Park:

Attached are the SYNCHRO files we did. What we generally did was took 40% of the projected flows from the report. Since there was no data for the top per. intersection, I assumed it to have similar flows as the bottom per. intersection. The LOS is listed as follows:

Top Per. Int. = A or B (I dont quite remember)
Top Roundabout = C
Bottom Roundabout = C
Bottom Per. Int. = C

-Henry
Took quick look and have few questions.

1. The roadway geometry does not seem to be same as what you guys proposed. Did you export the dxf file?

2. What about the pocket length? Like right turn and left turn pocket length? Right now all the right turning and left turning lanes are one long lane without any pocket length.

3. What about the truck %? Did you consider that portion as well?

We can talk more later.

Cheers,
Seri

-----Original Message-----
From: huanghc@uci.edu [mailto:huanghc@uci.edu]
Sent: Thursday, April 09, 2009 12:29 AM
To: Park, Seri
Subject: SYNCHRO File

Hi Professor Park:

Attached are the SYNCHRO files we did. What we generally did was took 40% of the projected flows from the report. Since there was no data for the top per. intersection, I assumed it to have similar flows as the bottom per. intersection. The LOS is listed as follows:

Top Per. Int. = A or B (I dont quite remember)
Top Roundabout = C
Bottom Roundabout = C
Bottom Per. Int. = C

-Henry
Hi Professor Park:

I did not do the lane geometry. I only inputted the data. For the truck 
%,
I did not know we need to do that. I will look into it and change the 
values. I will forward this to Andy and Quenton to for question 1 and 2.

I talked to Professor Jay yesterday, and he said he will work on it. He 
said it may take one or two days.

-Henry

Good!!!!
Let's work more on the detailed version.
Especially when you do the presentation, it is always better to follow 
the geometry
that you suggested to be more realistic.

Cheers,
Seri

Uh, wasn't sure with question 1 and 2. I answered question 3 (did not 
consider it).

-Henry

------------------------------ Original Message ------------------------- ---
Subject: RE: SYNCHRO File
From: "Park, Seri" <Seri.Park@tetratech.com>
Date: Thu, April 9, 2009 10:22 am
To: "huanghc@uci.edu" <huanghc@uci.edu>

------------------------------ Original Message ------------------------- ---
Subject: RE: SYNCHRO File
From: huanghc@uci.edu
Date: Thu, April 9, 2009 10:21 am
To: "Park, Seri" <Seri.Park@tetratech.com>

------------------------------ Original Message ------------------------- ---
Subject: [Fwd: RE: SYNCHRO File]
From: huanghc@uci.edu
Date: Thu, April 9, 2009 10:22 am
To: andyverdin@gmail.com (less) wkhuang@uci.edu

------------------------------ Original Message ------------------------- ---
Subject: [Fwd: RE: SYNCHRO File]-Seri Emailed Me Back
From: huanghc@uci.edu
Date: Thu, April 9, 2009 10:35 am
To: andyverdin@gmail.com (less) wkhuang@uci.edu

------------------------------ Original Message ------------------------- ---
Subject: RE: SYNCHRO File
From: "Park, Seri" <Seri.Park@tetratech.com>
Date: Thu, April 9, 2009 10:22 am
To: "huanghc@uci.edu" <huanghc@uci.edu>

------------------------------ Original Message ------------------------- ---
Good!!!!
Let's work more on the detailed version.
Especially when you do the presentation, it is always better to follow the geometry that you suggested to be more realistic.

Cheers,
Seri

Hi Professor Park:

No problem. Hope your daughter is feeling better. I think Monday will be the best time. This allows us to make any revisions on the SYNCHRO stuff for Thursday meeting. I am not sure yet (Since Professor Ritchie has not responded yet), but Thursday meeting may be a Tech Memo. We are required to have two Tech Memos this quarter.

So far, Andy, Phil, and me can attend for the Monday meeting. Greg will be out of time until Tuesday. I have not received a response back from Mark, Jorge, and Quenton yet.

-Henry

Hi,
I was wondering if we can postpone today's meeting. My little one is not feeling well and I have to babysit her...
Sorry about this.
Can we do it on next Monday at 5:15? And also have a meeting on next Thursday at 5:15?
Can you guys let me know?

Meanwhile, please make sure that you guys do consider and work on the items that I did point out on previous email.
Also, please check the following website for the Signing and Striping part. I changed the schedule so that we can do the striping part right after SYNCHRO.
http://www.dot.ca.gov/hq/esc/oe/project_plans/HTM/stdplns-US-customary-units-new06.htm#miscellaneous
Look at the PAVEMENT MARKERS, TRAFFIC LINES, AND PAVEMENT MARKINGS part and see how it is presented in the real world while you drive. Then you can figure out how to put in on your plans - like shoulder striping to be solid white line, Detail 27B. This is something that we are going to learn next week besides the SYNCHRO.

Again so sorry for the late notice. Not easy with the kids around... Let me know if next Monday will work for you.

Seri

Seri Park, Ph.D | Design Engineer
Main: 949.727.7099 | Fax: 949.727.7097
seri.park@tetratech.com

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---

**Subject:** SYNCHRO Activation Code

**From:** huanghc@uci.edu

**Date:** Thu, April 9, 2009 12:46 pm

**To:** ziggy@uci.edu

Hi Ziggy Bates:

I was the student that was with Professor Jay yesterday. I just want an update with what is happening with the activation code for SYNCHRO. Thank you.

Sincerely,

Henry Huang
It's been taken care of.

Yes, no problem, at 5 if you can just wait in the front until we confirm that Wen is finished for the Day.

