

CE 361
In-Class Design Problem #7:
Multilane Highway LOS

Name _____

A section of a multilane highway is to be reconstructed to improve the level of service. The section being considered is on a 5.25% upgrade that is $\frac{1}{2}$ mile long. The highway currently has 4-lanes (2 in each direction – all are 12-ft lanes) with a two-way left-turn lane in the middle and 6 foot shoulders on the right side. It is to be reconstructed into a 6-lane facility (3-lanes in each direction) undivided facility but, due to commercial development surrounding the highway, must remain in the current 72 foot right of way. There are currently 45 access points per mile and the free flow speed is determined to be 50mi/h. It is known that the road currently operates at capacity with 400 trucks/buses (no recreational vehicles) during the peak hour, a peak hour factor of 0.90 and all-commuter traffic.

The redesign is to reduce the number of access points per mile to 10 and to reduce the grade to 4.2% for $\frac{1}{2}$ mile. It is estimated that the new design will increase traffic by 15%.

1. Determine the lane width and shoulder width combination that will maximize capacity given that the 3 lanes (each direction) must fit within 36ft.
2. For the maximum-capacity lane/shoulder combination chosen above, determine the new design's level of service and density.