203 HORIZONTAL ALIGNMENT

203.01 GENERAL

Horizontal alignment consists of a series of circular curves and tangent sections. The horizontal alignment should provide safe continuous uniform operation for substantial roadway lengths. The major factors influencing horizontal alignment design are safety, profile, type of facility, design speed, cost, geotechnical constraints, topography, aesthetics, and functionality. All of these factors must be balanced to produce the safest, most economical alignment, which is in harmony with the natural contour of the land, and at the same time adequate for the design classification of the roadway.

In design, safety is always a major factor. The horizontal alignment shall provide at least the minimum stopping sight distance for the chosen design speed at all points along the roadway. The following standards apply to horizontal curvature on both 2-lane and multilane roadways except as noted.

203.02 STANDARDS FOR HORIZONTAL CURVATURE

Minimum Curvature - Table 200.05 gives the minimum curve radius based on design speed.

Table 200.05
Standards For Curve Radius

Roadway Classification	*Minimum Curve Radius (m)*
RURAL	
Freeway	2000
Expressway	2000
Collector	600
Local Access	100
URBAN	
Freeway	600
Expressway	600
Arterial (Main Rd)	600
Frontage Road	600
Sector Road	100
LOOP RAMPS	45

This table assumes unlimited sight distance. Minimum radius should also be checked against Figure 200.03. Every effort should be made to exceed the minimum.

If a glare screen or median barrier is used, adjustments may be necessary to maintain the required sight distance on divided roadway curves.

Alignment Consistency - Sudden reductions in alignment standards shall be avoided. Introduction of curves with lower design speeds shall be avoided at the end of long tangents, steep downgrades, or at other locations where high approach speeds may be anticipated. In no case shall the design speed between successive curves change more than 15 kph.

On roadways in mountainous or rolling terrain where horizontal and vertical curves are superimposed at grade summit or sag, the design speed of the horizontal curve should be at least equal to that of the crest or sag, and not more than 15 kph less than the measured or estimated running (85th percentile) speed of vehicles on the approach roadway.

Curve Length and Central Angle - For central angles less than 10 degrees, the minimum curve length should be 240 m to avoid a kinked appearance. For central angles smaller than 30 minutes, no curve is required. Above a 6000 m radius, parabolic curves may be used. In no case shall sight distance or other safety considerations be sacrificed to meet the above requirements.

Lane curve lengths in excess of 800m on 2-lane roadways should be avoided in consideration of the safety aspects associated with driver attentiveness and oncoming headlight glare.

On 2-lane roads a curve should not exceed a length of 800 m.

Compound Curves - Compound curves shall be avoided, except where use of a simple curve results in excessive cost.

If compound curves are used, the shorter radius should be at least two-thirds the longer radius when the shorter radius is 300 m or less. The total arc length of a compound curve should not be less than 150 m.