

WYOMING DEPARTMENT OF TRANSPORTATION
ROAD DESIGN MEMORANDUM #5
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Issued by: Project Development, WYDOT, Cheyenne

GENERAL TOPIC: DESIGN CRITERIA
SUBJECT: INTERCHANGES

General

Design all interchanges in accordance with the 2018 AASHTO Policy on Geometric Design of Highways and Streets (2018 AASHTO Green Book). To insure a consistent use of AASHTO'S wide range of acceptable design criteria, use these guidelines for lane widths, taper lengths, and superelevation in gore areas.

Ramp Widths

The widths given below assume that the minimum curve radius on the ramps is greater than 500 ft. Consider using the greater widths for ramps with relatively sharp curves, other alignment features, or both to provide vehicles with wider ramps on which to maneuver.

- **Use when:** All of the interchange ramps have a 20-year projected ADT \leq 400 and the crossroad is not a state highway.
 - Left shoulder width = 4 ft
 - Traveled way width = 12 ft
 - Right shoulder width = 4 ft
 - Total top width = 20 ft
- **Use when:** One or all of the interchange ramps have a 20-year projected ADT $>$ 400, or if the crossroad is a state highway.
 - Left shoulder = 4 ft
 - Traveled way width = 12 ft
 - Right shoulder = 8 ft
 - Total top width = 24 ft

Acceleration and Deceleration Lanes

- **Lane and Shoulder Widths:**
 - Traveled way width = 12 ft
 - Shoulder width = 4 ft (for ramp ADT \leq 400)
 - Shoulder width = 8 ft (for ramp ADT $>$ 400)

Note: The outside shoulder width used on the ramp, 4 ft or 8 ft, should be carried through the entire length of the acceleration/deceleration lane including the tapers.

- **Length:** Design acceleration and deceleration lane lengths in accordance with values given in Table 10-4, Minimum Acceleration Lane Lengths for Entrance Terminals with Flat Grades of Less Than 3 Percent, and Table 10-6, Minimum Deceleration Lane Lengths for Exit Terminals with Flat Grades of Less Than 3 Percent, of the 2018 Green Book, adjusted for grade using the factors in Table 10-5, Speed Change Lane Adjustment Factors as a Function of Grade.

The speed – distance curves given in Figure 3-16, Speed-Distance Curves for Acceleration of a Typical Heavy Truck of 140 lb/hp [85 kg/kW] on Upgrades and Downgrades, of the 2018 AASHTO Green Book for a heavy truck of 140 lb/hp are not representative of the trucks currently using Wyoming's interstate highways. Under normal circumstances, do not base the length of entrance ramps on the acceleration characteristics of a heavy truck.

- **Superelevation and Gore Area:** The speed at which vehicles enter/exit the mainline is determined by the radius of the entrance/exit curve and the superelevation that is provided in the gore area. The entrance/exit design speed determines the acceleration/ deceleration length that must be provided on the mainline and is often the controlling factor in the design of the entire ramp. From a construction standpoint, it is easiest to use a superelevation rate of 1.56 percent to 2.0 percent in the gore area to match the mainline cross slope. An arbitrary reduction of super rate to match mainline cross slope will significantly lengthen acceleration and deceleration lanes and violate driver expectancy. When the required ramp super rate is greater than the mainline cross slope, ensure the maximum algebraic difference is in accordance with Table 9-18, Maximum Algebraic Difference in Cross Slope at Turning Roadway Terminals, of the 2018 AASHTO Green Book.
- **Acceleration and Deceleration Lane Type:** When practicable the preferred option is to use a tapered design for exit ramps and a parallel design for entrance ramps. It is acceptable to deviate from using the preferred option when special conditions and engineering judgment deem necessary.

- **Parallel Lane Taper:** When practical, use a 600-foot taper length to end a parallel acceleration lane, rather than the 300-foot taper length recommended in the 2018 Green Book.

Other Design Considerations

- Designers have a normal tendency to focus on providing adequate acceleration/ deceleration lengths appropriate for the design speed of the first curve on the ramp. However, adequate acceleration/ deceleration distances should be provided at all critical locations on interchange ramps, i.e., at all horizontal/vertical curves along the entire length of the ramp.
- When practical, design interchanges to minimize the number of tower lights. A single tower light will illuminate both the entrance/exit ramps of the interchange if the entrance gore area is located directly opposite from the exit gore area.