4. Rural Tables. The rural tables do not provide design criteria for sub-categories. However, there are many "rural" facilities in Indiana which pass through relatively built-up, but unincorporated, areas. In these cases, it may be inappropriate to use the criteria for rural roads and highways. The designer may, as an option, use the "suburban" criteria for that functional classification (e.g., arterials) in relatively built-up rural areas. Therefore, if the area is "urban" in character (e.g., a densely populated area with a grid-like street system), it may be appropriate to use the urban design criteria even though the facility is rural. This decision will be documented in the Preliminary Engineering Report (see Chapter Seven).

5. Cross Section Elements. The designer should realize that some of the cross section elements included in a table (e.g., sidewalk width) are not automatically warranted in the project design. The values in the tables will only apply after the decision has been made to include the element in the highway cross section.

   General Department policy is that a 3R project will not be designed with a narrower roadway width than the existing facility. See Section 55-4.05.

6. Manual Section References. These tables are intended to provide a concise listing of design values for easy use. However, the designer should review the *Manual* section references for greater insight into the design elements.

7. Footnotes. The tables include many footnotes, which are identified by a number in parentheses, e.g., (6). The information in the footnotes is critical to the proper use of the design tables.

8. Controlling Design Criteria. The 3R tables of geometric design criteria provide an asterisk to indicate controlling design criteria which, if not met, require a Level One design exception. The discussion in Section 40-8.0 on design exceptions applies equally to the geometric design of 3R projects. However, the designer will evaluate the proposed design against the criteria presented in this Chapter.

Design Element				Manual Section	2-Lane				Multi-Lane	
Design Controls	Design Year Traffic (AADT)			40-2.01	< 400	400 ≤ AADT < 3000	3000 ≤ AADT < 5000	≥ 5000	Undivided	Divided
	Design Forecast Year			55-4.01	20 Years (1)				20 Years (1)	
	*Design Speed (km/h) (2)			55-4.01	Posted Speed Limit				Posted Speed Limit	
	Access Control			40-5.0	Partial Control / None				Partial Control / None	
	Level of Service			40-2.0	Desirable: B; Minimum: D				Desirable: B; Minimum: D	
Cross Section Elements	Travel Lane	*Width		55-4.05	3.6 m	3.6 m	3.6 m	3.6 m	3.6 m	
		Typical Surface Type (3)		Ch. 52	Asphalt / Concrete				Asphalt / Concrete	
	Shoulder (4)	*Width Usable		55-4.05	D: 1.8 m M: 0.6 m	D: 2.4 m M: 0.9 m	D: 2.4 m M: 1.8 m	D: 3.3 m M: 2.4 m	Desirable: 3.3 m Minimum: 2.4 m	Rt: D: 3.3 m; M: 2.7 m Lt: D: 1.2 m; M: 1.2 m
		*Width Paved		55-4.05	D: 1.2 m M: 0.0 m	D: 1.8 m M: 0.6 m	D: 1.8 m M: 0.6 m	D: 3.0 m M: 0.6 m	Desirable: 3.0 m Minimum: 2.4 m	Rt: D: 3.0 m; M: 2.4 m Lt: D: 1.2 m; M: 0.9 m
		Typical Surface Type (3)		Ch. 52	Asphalt / Concrete / Sealed Aggregate				Asphalt / Concrete / Sealed Aggregate	
	Cross Slopes	*Travel Lane (5)		55-4.05	2%				2%	
		Shoulder (6)		55-4.05	Paved Width ≤ 1.2 m: 2%; Paved Width > 1.2 m: 4% Asphalt / Concrete; 6% Sealed Aggregate				Paved Width ≤ 1.2 m: 2%; Paved Width > 1.2 m: 4% Asphalt / Concrete; 6% Sealed Aggregate	
	Auxillary Lanes	Lane Width		55-4.05	Desirable: 3.6 m; Minimum: 3.3 m				Desirable: 3.6 m; Minimum: 3.3 m	
		Shoulder Width			Des: Same as Next to Travel Lane; Min: 0.6 m				Des: Same as Next to Travel Lane; Min: 0.6 m	
	Median Width			55-4.05	N/A				0.0 m	Existing
	Obstruction Free Zone			55-5.02	See Section 55-5.02				See Section 55-5.02	
	Side Slopes	Cut	Foreslope	55-4.05	2:1 or Flatter (7)				2:1 or Flatter (7)	
			Ditch Width		(7)				(7)	
			Backslope		2:1 or Flatter (7)				2:1 or Flatter (7)	
		Fill			2:1 or Flatter (7)				2:1 or Flatter (7)	
	Median Slopes			55-4.05	N/A				Desirable: 8:1; Maximum: 4:1	
Bridges**	New or Reconstructed Bridge	*Structural Capacity		Ch. 60	HS-25 (8)					
		*Clear Roadway Width (9)		55-6.03	Full Paved Approach Width					
	Existing Bridge to Remain in Place	*Structural Capacity		Ch. 72	HS-20					
		*Clear Roadway Width		55-6.02	Travelway Plus 0.6 m on Each Side					
	*Vertical Clearance (Arterial Under) (10)	New or Replaced Overpassing Bridge		55-6.0	5.05 m					
		Existing Overpassing Bridge (11)			4.30 m					
		Sign Truss / Pedestrian Bridge			New: 5.35 m; Existing: 5.20 m					
	Vertical Clearance (Arterial Over Railroad) (12)			Ch. 69	7.00 m					

