

Design Element			Manual Section	2 Lanes				
Design Controls	Design-Year Traffic (AADT)		40-2.01	< 400	400 ≤ AADT < 1500	1500 ≤ AADT < 2000	≥ 2000	
	Design Forecast Period		40-2.02	20 Years (2)				
	*Design Speed (mph) (3)	Level	40-3.0	35 – 55	50 - 55	50 - 55	60	
		Rolling		30 - 55	35 - 55	35 - 55	50 - 55	
	Access Control		40-5.0	None				
Level of Service		40-2.0	Desirable: B; Minimum: C					
Cross Section Elements**	Travel Lane	*Width (4)	45-1.01	10 ft (4a)	11 ft	11 ft (4b)	12 ft	
		Typical Surface Type		Chp. 52	Asphalt / Concrete			
	Shoulder	*Width Usable	45-1.02	Des: 4 ft Min: 2 ft (5)	Des: 6 ft Min: 4 ft	Des: 8 ft Min: 6 ft	Des: 10 ft Min: 8 ft	
		*Width Paved (optional)	45-1.02	2 ft	4 ft	6 ft	8 ft	
		Typical Surface Type		Chp. 52	Asphalt / Aggregate / Earth			
	Cross Slope	*Travel Lane (6)	45-1.01	2%				
		Shoulder (6A)		45-1.02	Paved Width ≤ 4 ft: 2%; Paved Width > 4 ft: 4% - 6% Asphalt; 6%-8% Aggregate; 8% Earth			
	Auxiliary Lane	Lane Width	45-1.03	10 ft		Desirable: 11 ft Minimum: 10 ft	Desirable: 12 ft Minimum: 10 ft	
		Shoulder Width		Desirable: Same as Next to Travel Lane; Minimum: 2 ft				
	Clear Zone		49-2.0	(7)				
	Side Slopes (8)	Cut	Foreslope	45-3.0	Des: 6:1; Max: 4:1 (9)			
			Ditch Width		4 ft (10)			
Backslope			4:1 for 20 ft; 3:1 Max. to Top (11)					
Fill		45-3.0	Des: 6:1 to Clear Zone; Max: 3:1 to Toe					
Bridges**	New or Reconstructed Bridge	*Structural Capacity	Chp. 60	HL-93 (11A)				
		*Clear-Roadway Width (12)	45-4.01	Travelway + 4 ft	Travelway + 6 ft	Travelway + 8 ft	Full Paved Approach Width	
	Existing Bridge to Remain in Place	*Structural Capacity	Chp. 72	HS-15				
		*Clear-Roadway Width (13)	45-4.01	22 ft	22 ft	24 ft	28 ft	
	*Vertical Clearance (Collector Under)	New or Replaced Overpassing Bridge (14)	44-4.0	14.5 ft				
		Existing Overpassing Bridge		14 ft				
Vertical Clearance (Collector Over Railroad) (15)		Chp. 69	23 ft					

Des: Desirable; Min: Minimum.

* Controlling design criterion.

** Selection of the cross section and bridge elements is based on the design-year traffic volume irrespective of the design speed.

**GEOMETRIC DESIGN CRITERIA FOR RURAL COLLECTOR, LOCAL-AGENCY ROUTE
(New Construction or Reconstruction)**

Figure 53-4

Design Element		Manual Section	2 Lanes						
Alignment Elements	Design Speed		30 mph	35 mph	45 mph	50 mph	55 mph	60 mph	
	*Stopping Sight Distance	42-1.0	200 ft	250 ft	360 ft	425 ft	495 ft	570 ft	
	Decision Sight Distance	Speed / path / direction change	42-2.0	450 ft	525 ft	675 ft	750 ft	865 ft	990 ft
		Stop Maneuver		220 ft	275 ft	395 ft	465 ft	535 ft	610 ft
	Passing Sight Distance	42-3.0	1090 ft	1280 ft	1625 ft	1835 ft	1985 ft	2135 ft	
	Intersection Sight Distance, -3% to +3% (19)	46-10.0	P: 330 ft SUT: 420 ft	P: 390 ft SUT: 490 ft	P: 500 ft SUT: 630 ft	P: 630 ft SUT: 780 ft	P: 730 ft SUT: 890 ft	P: 840 ft SUT: 1020 ft	
	*Minimum Radius (e=8%)	43-2.0	270 ft	410 ft	590 ft	750 ft	1000 ft	1290 ft	
	*Superelevation Rate	43-3.0	e _{max} = 8% (16)						
	*Horizontal Sight Distance	43-4.0	(17)						
	*Vertical Curvature (K-value)	Crest	44-3.0	19	29	61	84	114	151
		Sag		37	49	79	96	115	136
	*Maximum Grade (18)	Level	44-1.02	7%	7%	6%	6%	5.5%	5%
		Rolling		9%	8%	7%	7%	6.5%	6%
Minimum Grade	44-1.03	Desirable: 0.5%; Minimum: 0.0%							

* Controlling design criterion. A deviation from such is a design exception, and is subject to approval. See Section 40-8.0.