Thanks!

Renae Ferrer | Engineer's Assistant
Direct: 949.585.1267 | Main: 949.727.7099 | Fax: 949.727.7097
renae.ferrer@tetratech.com

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Hi Seri,
That is fine if we meet on Monday at 5:15pm instead.

As for the SYNCHRO files, we plan on working on the bay lengths for the right and left turns tomorrow. We still have to fine tune a lot of the details on SYNCHRO. Also, we did not input the dxf file onto SYNCHRO but we are getting the measurements of the roadway from the drawings and manually inputting them.

Best Regards,
Andy Verdin
Hello Everyone,

We will NOT be meeting today since our meeting with Seri was postponed till Monday at 5:15. I know some of you guys can’t make that time because of prior commitments but if you can, you must be there.

We will be meeting tomorrow again to edit the SYNCHRO files that we have worked on so far. If we can get Prof. Jay to get the license on the computer we will meet in AIRB 2030, if not we will meet tomorrow at Tetra Tech at 5pm. Another email will be sent out tomorrow with the details once they are all figured out.

-Andy

Hi Ziggy Bates:

I tried opening SYNCHRO, and it still says I need an activation key.

-Henry Huang

You need to talk to Lisa Preble. She’s in charge of that lab. I gave her all the information she needs.

Hey Andy,

I got an email from Lisa saying that SYNCHRO is ready.

-Henry
Hey everyone,

Just a reminder that we have a meeting with Seri tomorrow at 5:15 (email one of the PMs back if you cannot make it. So far, I think Greg said he was not coming back until Tuesday) and Thursday at 5:15. The tech memo will be on 4/23 at 5:15.

-Henry

Hey Andy and Quenton,

If I remember correctly, we are meeting tomorrow at 2. Same place as last time.

-Henry

Hey Henry,

Yeah 2pm is fine. Also, the meeting on Friday at TetraTech was very unproductive because Seri was actually there and she just lectured me about how the SYNCHRO file should look like and we were only about to stay till 5:40 because that's when she left. yeah so ill explain the rest later tomorrow.

-Andy
Hi all,
Please take a look of the attached xls file.
This is what we are going to do today.

Cheers,
Seri

Seri Park, Ph.D | Design Engineer
Main: 949.727.7099 | Fax: 949.727.7097
seri.park@tetratech.com

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Roll Call: Henry Huang, Andy Verdin, Quenton Huang

Discussion: Further SYNCHRO discussion, add storage lengths

Assignments:
Add shoulders to CAD drawing

Accomplishments: Prepare things to discuss at 5:00PM meeting with CC
*Monday, April 13, 2009 – 5:00 PM-6:30 PM*

*Roll Call: Mark Beltran, Quenton Huang, Andy Verdin, Philip Wang, Henry Huang*

Discussion: SYNCHRO questions, signing and striping,

Assignments:

Send Seri: CAD drawing of roundabout, updated SYNCHRO file, and background image from Greg.

Come up with estimates and quantities for Signing and Striping using Excel file.

Label CAD file with details on sign/strip.

Finish before Thursday.

Accomplishments: Figure out how to merge lanes. Lane configurations.

---

**Subject:** Picture  
**From:** "Greg Thompson" <gthompson@uci.edu>  
**Date:** Mon, April 13, 2009 7:57 pm  
**To:** huanghc@uci.edu

Hey Henry,

Here is the picture. I'll see you tomorrow at 5:00pm.

-Greg

---

**Subject:** The Requested File  
**From:** huanghc@uci.edu  
**Date:** Mon, April 13, 2009 8:23 pm  
**To:** Seri.Park@tetratech.com  
**Cc:** andyverdin@gmail.com (less) wkhuang@uci.edu

Hi Seri Park:

Attached are the SYNCHRO file and picture of Portola. The following link  
http://rapidshare.com/files/221067345/Dwg_Drawings.rar.html has the dwg files. Open the South ramps file. The north ramps are referenced in it.

-Henry

---

**Subject:** RE: The Requested File  
**From:** "Park, Seri" <Seri.Park@tetratech.com>  
**Date:** Tue, April 14, 2009 8:27 am  
**To:** "huanghc@uci.edu" <huanghc@uci.edu>

Got all the files OK.  
I will send you the pdf file and other related stuffs.

Cheers,  
Seri
Hi all,
Here is the zip file that has

1. Example of Signal Design Sheet - pdf file
2. Conduit Cal sheet - xls file
3. Caltrans Standard files - CaltransStandard folder

Please review them and have them printed for this coming Thursday. As I said, the signal design could be easy or could be difficult! Also, please have the striping plan ready for the review. See you them on Thursday! BTW, can we make it 5:20?

I will look at your SYNCHRO files tonight.

Seri

Seri Park, Ph.D | Design Engineer
Main: 949.727.7099 | Fax: 949.727.7097
seri.park@tetratech.com

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Hi Seri,

I edited a little bit of the SYNCHRO file (Some of the movement configurations).

-Henry
Hi Professor Park:

The following link has a zip file with the striping plan and the quantities.


The Striping Plan:
- the numbers are the striping detail from Caltrans
- I have not made the cutsheets yet. I will try to at least get the drawing in cutsheet format before the meeting tomorrow.

Quantities:
- I rounded the numbers to the nearest 10s. I hope that is okay.

-Henry

Hi,

Do I need to be there like last time?

Seri

Hi everyone:

The following is the date, time, and location of the Tech Memo.

Date: 4/23
Time: 5:15 PM
Location: AIRB 4008 (The conference room we usually meet with Seri.)