D or Des: Desirable; M or Min: Minimum.

* Controlling design criteria (see Section 40-8.0). ** Selection of the cross section and bridge elements is based on the design year traffic volumes irrespective of the design speed.

GEOMETRIC DESIGN CRITERIA FOR RURAL ARTERIAL (3R Project)

Table 55-3A

Design Element			Manual Section			
Alignment Elements	Design Speed		---	80 km/h	90 km/h	100 km/h
	*Stopping Sight Distance		55-4.02	130 m	160 m	185 m
	DecisionSight Distance	Speed / Path / Direction Change	42-2.0	230 m	270 m	315 m
		Stop Maneuver		140 m	170 m	200 m
	Passing Sight Distance		42-3.0	Existing	Existing	Existing
	Intersection Sight Distance, -3% to +3% (14)		55-4.06	P: 190 m; SU: 235 m	P: 230 m; SU: 280 m	P: 265 m; SU: 320 m
	*Minimum Radii		55-4.03	See Section 55-4.03		
	*Superelevation Rate		55-4.03	See Section 55-4.03		
	*Horizontal Sight Distance		55-4.03	See Section 55-4.03		
	*Vertical Curvature (K-values)	Crest	55-4.04	See Section 55-4.04		
		Sag		See Section 55-4.04		
	*Maximum Grade (13)	Level	55-4.04	5%	4.5%	4%
		Rolling		6%	5.5%	5%
	Minimum Grade		44-1.03	Desirable: 0.5%; Minimum 0.0%		

* Controlling design criteria (see Section 40-8.0)

Deviations from controlling design criteria should be addressed in an approved design exception. Also, any operational or maintenance changes, permanent or temporary, exclusive of work-zone traffic control that in fact create substandard conditions such as by re-striping to obtain added lane(s) by reducing existing land widths or shoulders, must be addressed in design exceptions whether or not actual construction or reconstruction is involved.

Design exception requests are required for Level One design criteria for each project type as follows:

a) Non-exempt federally-funded project on the Interstate system requires FHWA approval.
b) Exempt federally-funded project on the Interstate system requires Chief, Design Division approval.
c) Non-federally-funded project on the Interstate system requires Chief, Design Division approval with an information copy sent to FHWA.
d. Project not on the Interstate system requires Chief, Design Division approval.

GEOMETRIC DESIGN CRITERIA FOR RURAL ARTERIAL (3R Project)

Table 55-3A (Continued)

GEOMETRIC DESIGN CRITERIA FOR RURAL ARTERIAL
(3R Project)

Footnotes to Table 55-3A

(1) Design Forecast Year. For a partial 3R project, the pavement should be designed for at least a 10-year design life.

(2) Design Speed. The minimum design speed should equal a) the anticipated posted speed limit after construction or b) the state legal limit of 60 mph on a non-posted multilane divided highway or 55mph on a non-posted two-lane highway.