A deviation from a controlling design criterion should be addressed in an approved design exception.

These criteria apply only to a federal-aid project.

**GEOMETRIC DESIGN CRITERIA FOR RURAL COLLECTOR, LOCAL-AGENCY ROUTE
(New Construction or Reconstruction)**

Figure 53-4 (continued)

GEOMETRIC DESIGN CRITERIA FOR RURAL COLLECTOR, LOCAL-AGENCY ROUTE
(New Construction or Reconstruction)

Footnotes to Figure 53-4

- (1) (Blank.)
- (2) (Blank.)
- (3) Design Speed. The minimum design speed should equal the minimum value or the anticipated posted speed limit after construction, whichever is greater. The legal speed limit is 55 mph on a non-posted highway.
- (4) Travel-Lane Width. The following will apply.
 - a. Use an 11-ft width if the design speed is 55 mph.
 - b. Use a 12-ft width if the design speed is 55 mph.
- (5) Shoulder Width. The following will apply.
 - a. If guardrail is required, the minimum width is 4 ft.
 - b. Usable-shoulder width is defined as the distance from the edge of the travel lane to the shoulder break point.
 - c. If curbs are to be used, the criteria described in Figure 53-8 should be applied.
- (6) Cross Slope (Travel Lanes). Cross slopes of 1.5% are acceptable on an existing bridge to remain in place.
- (6A) Cross Slope (Shoulder). See Figure 45-1A(1) or Figure 45-1A(2) for more-specific information.
- (7) Clear Zone. The clear zone will vary according to design speed, traffic volume, side slopes, and horizontal curvature. See Section 49-2.0.
- (8) Side Slope. Value is for new construction. See Sections 45-3.0 and 45-8.0 for more information. For a reconstruction project, see Section 49-3.0.
- (9) Foreslope. See Sections 49-2.0 and 49-3.0 for the lateral extent of the foreslope in a ditch section.
- (10) Ditch Width. A V-ditch should be used in a rock cut. See Section 45-8.0
- (11) Backslope. The backslope for a rock cut will vary according to the height of the cut and the geotechnical requirements. See Section 45-8.0 for typical rock-cut sections.

**GEOMETRIC DESIGN CRITERIA FOR RURAL COLLECTOR, LOCAL-AGENCY ROUTE
(New Construction or Reconstruction)**

Footnotes to Figure 53-4 (continued)

- (11A) Structural Capacity (New or Reconstructed Bridge). HS-25 loading with Alternate Military Loading should be applied for each project with notice to proceed with design beginning September 1, 2004, through December 31, 2005.
- (12) Width (New or Reconstructed Bridge). The following will apply.
- a. Where the approach roadway width (travelway plus shoulders) is surfaced, the surfaced width will be carried across the structure.
 - b. Each bridge longer than 100 ft will be analyzed individually. At a minimum, the roadway width will be the width of travel lanes plus a 3-ft right shoulder and a 3-ft left shoulder for AADT > 400.
 - c. See Section 59-1.0 for more information on bridge widths.
- (13) Width (Existing Bridge to Remain in Place). Clear width will be at least equal to the approach traveled way width or the table value, whichever is greater. For a bridge longer than 100 ft, the value does not apply. The acceptability of such a bridge will be assessed individually.
- (14) Vertical Clearance (Collector Under). Value includes an additional 6-in. allowance for future pavement overlays. Vertical clearance applies from usable edge to usable edge of shoulders.
- (15) Vertical Clearance (Collector Over Railroad). See Chapter Sixty-nine for additional information on railroad clearance under a highway.
- (16) Superelevation Rate. See Section 43-3.0 for value of superelevation rate based on design speed and radius.
- (17) Horizontal Sight Distance. For a given design speed, the necessary middle ordinate will be determined by the radius and the sight distance which applies at the site. See Section 43-4.0.
- (18) Maximum Grade. For a grade along a longitudinal distance of less than 480 ft (PVT to PVC), a one-way downgrade, or a road with AADT < 400, the maximum grade may be up to 2% steeper than the table value.
- (19) Intersection Sight Distance. For a left turn onto a 2-lane roadway: P = Passenger car; SUT = single unit truck. See Figure 46-10G for value for a combination truck.