-Henry
Actually ignore my previou email.
That is when we usually meet...
So are we doing the same thing like last time?
Is Prof. Ritchie going to be there as well?

Seri

Great!
I will take a look tomorrow.
Right now I am reviewing SYNCHRO files.

Cheers,
Seri

Thank you, I will work on getting the room for you.

- Pierre

All,
I have modified the network so that the layout matches our CAD file as well as the
I am not sure if the image file will load properly. I will teach you how to fix it in such case.
Please compare the revised SYNCHRO file to the one that you guys did previously.
Although volumes need to be updated - need to double check with you.

Tomorrow, we will go over the signal design - mainly detector location, phase info and pole selection part.

Cheers,
Seri

Seri Park, Ph.D | Design Engineer
Main: 949.727.7099 | Fax: 949.727.7097
seri.park@tetratech.com

---

Subject: RE: Tech Memo for T4
From: "Park, Seri" <Seri.Park@tetratech.com>
Date: Wed, April 15, 2009 11:30 pm
To: "huanghc@uci.edu" <huanghc@uci.edu>

Henry,
Do you have the Memo that you can bring tomorrow before the actual meeting? I want to check with you.

Cheers,
Seri

---

Subject: Re: Tech Memo for T4
From: huanghc@uci.edu
Date: Thu, April 16, 2009 12:55 am
To: "Pierre Auza" <pmauza@yahoo.com>

Hi Pierre,
The room is reserved already. You do not need to worry about it.

-Henry
Hi Professor Park:

Yes, it will be like last time. Professor Ritchie will be there.

-Henry

Hi Professor Park:

We have not started writing the memo yet, but I can write up an outline of the memo.

Also, I do not think I can have cutsheets for the striping by tomorrow. There was something else I needed to complete tonight. I did do the striping for the two traffic signal intersections, so they should be able to start traffic signal after tomorrow.

-Henry

Hey Andy and Quenton,

I got an email from Seri asking if we can show her our Tech Memo tomorrow. I told her we have not write it yet, but maybe we can give her a general outline. Can one of you write an outline? I am still working on the striping (Finished the plan, but still need to put it into cutsheets w/ notes). I realized the tangents for the north ramps are too short for superelevation. I revised it, but that took most of the night.

-Henry

No problem!
See you later.
Hi all,

Please use this file.

TTYL,

Seri

Seri Park, Ph.D | Design Engineer
Main: 949.727.7099 | Fax: 949.727.7097
seri.park@tetratech.com

---

Subject: Re: [Fwd: RE: Tech Memo for T4]
From: "Andy Verdin" <andyverdin@gmail.com>
Date: Thu, April 16, 2009 9:41 am
To: huanghc@uci.edu (less)
    "Quenton Huang" <wkhuang@uci.edu>

Hey Henry,

I'll bring in an outline.

-Andy

---

Subject: Re: CEE181- Signal Design
From: huanghc@uci.edu
Date: Thu, April 16, 2009 11:13 am
To: "Park, Seri" <Seri.Park@tetratech.com>

Hi Professor Park:

Forgot to reply back. but yes we can change it to 5:20. I will inform the
Hey Quenton,

Mark, Phil and I are going to be doing the Traffic Signal Design for the top intersection. (the intersection above the three lane roundabout)

Our group will be meeting on Monday at 3pm in AIRB 2030 to get it done. When is your group meeting?

-Andy

Subject: Striping Plan
From: huanghc@uci.edu
Date: Sat, April 18, 2009 8:05 pm
To: "Park, Seri" <Seri.Park@tetratech.com>

Hi Professor Park:

Attached are the pdfs of the striping plan. I am not sure if there are too many callouts so can you take a look at it when you have time.

-Henry

Subject: RE: Striping Plan
From: "Park, Seri" <Seri.Park@tetratech.com>
Date: Sat, April 18, 2009 8:43 pm
To: "huanghc@uci.edu" <huanghc@uci.edu>

Sure.
I will let you know by this coming thursday.
I a still trying to figure out the synchro part...

Seri
Hi guys,

I made some symbols for the traffic signals. I took them from a drawing I did for work. The file is in the dropbox. It is for a 1"-20" scale on half size. Also, attached a pdf of the drawing I used. Maybe this may help you with what you need (Some of the things in the drawing you will not need. ie. preemption and future signal head).

Quenton: Not sure if I can make it tonight.

-Henry

Subject: Re: Taffic Signal Symbols  
From: "Quenton Huang" <wkhuang@uci.edu>  
Date: Tue, April 21, 2009 3:03 pm  
To: huanghc@uci.edu (less)  
andiverdin@gmail.com

Should we draw the symbols onto the CAD file? And also, Andy, what intersection are you doing (north or south)?

Subject: Re: Taffic Signal Symbols  
From: huanghc@uci.edu  
Date: Tue, April 21, 2009 3:57 pm  
To: "Quenton Huang" <wkhuang@uci.edu>  
Cc: andiverdin@gmail.com

Hey Quenton,

The Symbols are used for the drawing. You will know what I mean when you look at the pdf. Also, Andy told me he is doing the top intersection. Not sure if they did though.

-Henry

Subject: Tech Memo 2  
From: "Andy Verdin" <andyverdin@gmail.com>  
Date: Thu, April 23, 2009 4:48 pm  
To: "Greg Thompson" <gthompso@uci.edu> (less)  
"Henry Huang" <huanghc@uci.edu>  
"Jorge Zamora" <jazamora@uci.edu>  
"Mark Beltran" <mbeltran@uci.edu>  
"Philip Wang" <rainfallmelon@gmail.com>  
"Quenton Huang" <wkhuang@uci.edu>

Hey Everyone,

Here is the second tech memo.