(3) Surface Type. The pavement type selection will be determined by the Materials and Tests Division's pavement design engineer or by the local jurisdiction.

(4) Shoulder. The following will apply:

a. On an INDOT facility, the shoulder should be paved to the front face of guardrail. The desirable guardrail offset is 0.6 m from the effective usable shoulder width. In a restrictive situation, the guardrail offset may be 0.3 m from the effective usable shoulder width. See Section 49-5.0 for more information.

b. If guardrail is present, the minimum offset from E.T.L. to the front face of guardrail should desirably be equal to the shy line distance, but should not be less than 1.2 m. See Section 49-5.0 for shy line offsets.

c. Usable shoulder width is defined as the distance from the edge of the travel lane to the shoulder break point.

(5) Cross Slope (Travel Lane). Cross slopes of 1.5% are acceptable on an existing bridge to remain in place.

(6) Cross Slopes (Shoulder). Table values are for tangent sections. See Figure 45-1A(1) or Figure 45-1A(2) for more-specific information. See Figure 43-3M or Figure 43-3N for shoulder cross slope on a horizontal curve.

(7) Side Slopes. Section 55-4.05 provides additional information for side slope criteria.

(8) Structural Capacity (New or Reconstructed Bridge). The following will apply:

a. Each bridge on a facility with greater than 600 trucks per day should be checked using the Alternate Military loading.
b. Each State highway bridge within 25 km of a Toll Road gate must be designed for Toll Road Loading.
c. Each bridge on an Extra Heavy Duty Highway must be designed for the Michigan Train truck loading configuration.
d. See Chapter Sixty for additional information on the loading configurations.

(9) Width (New or Reconstructed Bridge). Width is the minimum for a 3R project. See Section 59-1.0 for additional information on bridge width. On a State highway, the minimum clear roadway width should be 9.4 m.

(10) Vertical Clearance (Arterial Under). Table values include an additional 150 mm allowance for a future pavement overlay. Vertical clearances apply from usable edge to usable edge of shoulders.

(11) Vertical Clearance (Existing Bridge). See Section 55-6.02 for additional information on minimum allowable vertical clearance.

(12) Vertical Clearance (Arterial Over Railroad). See Chapter Sixty-nine for additional information on railroad clearance under a highway.

(13) Maximum Grade. A grade that is 1% steeper may be used for a one-way downgrade.

(14) Intersection Sight Distance. For left turn onto a 2-lane road. P = Passenger car; SU = single unit truck. See Figure 46-10G for values for combination trucks.

Design Element				Manual Section	2-Lane				
Design Controls	Design Year Traffic (AADT)			40-2.01	< 400	400 ≤ AADT < 1000	1000 ≤ AADT < 3000	3000 ≤ AADT < 5000	≥ 5000
	Design Forecast Year			55-4.01	20 Years (1)				
	*Design Speed (km/h) (2)			55-4.01	Posted Speed Limit				
	Access Control			40-5.0	None				
	Level of Service			40-2.0	Desirable: B; Minimum: D				
Cross Section Elemnts	Travel Lane	*Width		55-4.05	Des: 3.6 m Min: 3.0 m	Des: 3.6 m Min: 3.3 m	Des: 3.6 m Min: 3.3 m	3.6 m (3)	3.6 m (3)
		Typical Surface Type (4)		Ch. 52	Asphalt / Concrete				
	Shoulder (5)	*Width Usable		55-4.05	Des: 1.2 m Min: 0.6 m	Des: 1.8 m Min: 0.6 m	Des: 2.4 m Min: 0.9 m	Des: 2.4 m Min: 1.8 m	Des: 3.0 m Min: 1.8 m
		*Width Paved		55-4.05	Des: 0.6 m Min: 0.0 m	Des: 1.2 m Min: 0.0 m	Des: 1.2 m Min: 0.6 m	Des: 1.8 m Min: 0.6 m	Des: 2.4 m Min: 0.6 m
		Typical Surface Type (4)		Ch. 52	Asphalt / Concrete / Sealed Aggregate				
	Cross Slope	*Travel Lane (6)		55-4.05	2% Typical; 3% Maximum				
		Shoulder (7)		55-4.05	Paved Width ≤ 1.2 m: 2%-3%; Paved Width > 1.2 m: 4%-6% Asphalt / Concrete; 6% Sealed Aggregate				
	Auxiliary Lanes	Lane Width		55-4.05	Des: Same as Travel Lane Min: 3.0 m		Des: Same as Travel Lane Min: 3.3 m		
		Shoulder Width			Des: Same as Next to Travel Lane; Min: 0.6 m				
	Obstruction Free Zone			55-5.02	See Section 55-5.02				
	Side Slopes	Cut	Foreslope	55-4.05	2:1 or Flatter (8)				
			Ditch Width		(8)				
			Backslope		2:1 or Flatter (8)				
		Fill		55-4.05	2:1 or Flatter (8)				
Bridges**	New or Reconstructed Bridge	*Structural Capacity		Ch. 60	HS-25 (9)				
		*Clear Roadway Width (10)		55-6.03	Full Paved Approach Width				
	Existing Bridge to Remain in Place	*Structural Capacity		Ch. 72	HS-15				
		*Clear Roadway Width (11)		55-6.02	6.6 m	6.6 m	7.2 m	8.4 m	8.4 m
	*Vertical Clearance (Collector Under)	New or Replaced Overpassing Bridge (12)		55-6.0	4.45 m				
		Existing Overpassing Bridge (13)			4.30 m				
	Vertical Clearance (Collector Over Railroad) (14)			Ch. 69	7.00 m				

