

**CE 458/558 Public Transportation Systems  
Spring Quarter 2005**

**Assignment: Bus Facility Capacity**

This assignment is based on actual data developed for a proposed exclusive busway in the median of K Street in downtown Washington, DC. The busway will have one lane in each direction, no passing, and two on-line loading areas at each far-side stop. Because this is a median bus lane, right turns are not made from the bus lane by general traffic.

**Planning Method**

*1. Assuming that the critical stop's dwell time is 30 seconds, estimate the capacity of the busway (bus lane) using the TCQSM's planning method. Attach a copy of the appropriate graph from Appendix D of Part 4 showing your work, as part of your answer.*

**Operations Method**

As is typically the case with real-world data, not all of the data you might want may actually be available. WMATA ride checks indicate that the 17<sup>th</sup>/Connecticut stop has the highest passenger volume. The spreadsheet on the class web site provides a.m. and p.m. peak period dwell time observations for both the eastbound and westbound directions. For each bus arrival, the clock starts at 0 seconds. The spreadsheet columns provide the following times:

- **Doors Open:** Seconds after the bus comes to a halt when the door opens.
- **Main Flow Stops:** Seconds after the bus comes to a halt when all passengers waiting for the bus have boarded and all passengers on the bus who wanted to have disembarked. Stragglers are not included.
- **Doors Close:** Seconds after the bus comes to a halt when the doors have finished closing.
- **Bus Leaves:** Seconds after the bus comes to a halt when it starts to leave the stop.

Keep in mind that the TCQSM defines dwell time as the time required to serve passenger movements, plus a door opening and closing time. Bus drivers may keep the doors open while the traffic signal remains red; however, this shouldn't be counted as part of the dwell time.

*2. Based on the TCQSM definition of dwell time, describe a process for determining the average dwell time from the data collection sheets.*

*3. Following your process, determine the average dwell time and the coefficient of variation of dwell time at the 17<sup>th</sup>-Connecticut stop, by direction for both peak periods (four pairs of values), for existing conditions.*

The traffic signal cycle on K Street is 80 seconds and the amount of green time for K Street at 17<sup>th</sup>/Connecticut is 37 seconds.

*4. Which variables needed to calculate capacity haven't been provided? Provide suitable values for the missing variables and justify why you chose those values.*

*5. Calculate design and maximum capacity values for the busway based on the direction and peak period with the highest dwell time, using your work from Question 3.*