-Andy
Hi guys,

Just wanted to follow up with some information that I missed today. When you put the poles for the signal heads etc (Pole A from the attached figure page 1), you also need to put another pole (this one is smaller one) at the corner across where you are putting the pole A. These poles are usually type 1-A.

So in the end, for 4-leg intersection, you will need 8 poles, 4 poles like Pole A and 4 poles like type 1-a pole.

Please see the attached PDF file. I also have attached the example on second page.

So sorry about this. I knew that I missed something.

Also, the CSC stands for Conductor Signal Cable.

Please feel free to email or contact me if you have questions.

Cheers,
Seri

Seri Park, Ph.D | Design Engineer
Main: 949.727.7099 | Fax: 949.727.7097
seri.park@tetratech.com

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Hi everyone,

I edited the traffic signal design for the north and south intersection. The south intersection is in the dropbox. Unfortunately, I did not upload the north intersection in the dropbox, and I left my flash drive at Irvine (I'm back home in Diamond Bar right now). I will upload the north intersection when I get back on Sunday evening (around 7 PM?). Sorry.

For Monday/Tuesday, I will go over the pole and conduct schedule again. I will give you a chart I have from a project at work for the pole and conduct schedule.

-Henry

---

Subject: tomorrow's meeting
From: mbeltran@uci.edu
Date: Sun, April 26, 2009 8:16 pm
To: huanghc@uci.edu (less)
    andyverdin@gmail.com

Hey guys, I'm not sure what time we were planning on meeting, but I just wanted to let you know that I have to leave at 4:00pm for my Management teacher's Office Hours, and I have class after. I think I briefly mentioned it to Andy before, but I just wanted to make sure you guys knew.

I will be free after class until that time to meet up, so I'll be available then. TTYL and see you tomorrow!

-Mark

---

Subject: Re: [CEE 181] Tech Memo #3 for T4
From: "Stephen Ritchie" <sritchie@uci.edu>
Date: Wed, April 29, 2009 4:55 pm
To: huanghc@uci.edu

OK, thanks Henry

SGR

Stephen G. Ritchie
Professor of Civil Engineering and
Director, Institute of Transportation Studies
4000 AIR Building
University of California
Irvine, CA 92697-3600
USA
Voice: (949) 824-4214
Fax: (949) 824-8385
sritchie@uci.edu
Subject: RE: Final Tech Memo
From: "Park, Seri" <Seri.Park@tetratech.com>
Date: Tue, May 5, 2009 9:35 pm
To: "huanghc@uci.edu" <huanghc@UCI.EDU>

Henry,
Are we meeting again with Dr. Ritchie?
Just curious...

Seri

Subject: CEE 181 - Curb Return xls file
From: "Park, Seri" <Seri.Park@tetratech.com>
Date: Fri, May 8, 2009 3:45 pm
To: "jazamora@uci.edu" <jazamora@uci.edu> (less)
"mbeltran@uci.edu" <mbeltran@uci.edu>
"andyverdin@gmail.com" <andyverdin@gmail.com>
"rainfallmelon@gmail.com" <rainfallmelon@gmail.com>
"wkhuang@uci.edu" <wkhuang@uci.edu>
"huanghc@uci.edu" <huanghc@uci.edu>
"gthompso@uci.edu" <gthompso@uci.edu>

Hi guys,
Here is the zip file that will show an example of the description of Curb Return profile.

1. PDF files - you will see two pdf files. Please pay attention at the curbs and see how we need to show the elevation at delta/4 points. You will also see how the small profile on those pdf files show the overall flow of drainage.
2. xls files - I have named per Curve. If you look at the xls file, you will need to input
   * Incoming grade (C4)
   * Outgoing grade (C5)
   * Curb Length (C6) - basically the curve length
   * BCR, ECR elevation (C7,8)
   * Once you enter those inputs, then you will get the outputs from G4, H4, and I4.
   * Pay attention on the sign of the grades (+) or (-). I will leave it up to you guys to figure out by looking at provided examples. It basically has to do with how the slope is formed as you go from BCR to ECR.

Please have the followings ready for next week
1. Sheet cutting for the plans of newly added intersections
2. Add all the callouts for the newly sheets - especially have the curb returns ready.
3. Have at least Superelevation part cut sheet - I will send you on Monday an
example.

See you then on Thursday and have a very nice weekend!

Seri

Seri Park, Ph.D, PTP | Design Engineer
Main: 949.727.7099 | Fax: 949.727.7097
seri.park@tetratech.com

Subject: Re: Schedule for This Week: Edit
From: "Andy Verdin" <andyverdin@gmail.com>
Date: Mon, May 11, 2009 9:21 am
To: huanghc@uci.edu
Cc: wkhuang@uci.edu

Hey Henry,

I cant meet today but Ill work on the superelevation with Quenton. I am going to be working on it Wednesday and possibly tomorrow depending on how long the lab is for 124.

-Andy

Subject: Re: Schedule for This Week
From: "Greg Thompson" <gthompso@uci.edu>
Date: Tue, May 12, 2009 10:42 am
To: huanghc@uci.edu
Cc: mbeltran@uci.edu (less)
    gthompso@uci.edu
    jazamora@uci.edu
    rainfallmelon@gmail.com
    andyverdin@gmail.com
    wkhuang@uci.edu

Hey Team,

Are we meeting to work together on stuff today or are we just going to show up on Thursday?

-Greg
Hey Greg,

I don't think we are meeting up.