Des: Desirable; Min: Minimum.

* Controlling design criteria (see Section 40-8.0). ** Selection of the cross section and bridge elements is based on the design year traffic volumes irrespective of the design speed.

GEOMETRIC DESIGN CRITERIA FOR STATE RURAL COLLECTOR ROAD (3R Project)
Table 55-3B

Design Element			Manual Section	2-Lane				
Alignment Elements	Design Speed		---	60 km/h	70 km/h	80 km/h	90 km/h	100 km/h
	*Stopping Sight Distance	Desirable	55-4.02	85 m	105 m	130 m	160 m	185 m
	Decision Sight Distance	Speed / Path / Direction Change	42-2.0	170 m	200 m	230 m	270 m	315 m
		Stop Maneuver		95 m	115 m	140 m	170 m	200 m
	Passing Sight Distance		42-3.0	Existing	Existing	Existing	Existing	Existing
	Intersection Sight Distance, -3% to +3% (16)		55-4.06	P: 125 m SU: 160 m	P: 150 m SU: 185 m	P: 190 m SU: 235 m	P: 230 m SU: 280 m	P: 265 m SU: 320 m
	*Minimum Radii		55-4.03	See Section 55-4.03				
	*Superelevation Rate		55-4.03	See Section 55-4.03				
	*Horizontal Sight Distance		55-4.03	See Section 55-4.03				
	*Vertical Curvature (K-values)	Crest	55-4.04	See Section 55-4.04				
		Sag		See Section 55-4.04				
	*Maximum Grade (15)	Level	55-4.04	9%	8%	8%	7.5%	7%
		Rolling		10%	9%	9%	8.5%	8%
	Minimum Grade		44-1.03	Desirable: 0.5%; Minimum: 0.0%				

* Controlling design criteria (see Section 40-8.0).

Deviations from controlling design criteria should be addressed in an approved design exception. Also, any operational or maintenance changes, permanent or temporary, exclusive of work-zone traffic control that in fact create substandard conditions such as by re-striping to obtain added lane(s) by reducing existing lane widths or shoulders, must be addressed in design exceptions whether or not actual construction or reconstruction involved.

Design exception requests for Level One design criteria require Chief, Design Division approval.

GEOMETRIC DESIGN CRITERIA FOR STATE RURAL COLLECTOR ROAD (3R Project)

Table 55-3B (Continued)

GEOMETRIC DESIGN CRITERIA FOR STATE RURAL COLLECTOR ROAD
(3R Project)

Footnotes to Table 55-3B

(1) Design Forecast Year. For a partial 3R project, the pavement should be designed for at least a 10-year design life.

(2) Design Speed. The minimum design speed should equal a) the anticipated posted speed limit after construction or b) the state legal limit (55 mph) on a non-posted highway.

