FINAL PROJECT

Due May 4, 2006

You are to develop a coordinated signal timing plan for the p.m. peak period of the signal system near UNR. You may form a team with another student to work on some of the tasks of the project. However, each student must submit his/her individual project report. A final presentation will be given by the groups. The network with existing traffic volume data, signal timing and geometric information has been coded in Synchro, and can be found from the WebCT site (The timing has already been optimized in Synchro, therefore, it is the best you can get with the current signal control). You should apply all the knowledge and skills learned from the class while developing an improved signal timing plan. At a minimum, you should complete the following tasks:

1. You should code the two signals on Virginia Street using the TTI-4-phase diamond phasing, i.e., the two signals will be controlled by a single NEMA controller and operate as a diamond interchange.

2. Examine the other signals on Center Street and Sierra Street for similarities to diamond interchanges, and propose a signal phasing and timing solution, so that the two signals on Center Street can be controlled by a single controller, and the two signals on Sierra Street can be controlled by a single controller. Therefore, the final solution is to have three signal controllers to control the six intersections in the network. You need to document the phasing, ring, and barrier structure for your proposed solutions.

3. Based on your proposed signal control, conduct optimization runs in Synchro and select the best timing plan from Synchro. Identify deficiencies, if any, for the timing solution from Synchro, and make necessary adjustments to improve the initial solution. While assessing the quality of timing solutions, you need to examine the time-space diagram, and how major traffic movements are progressed. For example, during the p.m. peak hour, what are the major traffic movements that should be progressed, and how your timing should be developed to achieve the best progression
for the major movements? One example is the southbound traffic on Virginia Street that goes to the eastbound on I-80. You need to conduct simulation runs and document the major performance measures (e.g., delay, speed, travel time) while comparing different timing solutions.

4. Summarize your signal timing solutions using figures or tables, including major signal timing parameters, such as cycle length, offsets, and splits.

5. Make any recommendations on potential modification of geometry and signal control to improve the system operations. For example, the southbound traffic on Virginia Street causes significant imbalanced usage of the lanes due to heavy left-turn traffic going to the east on I-80. Can you think of a solution to resolve such a problem? Demonstrate whether your solution would work.