-Henry

OK cool,

I don't have access to the drop box. I never set it up. I remember trying once back in the winter quarter and it wasn't working so I gave up. Is there any way you can email me that file with the cost estimate info for the striping? Also, I will probably need the cut sheets with the striping info so I can get the numbers.

Thanks!

-Greg

Hey guys,

I could show up later today, but I actually don't know how to use the AutoCAD drawings we have for Civil 3D. Maybe it was just because I didn't have a toolbar lol (people need to delete their files off the school computers instead of hording everything). Let me know if you guys are gonna go cause I might head over there. If not, I can just work on it tomorrow after my Chinese quiz.

--

Philip Wang, EIT
Subject: Re: Schedule for This Week
From: mbeltran@uci.edu
Date: Tue, May 12, 2009 4:25 pm
To: "Philip." <rainfallmelon@gmail.com>
Cc: "Greg Thompson" <gthompso@uci.edu> (less)
    huanghc@uci.edu
    mbeltran@uci.edu
    jazamora@uci.edu
    andyverdin@gmail.com
    wkhuang@uci.edu

I have practice tonight, so I can't meet up. Tomorrow, after 3:30pm is the best option for me. Phil and I will be working on the plan and profile with Jorge's help, as discussed.

- Mark

Subject: Re: Schedule for This Week
From: huanghc@uci.edu
Date: Tue, May 12, 2009 4:48 pm
To: "Greg Thompson" <gthompso@uci.edu>

Hi Greg,

Attached is the pdf striping file. Email if you need anything else.

-Henry

Subject: Thursday's Meeting
From: huanghc@uci.edu
Date: Tue, May 12, 2009 7:03 pm
To: andyverdin@gmail.com (less)
    wkhuang@uci.edu

Hey Andy and Quenton,

I found out today that I have to go up to LA Thursday. I will be there till mid to late afternoon. I will try to make it on time to the meeting.

If I cannot, I will text you two Thursday afternoon (probably around 4 PM).

-Henry

Subject: RE: CEE 181 - Curb Return xls file
From: "Park, Seri" <Seri.Park@tetratech.com>
Date: Wed, May 13, 2009 3:24 pm
To: "huanghc@uci.edu" <huanghc@uci.edu>

I am out of office now. Will do tomorrow morning.
Hi Seri,

Can you send us a sample sheet for superelevation?

-Henry

I can meet up after 6:30 for a couple of hours. Hopefully we should be able
to get everything done tonight.

Hi Professor Ritchie and Professor Park:

I found out yesterday that I have to go up to LA tomorrow. I will be there
till mid to late afternoon. I will try to make it to the meeting. If I
cannot, I will let Andy and Quenton know. Sorry.

-Henry

Henry,

Safe trip to LA.

Thanks for letting us know in advance.

Seri
Hey again guys,

I wanted to add that the new file does not fix all the issues related to the roundabout. We still need to incorporate a structure as well as the freeway onramp angle. We should talk about whether or not to use the new or old plan.

Phil

Hey Team,

Here is a small excel spreadsheet with the cost analysis data. I lumped all the specific types into their three general categories because I could not find specific costs for each on the cal trans web page thing or the packet we used last quarter either. The costs should be pretty accurate based on 2008 and 2009 projects.

See you all tomorrow!

-Greg
Hi all,
Please find the ROW cost related info from the attached file.
Look at page 2 carefully. I guess ROW cost is indeed high!

TTYL and see you soon,
Seri

---

Subject: [CEE 181C] Tech Memo #3
From: "Andy Verdin" <andyverdin@gmail.com>
Date: Thu, May 14, 2009 3:25 pm
To: "Greg Thompson" <gthompso@uci.edu> (less)
   "Henry Huang" <huanghc@uci.edu>
   "Jorge Zamora" <jazamora@uci.edu>
   "Mark Beltran" <mbeltran@uci.edu>
   "Philip Wang" <rainfallmelon@gmail.com>
   "Quenton Huang" <wkhuang@uci.edu>

Hey,

Look over the Tech Memo #3 and let me know if there needs to be any changes. I’ve already printed out the signage/striping and quantities, intersection signal design, curve data, and schedule. That’ll be included in the addendum.

–Andy

---

Subject: CEE 181 - Example of Superelevation
From: "Park, Seri" <Seri.Park@tetratech.com>
Date: Thu, May 14, 2009 4:00 pm
To: "jazamora@uci.edu" <jazamora@uci.edu> (less)
   "mbeltran@uci.edu" <mbeltran@uci.edu>
   "andyverdin@gmail.com" <andyverdin@gmail.com>
   "rainfallmelon@gmail.com" <rainfallmelon@gmail.com>
   "wkhuang@uci.edu" <wkhuang@uci.edu>
   "huanghc@uci.edu" <huanghc@uci.edu>
   "gthompso@uci.edu" <gthompso@uci.edu>

Hi there,
Here is the pdf file of the superelevation example.
I will bring the printed version today.
See you later!

Seri

---

Subject: Traffic Counts Report
From: huanghc@uci.edu
Date: Thu, May 14, 2009 8:14 pm
To: "Greg Thompson" <gthompso@uci.edu>

Hey Greg,

Mark told me that you have the report Seri gave us with the traffic counts. Can I bring it to class tomorrow?

–Henry
Hey guys,

Sorry I could not make it today. What happened?