(3) Travel Lane (Widths). A minimum 3.3-m travel lane may be used where truck volumes are less than 200 trucks per day.

(4) Surface Type. The pavement type selection will be determined by the Materials and Tests Division's pavement design engineer or by the local jurisdiction.

(5) Shoulder. The following will apply:

a. On an INDOT facility, the shoulder should be paved to the front face of guardrail. The desirable guardrail offset is 0.3 m from the effective usable shoulder width. In a restrictive situation, the guardrail offset may be 0.3 m from the effective usable shoulder width. See Section 49-5.0 for more information.

b. If guardrail is present, the minimum offset from E.T.L. to the front face of guardrail should desirably be equal to the shy line distance, but not less than 1.2 m. See Section 49-5.0 for shy line offsets.

c. Usable shoulder width is defined as the distance from the edge of the travel lane to the shoulder break point.

(6) Cross Slope (Travel Lane). Cross slopes of 1.5% are acceptable on an existing bridge to remain in place.

(7) Cross Slopes (Shoulder). Table values are for tangent sections. See Figure 45-1A(1) or Figure 45-1A(2) for more-specific information. See Figure 43-3M or Figure 43-3N for shoulder cross slope on a horizontal curve.

(8) Side Slopes. Section 55-4.05 provides additional information for side slope criteria.

(9) Structural Capacity (New or Reconstructed Bridge). The following will apply:

a. Each bridge on a facility with greater than 600 trucks per day should be checked using the Alternate Military loading.
b. Each State highway bridge within 25 km of a Toll Road gate must be designed for Toll Road Loading.
c. Each bridge on an Extra Heavy Duty Highway must be designed for the Michigan Train truck loading configuration.
d. See Chapter Sixty for additional information on the loading configurations.

(10) Width (New or Reconstructed Bridge). Width is the minimum for a 3R project. See Section 59-1.0 for additional information on bridge width. On a State highway, the minimum clear roadway width should be 9.4 m.

(11) Width (Existing Bridge to Remain in Place). Clear width will be at least equal to the approach traveled way width or the table values, whichever is greater.

(12) Vertical Clearance (Collector Under). Table values include an additional 150 mm allowance for a future pavement overlay. Vertical clearances apply from usable edge to usable edge of shoulders.

(13) Vertical Clearance (Existing Bridge). See Section 55-6.02 for additional information on minimum allowable vertical clearance.

(14) Vertical Clearance (Collector Over Railroad). See Chapter Sixty-nine for additional information on railroad clearance under a highway.

(15) Maximum Grades. For a grade less than 150 m in length (PVT to PVC), the maximum grade may be up to 2% steeper than table value. For a road with AADT < 400, the maximum grade may also be 2% steeper.

(16) Intersection Sight Distance. For left turn onto a 2-lane road, P = Passenger car; SU = single unit truck. See Figure 46-10G for values for combination trucks.

