

Widening - Where ramps have curve radii of 90 m or less with a central angle greater than 60 degrees the lane furthest to the right of the ramp, shall be widened in accordance with Table 500.03 in order to accommodate large truck wheel paths. More than one lane may be widened if warranted by truck and bus usage.

<i>Table 500.03</i> Ramp Widening For Trucks		
<i>Ramp Radius</i> (m)	<i>Widening</i> (m)	<i>Lane Width</i> (m)
<40	2.0	5.6
40 - 44	1.6	5.2
45 - 54	1.3	4.9
55 - 64	0.9	4.5
65 - 74	0.6	4.2
75 - 90	0.3	3.9
>90	0	3.6

For ramps having curve radii of 90 m or less with a central angle greater than 60 degrees.

Normally, loop ramps are one lane unless capacity warrants additional lanes. Consideration should be given to providing a directional ramp when loop volumes exceed 1500 vehicles per hour. If multiple lanes are provided, normally only the right lane needs to be widened.

Loop Ramps - Radii for loop ramps should normally range from 45 m to 60 m. Increasing the radii beyond 60 m is typically not cost effective as the slight increase in design speed is usually outweighed by the increased right of way requirements and the increased travel distance. For roadway design speeds greater than 80 kph the loop design speed should not be less than 40 kph (45 m radius). Extremely tight curves (less than 35 m radii) should be avoided because they lead to increased off-tracking and increase the potential for vehicles to enter the curve with excessive speed. See Table 200.05 for further guidelines on radius versus design speed.

Research indicates that trucks often enter loops with excessive speed, either due to inadequate deceleration on exit ramps or due to driver efforts to maintain speed on entrance ramps to

facilitate acceleration and merging. Where the loop ramp has a small radius on a steep descent (over 6%), it is important to develop the standard 2/3 full superelevation rate by the beginning of the curve. On loop entrance ramps this can often be facilitated by beginning the ramp with a short tangent (20 m to 30 m) that diverges from the cross street at an angle of 4 to 9 degrees. Longer tangents are desirable.

Distance Between Successive On-Ramps - The minimum distance between two successive freeway on-ramps should be the distance needed to provide the standard on-ramp acceleration taper shown on Figure 500.13. This distance should be about 300 m. If the upstream ramp adds an auxiliary lane, the downstream ramp should merge with the auxiliary lane. The distance between on-ramp noses will then be controlled by interchange geometry.

Distance Between Successive Exits - The minimum distance between successive exit ramps for guide signing should be 300 m on the freeway and 180 m on collector-distributor roads.

508 ENTRANCE/ EXIT RAMP DESIGN STANDARDS

General - The ramp entrance/exit is that ramp portion adjacent to the through travelled way, including speed-change lanes, tapers, and islands. All freeway entrances and exits shall connect to the right of through traffic. The following paragraphs discuss various design elements of ramp entrances/exits.

Entrance/Exit Sight Distance - Decision sight distance is desirable along the freeway prior to an exit nose and the entire exit terminal should be visible.

When an exit must be located where visibility is limited by physical restrictions which cannot be corrected by cut widening or object removal, an auxiliary lane in advance of the exit should be provided. The minimum length of auxiliary lane shall be 300 m desirable, 180 m minimum.