

Design Element			Manual Section	2 Lanes						
Design Controls	Design-Year Traffic (AADT)		40-2.01	< 50	50 ≤ AADT < 250	250 ≤ AADT < 400	400 ≤ AADT < 1500	1500 ≤ AADT < 2000	≥ 2000	
	Design Forecast Period		40-2.02	20 years						
	*Design Speed (mph) (3)	Level	40-3.0	30 – 55	30 – 55	35 – 55	50 – 55	50 – 55	50 – 55	
		Rolling		30 – 55	30 – 55	30 – 55	35 – 55	35 – 55	35 – 55	
	Access Control		40-5.0	None						
Level of Service		40-2.0	Desirable: B; Minimum: D							
Cross Section Elements**	Travel Lane	*Width	45-1.01	10 ft	10 ft	10 ft (4a)	11 ft	11 ft (4b)	12 ft	
		Typical Surface Type	Chp. 52	Asphalt / Concrete / Aggregate						
	Shoulder	*Width Usable	45-1.02	2 ft	2 ft	2 ft	6 ft (5)	6 ft	8 ft	
		Typical Surface Type	Chp. 52	Asphalt / Aggregate / Earth						
	Cross Slope	*Travel Lane (6)	45-1.01	2%-3% Asphalt / Concrete; 6% Aggregate						
		Shoulder (6A)	45-1.02	Paved Width ≤ 4 ft: 2% - 3%; Paved Width > 4 ft: 4% - 6% Asphalt/Concrete; 6%-8% Aggregate; 8% Earth						
	Auxiliary Lane	Lane Width	45-1.03	Same as Travel Lane			Des: Same as Travel Lane; Min: 10 ft			
		Shoulder Width		Desirable: 4 ft; Minimum: 2 ft						
	Clear Zone		49-2.0	(7)						
	Side Slopes	Cut	Foreslope	45-3.0	4:1 (V ≥ 60) (8); 3:1 (V ≤ 50) (8)					
			Ditch Width		Des: 4 ft; Min: 0.0 ft					
Backslope			4:1 (V ≥ 60); 3:1 (V ≤ 50) (9)							
Fill		0-30 ft Height	45-3.0	Desirable: 4:1; Maximum: 3:1						
	>30 ft Height	3:1								
Bridges**	New or Reconstructed Bridge	*Structural Capacity	Chp. 60	HL-93 (9A)						
		*Clear-Roadway Width (10)	45-4.01	Travelway + 4 ft			Travelway + 6 ft		Full Paved Approach Width	
	Existing Bridge to Remain in Place	*Structural Capacity	Chp. 72	HS-10	HS-15					
		*Clear-Roadway Width (11)	45-4.01	20 ft	22 ft	24 ft	28 ft			
	*Vertical Clearance (Local Road Under)	New or Replaced Overpassing Bridge (12)	44-4.0	14.5 ft						
		Existing Overpassing Bridge		14 ft						
Vertical Clearance (Local Road Over Railroad) (13)		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 LOCAL ROAD  
(New Construction or Reconstruction)**

**Figure 53-5**

Design Element		Manual Section	2 Lanes							
Alignment Elements	Design Speed	----	20 mph	25 mph	30 mph	35 mph	45 mph	50 mph	55 mph	
	*Stopping Sight Distance		42-1.0	115 ft	155 ft	200 ft	250 ft	360 ft	425 ft	495 ft
	Decision Sight Distance	Speed / Path / Direction Chg.	42-2.0	300 ft	375 ft	450 ft	525 ft	675 ft	750 ft	865 ft
		Stop Maneuver		130 ft	170 ft	220 ft	275 ft	395 ft	465 ft	535 ft
	Passing Sight Distance		42-3.0	710 ft	900 ft	1090 ft	1280 ft	1625 ft	1835 ft	1985 ft
	Intersection Sight Distance		46-10.0	220 ft	280 ft	330 ft	390 ft	500 ft	550 ft	610 ft
	*Minimum Radius (e=8%)		43-2.0	90 ft	180 ft	270 ft	590 ft	590 ft	750 ft	1000 ft
	*Superelevation Rate		43-3.0	e <sub>max</sub> =8% (14)						
	*Horizontal Sight Distance		43-4.0	(15)						
	*Vertical Curvature (K-value)	Crest	44-3.0	7	12	19	29	61	84	114
		Sag		17	26	37	49	79	96	115
	*Maximum Grade	Level	44-1.02	8%	7%	7%	7%	7%	6%	5.5%
		Rolling		11%	11%	10%	9%	9%	8%	7%
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 LOCAL ROAD  
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**Figure 53-5 (continued)**

**GEOMETRIC DESIGN CRITERIA FOR RURAL LOCAL ROAD**  
**(New Construction or Reconstruction)**

**Footnotes to Figure 53-5**

- (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 11-ft lanes where  $V \leq 50$  mph.
  - b. Use 12-ft lanes where  $V \geq 55$  mph.
- (5) Shoulder Width. The following will apply.
  - a. For  $400 \leq \text{AADT} < 1500$ , the shoulder width may be 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 53-9 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. For a design speed of lower than 50 mph, a 10-ft clear zone may be used.
- (8) Foreslope. See Sections 49-2.0 and 49-3.0 for the lateral extent of the foreslope in a ditch section.
- (9) Backslope. The backslopes for a rock cut will vary according to the height of the cut and the geotechnical requirements.
- (9A) 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.

**GEOMETRIC DESIGN CRITERIA FOR RURAL LOCAL ROAD**  
**(New Construction or Reconstruction)**

**Footnotes to Figure 53-5 (continued)**

- (10) Width (New or Reconstructed Bridge). A 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 > 2000. Where shoulders are paved, it is desirable to provide the full approach-roadway width. See Section 59-1.0 for more information on bridge width.
- (11) Width (Existing Bridge to Remain in Place). Minimum roadway width of 2 ft narrower than the value may be used on a road with few trucks. The clear-roadway width should be at least the same width as the approach travelway. For a one-lane bridge, the width may be 18 ft. For a bridge longer than 100 ft, the value does not apply. The acceptability of each such bridge will be assessed individually.
- (12) Vertical Clearance (Local Road Under). Value includes an additional 6-in. allowance for future pavement overlays. Vertical clearance applies from usable edge to usable edge of shoulders.
- (13) Vertical Clearance (Local Road Over Railroad). See Chapter Sixty-nine for additional information on railroad clearance under highway.
- (14) Superelevation Rate. See Section 43-3.0 for value of superelevation rate based on design speed and radius.
- (15) 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.