Design Element				Manual Section	2-Lane				
Design Controls	Design Year Traffic (AADT)			40-2.01	< 400	400 ≤ AADT < 1000	1000 ≤ AADT < 3000	3000 ≤ AADT < 5000	≥ 5000
	Design Forecast Year			55-4.01	20 Years (2)				
	*Design Speed (km/h)			55-4.01	See Section 55-4.01 (3)				
	Access Control			40-5.0	None				
	Level of Service			40-2.0	Desirable: B; Minimum: D				
Cross Section Elements	Travel Lane	*Width (4)		55-4.05	Des: 3.0 m Min: 2.7 m (4a)	Des: 3.3 m Min: 3.0 m (4b)	Des: 3.3 m Min: 3.0 m (4b)	Des: 3.6 m Min: 3.3 m	Des: 3.6 m Min: 3.3 m (4c)
		Typical Surface Type		Ch. 52	Asphalt / Concrete				
	Shoulder (5)	*Width Usable		55-4.05	Des: 1.2 m Min: 0.6 m	Des: 1.8 m Min: 0.6 m	Des: 1.8 m Min: 0.9 m	Des: 2.4 m Min: 1.8 m	Des: 3.0 m Min: 2.4 m
		*Width Paved		55-4.05	Des: 0.6 m Min: 0.0 m	Des: 0.6 m Min: 0.0 m	Des: 1.2 m Min: 0.6 m	Des: 1.8 m Min: 0.6 m	Des: 2.4 m Min: 0.6 m
		Typical Surface Type		Ch. 52	Asphalt / Aggregate / Earth				
	Cross Slope	*Travel Lane (6)		55-4.05	2%-3%				
		Shoulder (7)		55-4.05	Paved Width ≤ 1.2 m: 2%-3%; Paved Width > 1.2 m: 4%-6% Asphalt; 6%-8% Aggregate; 8% Earth				
	Auxiliary Lanes	Lane Width		55-4.06	Des: 3.0 m; Min: 2.7 m		Des: 3.3 m; Min: 3.0 m		Des: 3.6 m Min: 3.0 m
		Shoulder Width			Des: Same as Next to Travel Lane; Min: 0.6 m				
	Obstruction-Free Zone			55-5.02	See Section 55-5.02				
	Side Slopes	Cut	Foreslope	55-4.05	2:1 or Flatter (8)				
			Ditch Width		(8)				
			Backslope		2:1 or Flatter (8)				
		Fill		55-4.05	2:1 or Flatter (8)				
Bridges**	New or Reconstructed Bridge	*Structural Capacity		Ch. 60	HS-25(8a)				
		*Clear Roadway Width (9)		55-6.03	Travelway +1.2 m	Travelway +1.8 m	Travelway +1.8 m	Travelway +2.4 m	Full Paved Appr. Width
	Existing Bridge to Remain in Place	*Structural Capacity		Ch. 72	HS-15 (10)				
		*Clear Roadway Width (11)		55-6.02	6.6 m	6.6 m	7.2 m	8.4 m	8.4 m
	*Vertical Clearance (Collector Under)	New or Replaced Overpassing Bridge (12)		55-6.0	4.45 m				
		Existing Overpassing Bridge			4.30 m				
	Vertical Clearance (Collector Over Railroad) (13)			Ch. 69	7.00 m				

Des: Desirable; Min: Minimum.

* Controlling design criteria (see Section 40-8.0). ** Selection of the cross section and bridge elements is based on the design year traffic volumes irrespective of the design speed.

GEOMETRIC DESIGN CRITERIA FOR LOCAL AGENCY RURAL COLLECTOR ROAD [(1)] (3R Project)

Table 55-3C

Design Element			Manual Section	2-Lane				
Alignment Elements	Design Speed		---	50 km/h	60 km/h	70 km/h	80 km/h	90 km/h
	*Stopping Sight Distance		55-4.02	65 m	85 m	105 m	130 m	160 m
	Decision Sight Distance	Speed / Path / Direction Change	42-2.0	145 m	170 m	200 m	230 m	270 m
		Stop Maneuver		70 m	95 m	115 m	140 m	170 m
	Passing Sight Distance		42-3.0	Existing	Existing	Existing	Existing	Existing
	Intersection Sight Distance, -3% to +3% (15)		55-4.06	P: 105 m SU: 135 m	P: 125 m SU: 160 m	P: 150 m SU: 185 m	P: 190 m SU: 235 m	P: 230 m SU: 280 m
	*Minimum Radii		55-4.03	See Section 55-4.03				
	*Superelevation Rate		55-4.03	See Section 55-4.03				
	*Horizontal Sight Distance		55-4.03	See Section 55-4.03				
	*Vertical Curvature (K-values)	Crest	55-4.04	See Section 55-4.04				
		Sag		See Section 55-4.04				
	*Maximum Grade (14)	Level	55-4.04	9%	9%	8%	8%	7%
		Rolling		11%	10%	9%	9%	8%
	Minimum Grade		44-1.03	Desirable: 0.5%; Minimum: 0.0%				

* Controlling design criteria (see Section 40-8.0).

Deviations from controlling design criteria should be addressed in an approved design exception. Also, any operational or maintenance changes, permanent or temporary exclusive of work-zone traffic control that in fact create substandard conditions such as by re-striping to obtain added lane(s) by reducing existing lane widths or shoulders, must be addressed in design exceptions whether or not actual construction or reconstruction is involved.

Design exception requests for Level One design criteria require Chief, Design Division approval.