-Henry

Subject: Re: overview of tech memo 3 meeting
From: andyverdin@gmail.com
Date: Thu, May 14, 2009 8:25 pm
To: "Henry Huang" <huanghc@uci.edu> (less)
    "Quenton Huang" <wkhuang@uci.edu>

Hey Henry,

It was pretty much the same thing that always happens. Ritchie just says we are doing a lot of work and wonders of other groups are doin the same amount. He didn't really say much. He just emphasized the cost report and that we should be able to defend any costs we have. Seri gave us the actual right of way costs and now we have a source. Its the email she sent earlier. She made some mark ups on the plans, like we forgot to add the distances in the intersection design. And we also need to draw all of the ramps in the curve return cutsheets because we didn't do it. And then she went over superelevation and gave us a some examples to look at. Quenton and myself are going to meet on Monday to finish up the superelevation. The meeting was pretty short and we really just need to start focusing on writing up the report now. Especially with the SYNCHRO stuff and te alternatives that we told Seri about. Ill talk to you some more tomorrow.

-Andy

Subject: Re: Traffic Counts Report
From: "Greg Thompson" <gthompso@uci.edu>
Date: Thu, May 14, 2009 9:31 pm
To: huanghc@uci.edu

Hey Henry,

I am not going to be in class tomorrow because I have a track meet. I am not sure if I still have the report. I think Andy might have it. Did you check with him?
The traffic counts were part of the sample report that she gave us. I'll look around to see if it is here, but I know I cleaned my room/desk at the beginning of the quarter and I don't remember seeing it or putting it anywhere.

-Greg

Hi everyone,

Hope everyone had a great weekend. Two more weeks and we are finished. For this week, our goal is to complete everything (except the presentation stuff and the executive summary) by Thursday's meeting. Since I am not sure with everyone's schedule, please email/call each other to schedule a time to meet up. Remember, finish report by this Thursday's meeting. Email me with the write up when you are done so I can put the report together.

Phil: write up for: SYNCHRO (with Mark), Signal (with Jorge & Quenton), and Purpose; and any of the curb stuff that needs to be worked on.

Mark: write up for SYNCHRO (with Phil), any curb stuff that still needs to be worked on, and the executive summary (I will email you the report after I get all the parts from everyone)

Jorge: write up for Signal (with Phil & Quenton), Cost (with me and Greg)

Quenton: write up for Signal (with Phil & Jorge) and Superelevation stuff (with Andy)

Andy: Superelevation stuff (with Quenton) and Project Schedule

Greg: Coast (with me and Jorge)

SYNCHRO Part Outline (Feel free to add/substruct parts if you think is not needed)

-How we got the counts (From report Seri gave us and took 40% of those
values...because the actual site we are working on is fully developed just bs something)
-LOS with different signal settings (attached .doc is what I got from SYNCHRO)
-any other things you guys think is needed

Signal Part Outline (Feel free to add/substract parts if you think is not needed)
-Dunno but can look at the report from T1 2007 for ideas

Attached are:
-Report so far
-Table of Contents with which part you are responsible
-LOS report
-SYNCHRO file

Email any of the PMs if you have any questions.

-Henry

---

Subject: CEE 181C Superelevation Meeting On Monday
From: "Andy Verdin" <andyverdin@gmail.com>
Date: Sun, May 17, 2009 11:24 pm
To: "Quenton Huang" <wkhuang@uci.edu>
Cc: "Henry Huang" <huanghc@uci.edu>

Hey Quenton,

I won't be able to meet tomorrow, Monday May 18 to work on the superelevation. I have an important dinner that I have to go to.

You can go ahead and work on the super elevation for the south curves, if necessary, since I believe they don't really require superelevation but nonetheless we will need to show confirmation of this.

Also, write up a paragraph for the superelevation for the south ramp explaining whether or not it actually needed super elevation and I'll add that onto my part.

I'll be busy on Tuesday as well, but I am free on Wednesday so I'll be able to get it done then and if you want we can meet then.

-Andy

---

From: huanghc@uci.edu
Date: Mon, May 18, 2009 3:48 pm
To: jazamora@uci.edu

Hey Jorge,

Greg took care of most of the cost stuff. We will finish the writeup
Dear Henry,

You Rock!

Best Regards,

Gregory Paul Thompson, CEO
ZOT Engineering INC 2009

Hey everyone,

I just want to see where everyone is with what they need to do.

-Henry

Hey guys,

I am 0% Done. I will be in AIRB from 3-Finishing Time cause i need to study
for a chinese quiz and finish hwk for that class also by tomorrow so if anyone wants to join me.

Phil
Subject: [CEE 181C] Updating the Traffic Signal Files
From: "Andy Verdin" <andyverdin@gmail.com>
Date: Wed, May 20, 2009 8:20 pm
To: "Henry Huang" <huanghc@uci.edu> (less)
"Quenton Huang" <wkhuang@uci.edu>

Hey,

Do you guys know if anyone updated the traffic signal autocad to include the distances between the loops, and the width of the lanes?

-Andy

Subject: Re: [CEE 181C] Updating the Traffic Signal Files
From: huanghc@uci.edu
Date: Wed, May 20, 2009 9:08 pm
To: "Andy Verdin" <andyverdin@gmail.com>

Hey Andy,

Nope. I guess I can do it. I think the widths are on already.

-Henry

Subject: Phil's FDR Update
From: "Philip ." <rainfallmelon@gmail.com>
Date: Thu, May 21, 2009 1:23 pm
To: "Philip Wang" <rainfallmelon@gmail.com> (less)
"huanghc@uci.edu" <huanghc@uci.edu>
Cc: "mbeltran@uci.edu" <mbeltran@uci.edu>

Hey Henry,

FYR

Subject: Cost Question
From: huanghc@uci.edu
Date: Fri, May 22, 2009 11:59 pm
To: "Park, Seri" <Seri.Park@tetratech.com>

Hi Seri,

I have a quick question about the North Roundabout On-Ramp. In the drawing, It shows the on-ramp going over the steeet (Our mistake that we did not catch early on). That means it will need a structure. In general, what is the ballpark estimate. I was thinking about it, and I would not want McNally or any other professors asking us if we considered the structure cost and we say no.

