Two-Lane Entrance Ramps - A standard two lane entrance ramp is illustrated in Figure 500.14. This design may be utilized in situations where the estimated design year volume exceeds 1500 equivalent passenger cars per hour. Figure 500.14 includes a minimum 300 m auxiliary lane parallel to the freeway, which is only used where adequate design year capacity exists on the through facility. If capacity is inadequate, consideration should be given to extending the auxiliary lane to the next interchange or adding additional freeway through lanes. For most urban situations, it is recommended that multiple ramp lanes taper to a single lane prior to the 2-meter separation point (where merging is considered to begin).

Entrance/Exit Locations - Freeway entrances and exits should be located on tangent sections wherever possible. This provides maximum sight distance and optimum traffic operation.

Where it is necessary to locate entrances/exits on a curve, the ramp entrances and exit tapers should also be curved. The exit taper radius should approximate the freeway edge of travelled way in order to develop the standard degree of divergence (Figure 500.16).

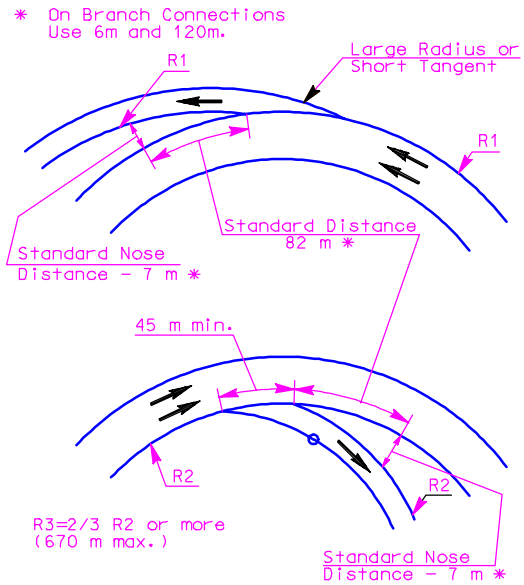

Figure 500.16
Curved Entrance/Exit Locations
From Caltrans, 1995, Highway Design Manual

On curved entrance ramps the distance from the inlet nose (4.25 m point) to the end of the acceleration lane taper should equal the sum of the distances shown on Figure 500.13 The 50:1 taper may be curved to fit the conditions, and the 1000 m radius curve may be adjusted.

Entrance/ Exit Grades - Grades for freeway entrances and exits are controlled primarily by sight distance requirements. Ramp profile grades should not exceed 6%.

Exit Profiles - Vertical curves located just beyond the exit nose should be designed with a minimum 80 kph stopping sight distance. Beyond this point, progressively lower design speeds may be used to accommodate loop ramps and other geometric features.

Entrance Profiles - Entrance profiles should approximately parallel the freeway profile for at least 30 m prior to the inlet nose to provide intervisibility in merging situations. The vertical curve at the inlet nose should be consistent with approach alignment standards.

Where large-truck volumes exceed 20 vehicles per hour on ascending entrance ramps with sustained upgrades exceeding 2%, a minimum 450 m long auxiliary lane should be provided to insure satisfactory separating conditions.

Exit Ramp Transitions - Exit ramps in urban areas may require additional lanes at the cross road intersection to provide storage and increase capacity.

If the length of a single lane ramp exceeds 300 m, an additional lane should be provided on the ramp to permit passing maneuvers.

508.01 RAMP TERMINAL DESIGN

The ramp terminal is defined as the area where the ramp meets the cross road.

Terminals - Ramp terminals should be treated as at-grade intersections. The terminal design shall be per Part 2, Section 400, At-Grade Intersections, based on near-minimum turning conditions.

Terminal Grades - Ascending off-ramps should join the cross roads on a reasonably flat grade to expedite truck starts from a stopped condition. Ramp terminals should connect where the grade