GEOMETRIC DESIGN CRITERIA FOR LOCAL AGENCY RURAL COLLECTOR ROAD[(1)]
(3R Project)

Table 55-3C (Continued)

GEOMETRIC DESIGN CRITERIA FOR LOCAL AGENCY RURAL COLLECTOR ROAD[1]
(3R Project)

Footnotes to Table 55-3C

(1) Applicability. This table is only applicable to a federal-aid funded project.

(2) Design Forecast Year. For a partial 3R project, the pavement should be designed for at least a 10-year design life.

(3) Design Speed. The minimum design speed should equal a) the anticipated posted speed limit after construction or b) the state legal limit (55 mph) on a non-posted highway.

(4) Travel Lane (Width). A 3.3-m travel lane width should be used where truck volumes exceed 200 trucks per day. In addition, the following will apply:

a. Where V ≥ 80 km/h, the minimum width is 3.0 m.
b. Where V ≥ 80 km/h, the minimum width is 3.3 m.
c. Where V ≥ 80 km/h, the minimum width is 3.6 m.

(5) Shoulder Width. The following will apply:

a. The desirable guardrail offset is 0.3 m from the effective usable shoulder width. See Section 49-5.0 for more information.

b. If guardrail is present, the minimum offset from the E.T.L. to face of guardrail should desirably be equal to the shy line offset distance, but not less than 1.2 m (see Section 49-5.0 for shy line offsets).

c. Usable shoulder width is defined as the distance from the edge of the travel lane to the shoulder break point.

(6) Cross Slope (Travel Lane). Cross slopes of 1.5% are acceptable on an existing bridge to remain in place.

(7) Cross Slope (Shoulder). Table values are for tangent sections. See Figure 45-1A(1) or Figure 45-1A(2) for more-specific information. See Figure 43-3M or Figure 43-3N for shoulder cross slope on a horizontal curve.

(8) Side Slopes. Section 55-4.05 provides additional information for side slope criteria.

(8a) Structural Capacity (New or Reconstructed Bridge). A bridge with design year average daily truck traffic (ADTT) greater than 1,000 should be designed for HS 25 live loads. A bridge with an ADTT less than or equal to 1,000 may be designed for HS 25 or HS 20, whichever the LPA elects.

(9) Width (New or Reconstructed Bridge). The following will apply:

a. Where the approach roadway width (travelway plus shoulders) is surfaced, such surfaced width should be carried across all structures.

b. The width of each bridge of more than 30 m in length will be analyzed individually. At a minimum, the roadway width of such a bridge should be the width of travel lanes plus a 0.9-m right shoulder and 0.9-m left shoulder.

c. See Section 59-1.0 for more information on bridge width.

(10) Structural Capacity (Existing Bridge to Remain in Place). If the AADT $\leq$ 50, a HS-10 loading is acceptable.

(11) Width (Existing Bridge to Remain in Place). Clear width should be at least equal to the approach traveled way width or the table value, whichever is greater. For a bridge of more than 30 m in length, the value in the table does not apply. The acceptability of such a bridge will be assessed individually.

(12) Vertical Clearance (Collector Under). Table value includes an additional 150 mm allowance for a future pavement overlay. Vertical clearances apply from usable edge to usable edge of shoulders.

(13) Vertical Clearance (Collector Over Railroad). See Chapter Sixty-nine for additional information on railroad clearance under a highway.

(14) Maximum Grades. For a grades of less than 150 m in length (PVT to PVC), the maximum grade may be 2% steeper than table value. For a road with AADT < 400, the maximum grade may also be 2% steeper.

(15) Intersection Sight Distance. For left turn onto a 2-lane road, P = Passenger car; SU = single unit truck. See Figure 46-10G for values for combination trucks.