-Henry
Subject: RE: Cost Question
From: "Park, Seri" <Seri.Park@tetratech.com>
Date: Sat, May 23, 2009 9:23 am
To: “huanghc@uci.edu” <huanghc@uci.edu>

Henry,
I don't have the estimate right now but will let you know on Tuesday.

Any questions?

Seri

Subject: Crunch Time
From: huanghc@uci.edu
Date: Mon, May 25, 2009 11:12 am
To: mbeltran@uci.edu (less)
gthompso@uci.edu
jazamora@uci.edu
rainfallmelon@gmail.com
andyverdin@gmail.com
wkhuang@uci.edu

Hi everyone,

Hope everyone had a great weekend. This is the FINAL week. We should be done with everyone by Saturday. Everyone knows their assignments. Call each other set up a meeting time. Even though we are not required to finish our report by Saturday's presentation, we need to submit an executive summary (so basically finished with the report). Please submit your writing parts by Thursday evening to me. This gives Mark Friday to work on the executive summary.

I will meet with Greg tomorrow to work on the presentation slides. I am not sure about the time yet. We hope to have a dry run on Thursday's meeting.

I cannot stress it enough that we need to finish the report by Saturday. I MEAN IT.

-Henry

Subject: Tomorrow's Meeting
From: huanghc@uci.edu
Date: Mon, May 25, 2009 11:14 am
To: gthompso@uci.edu

Hey Greg,

What time are you free tomorrow? I do not have class tomorrow so I do not have any time constraints. Tomorrow, I want to finish the presentation slides (or most of it).

-Henry
Subject: Re: Tomorrow's Meeting  
From: "Greg Thompson" <gthompso@uci.edu>  
Date: Mon, May 25, 2009 11:30 am  
To: huanghc@uci.edu

Hey Henry,

I work all day tomorrow so could we meet up around 5:30? That would be best. I think we can get most of it done in a couple hours.

Is there anything else I am responsible for this week?

Thanks!
-Greg

Subject: Updated Layout Files  
From: huanghc@uci.edu  
Date: Mon, May 25, 2009 9:36 pm  
To: jazamora@uci.edu (less)  
rainfallmelon@gmail.com

Hey Jorge and Phil,

Can either one of you give me the updated pdf cutsheets for the roundabout layout?

-Henry

Subject: CEE 181 - SYNCHRO  
From: "Park, Seri" <Seri.Park@tetratech.com>  
Date: Mon, May 25, 2009 10:44 pm  
To: "jazamora@uci.edu" <jazamora@uci.edu> (less)  
"mbeltran@uci.edu" <mbeltran@uci.edu>  
"andyverdin@gmail.com" <andyverdin@gmail.com>  
"rainfallmelon@gmail.com" <rainfallmelon@gmail.com>  
"wkhuang@uci.edu" <wkhuang@uci.edu>  
"huanghc@uci.edu" <huanghc@uci.edu>  
"gthompso@uci.edu" <gthompso@uci.edu>

Guys,
Quick Question. Do you guys need my laptop to run the SYNCHRO simulation during the presentation?
Just lem e know.

Cheers,
Seri

Subject: Re: CEE 181 - SYNCHRO  
From: huanghc@uci.edu  
Date: Mon, May 25, 2009 10:47 pm  
To: "Park, Seri" <Seri.Park@tetratech.com>
Hi Seri,

I am not sure. I will try to find a way to save it as a movie file since McNally wants us you run it from the TA's laptop.

-Henry

---

Subject:  RE: CEE 181 - SYNCHRO
From:  "Park, Seri" <Seri.Park@tetratech.com>
Date:  Mon, May 25, 2009 10:52 pm
To:  "huanghc@uci.edu" <huanghc@uci.edu>

Hi,
Just let me know if you need any help.
I'll also ask around if there is any way we can save as video clip.

Cheers,
Seri

---

Subject:  Re: Updated Layout Files
From:  "Jorge Zamora" <jazamora@uci.edu>
Date:  Wed, May 27, 2009 10:16 am
To:  huanghc@uci.edu

Henry,
Phil did the layout changes for the north roundabouts so I'm not sure which file is the current one. I can print you out a pdf of the two original files but I don't think that's what you are looking for. let me know what you want me to do buddy.

Jorge

---

Subject:  RE: Cost Question
From:  "Park, Seri" <Seri.Park@tetratech.com>
Date:  Wed, May 27, 2009 11:12 am
To:  "huanghc@uci.edu" <huanghc@uci.edu>

Henry,
I looked at the cost estimate file for the Tippecanoe eave project (the topo that I gave you guys for this CEE 181), and the Structure cost is listed as $3,500,000.00. I hope that this gives you an idea of the structure cost. Let's talk more tomorrow.

Cheers,
Seri

---

Subject:  Re: Updated Layout Files
From:  "Philip ." <rainfallmelon@gmail.com>
Hey Henry,

Sorry for the delayed response. But what pdfs are you looking for. Everything that we had for last quarter is in the dropbox. Please elaborate on which files you wanted cutsheets for.

Phil

Hey Quenton,

Can you send me what you are going to write for superelevation so that I can compile it into one paragraph and send it to Henry.

