Homework #3 – Vertical Curve Design
CIVL 3161
Due Thursday, February 25, 2010

1. A 600-ft vertical curve connects a +4% grade to a -2% grade with the PVI at station 45 + 60.55. The PVI has elevation 348.64 ft. Calculate the location and elevation of the PVC, PVT, and the high point of the curve.

2. A sag vertical curve will connect two tangents, a -3% grade and a +5% grade, 800 ft apart. The ravine in which the sag curve will be situated needs to be built up. The elevation of the curve at its deepest point must be at elevation 168.00 feet or higher to clear a major pipe installation. If the PVC is at station 0 + 00 with an elevation of 176.20 feet, determine the location of the deepest point of the curve and the height of fill required above the culvert.

3. Problem 3.3 in Mannering text.

4. A particular crest vertical curve on SR 361 between Middletown and Shoridan has long been criticized as being unsafe. Its length is 400 ft. The prevailing speed on the crest vertical curve is 50 mph. In its present condition, its tangent grades are +2% and -3%. Does the CVC meet minimum SSD standards? Because of a grant from the Governor’s Highway Safety Initiative, it will be possible to enforce a speed limit of 45 mph on the curve. Will the vertical curve meet minimum SSD standards if speeds can be limited to 45 mph?

5. Problem 3.8 in Mannering text.