Thanks,

Andy Verdin

Hey Henry,

We can't just use the cutsheets you had for them when you printed out the signage and striping? I was under the impression we were going to use the same cutsheets from last quarter for that since the new tangent didn't fix anything and due to all the issues I ran into. If we use the new profile, I would have to build a structure instead. I propose we use the old cutsheets for the plan and profile views.

Phil

Okay Henry,
I uploaded the cutsheets of what I got into the dropbox although I see many issues. Jorge can you do the same for the south section? If I am correct, all you have to do is add a cutsheet for the new south intersection.

Phil

---

Subject: CEE 181 - Presentation PPT
From: "Park, Seri" <Seri.Park@tetratech.com>
Date: Wed, May 27, 2009 11:30 pm
To: "huanghc@uci.edu" <huanghc@uci.edu>
Cc: "jazamora@uci.edu" <jazamora@uci.edu> (less)
"mbeltran@uci.edu" <mbeltran@uci.edu>
"andyverdin@gmail.com" <andyverdin@gmail.com>
"rainfallmelon@gmail.com" <rainfallmelon@gmail.com>
"wkhuang@uci.edu" <wkhuang@uci.edu>
"huanghc@uci.edu" <huanghc@uci.edu>
"gthompso@uci.edu" <gthompso@uci.edu>

Henry,
I took a quick look on PPT file.
My comments

1. slide #3 - move Design checklist under Caltrans bullet like HDM etc. the design checklist comes from Caltrans.
2. slide #5 - Please add contingency. 20% of Total cost since it is at 30%.
3. slide #6 - I would add the STAA truck template or a figure to show the actual truck.
4. slide #10 - don't forget to mention that you guys considered
   * Loop location
   * Conduit fill - less than 26% (?) for future addition
   * Mast arm based on Caltrans standard pan that also considers the wind velocity, why you guys added one more head count (for future etc)

So far, based on the provided PPT, this is what I can say. I think you guys need to decide about the SYNCHRO. I am still trying to figure it out....

Cheers,
Seri

---

Subject: Report
From: huanghc@uci.edu
Date: Fri, May 29, 2009 12:29 am
To: "Park, Seri" <Seri.Park@tetratech.com>

Hi Seri,
Here is most of the report. I still dont have the superelevation stuff yet.

-Henry

---

**Subject:** RE: Report  
**From:** "Park, Seri" <Seri.Park@tetratech.com>  
**Date:** Fri, May 29, 2009 9:16 pm  
**To:** "huanghc@uci.edu" <huanghc@uci.edu>  
**Cc:** "jazamora@uci.edu" <jazamora@uci.edu> (less)  
"mbeltran@uci.edu" <mbeltran@uci.edu>  
"andyverdin@gmail.com" <andyverdin@gmail.com>  
"rainfallmelon@gmail.com" <rainfallmelon@gmail.com>  
"wkhuang@uci.edu" <wkhuang@uci.edu>  
"huanghc@uci.edu" <huanghc@uci.edu>  
"gthompso@uci.edu" <gthompso@uci.edu>  

Hi all,
Here are my comments. I will also bring the edited printouts tomorrow. 
Hope that
this will be too late for you guys.
Please make sure that you do correct the report OK?

Cheers and see you tomorrow,
Seri

---

**General Comments**
1. The header of the report should read "Final Design Report" not
"Preliminary Design Report". Please correct it.
2. Please be consistent with the Caltrans calling out. Here is the rule.
a. when you mention for the 1st time in EACH chapter call out
"California Department of Transportation (Caltrans)" (not CA Department of Transportation).
b. Then WITHIN the same chapter call out "Caltrans" after calling out full name.
3. Where are Location and Vicinity Map? Please don't forget to include within the report.
4. Calling out HDM - similar to Caltrans calling out. When you first mention at the beginning of each chapter, then spell out completely with its publication year. When you call out again WITHIN the same chapter then just say Caltrans HDM (2007).

**Specific Comments**
1. Page 4,8,9,10,24-related to Caltrans calling out (same as General comment #2)
2. Page 8,10,12,14-related to HDM calling out (same as General comment #4)

3. Page 4 - in section 1.2, put the "Curb Return Grading" as separate item.
4. Page 5 – in section 2.1, rather than using "E/W", spell out as "East-West"
5. Page 8
   a. Spell out NEPA and CEQA
   b. Also, mention that you guys also considered ADA as Design Criteria. Don’t forget to spell out and mention in detail what it is about.
6. Page 11 – Spell out ITE
7. Page 16 – rather than "As you can see...", use "As it is clear from above mentioned figures..."
8. Page 17 – Figure 7 has different font size compared to other figures. Please fix.
9. Page 18
   a. 1st sentence – change "level of service" to "LOS" since with change c, the LOS will be explained.
   b. 2nd sentence – rather than "...does not need additional lanes.", use "...does not need further design modification".
   c. should mention briefly about different level of LOS. So insert the following at the beginning of the paragraph.

   "Level of service (LOS) represents a qualitative ranking of the traffic operational conditions experienced by the users of a facility under specified roadway, traffic, and traffic control (if present) conditions. In addition, LOS is a qualitative indication of operating conditions as presented by various traffic parameters such as delay, speed, and volume to capacity ratio. Current practice designates six (6) levels of service ranging from A to F, with LOS A representing the best operating conditions and LOS F representing the worst."
   d. 3rd paragraph – change "level of service" into "LOS"
11. Page 23 – In figure 15, do you think it is better to kinda highlight "Pelican" pedestrian since you guys choose this alternative?
12. Page 25 – section 12.4 – which drawing? Please mention more specifically, i.e., the signal Design sheet #?