Design Element				Manual Section	2-Lane				
Design Controls	Design Year Traffic (AADT)			40-2.01	< 400	400-≤ AADT < 1000	1000-≤ AADT < 3000	3000-≤ AADT < 5000	≥ 5000
	Design Forecast Year			55-4.01	20 Years (2)				
	*Design Speed (km/h)			55-4.01	See Section 55-4.01 (3)				
	Access Control			40-5.0	None				
	Level of Service			40-2.0	Desirable: B; Minimum: D				
Cross Section Elements**	Travel Lane	*Width (4)		55-4.05	Des: 3.0 m; Min: 2.7 m (4a)		Des: 3.3 m Min: 3.0 m (4b)	Des: 3.6 m Min: 3.3 m (4c)	Des: 3.6 m Min: 3.3 m (4c)
		Typical Surface Type		Ch. 52	Asphalt / Concrete / Aggregate				
	Shoulder (5)	*Width Usable		55-4.05	Min: 0.6 m	Des: 1.2 m Min: 0.6 m	Des: 1.8 m Min: 0.9 m	Des: 1.8 m Min: 1.2 m	Des: 2.4 m Min: 1.8 m
		Typical Surface Type		Ch. 52	Asphalt / Aggregate / Earth				
	Cross Slope	*Travel Lane (6)		55-4.05	2%-3% Asphalt / Concrete; 6%-8% Aggregate				
		Shoulder (7)		55-4.05	Paved Width ≤ 1.2 m: 2%-3%; Paved Width > 1.2 m: 4%-6% Asphalt; 6%-8% Aggregate; 8% Earth				
	Auxiliary Lanes	Lane Width		55-4.06	Des: Same As Travel Lane Min: 2.7 m		Des: Same as Travel Lane Min: 3.0 m		
		Shoulder Width			Des: 1.2 m; Min: 0.6 m				
	Obstruction Free Zone			55-5.02	See Section 55-5.02				
	Side Slopes	Cut	Foreslope	55-4.05	2:1 or Flatter (8)				
			Ditch Width		(8)				
			Backslope		2:1 or Flatter (8)				
		Fill		55-4.05	2:1 or Flatter (8)				
Bridges**	New or Reconstructed Bridge	*Structural Capacity		Ch. 60	HS-25(8a)				
		*Clear Roadway Width (9)		55-6.03	Travelway +1.2 m	Travelway +1.8 m			Full Paved Appr. Width
	Existing Bridge to Remain in Place	*Structural Capacity		Ch. 72	HS-15 (10)				
		*Clear Roadway Width (11)		55-6.02	6.0 m	6.6 m	7.2 m	8.4 m	8.4 m
	*Vertical Clearance (Collector Under)	New or Replaced Overpassing Bridge (12)		55-6.0	4.45 m				
		Existing Overpassing Bridge			4.30 m				
	Vertical Clearance (Collector Over Railroad) (13)			Ch. 69	7.00 m				

Des: Desirable; Min: Minimum.

* Controlling design criteria (see Section 40-8.0). ** Selection of the cross section and bridge elements is based on the design year traffic volumes irrespective of the design speed.

GEOMETRIC DESIGN CRITERIA FOR RURAL LOCAL ROAD [1] (3R Project)

Table 55-3D

Design Element			Manual Section	2-Lane				
Alignment Elements	Design Speed		---	50 km/h	60 km/h	70 km/h	80 km/h	90 km/h
	*Stopping Sight Distance		55-4.02	65 m	85 m	105 m	130 m	160 m
	Decision Sight Distance	Speed / Path / Direction Change	42-2.0	145 m	170 m	200 m	230 m	270 m
		Stop Maneuver		70 m	95 m	115 m	140 m	170 m
	Passing Sight Distance		42-3.0	Existing	Existing	Existing	Existing	Existing
	Intersection Sight Distance , -3% to +3% (14)		55-4.06	P: 105 m SU: 135 m	P: 125 m SU: 160 m	P: 150 m SU: 185 m	P: 170 m SU: 235 m	P: 190 m SU: 280 m
	*Minimum Radii		55-4.03	See Section 55-4.03				
	*Superelevation Rate		55-4.03	See Section 55-4.03				
	*Horizontal Sight Distance		55-4.03	See Section 55-4.03				
	*Vertical Curvature (K-values)	Crest	55-4.04	See Section 55-4.04				
		Sag		See Section 55-4.04				
	*Maximum Grade	Level	55-4.04	10%	9%	8.5%	8%	7%
		Rolling		12%	11%	10.5%	10%	9%
	Minimum Grade		44-1.03	Desirable: 0.5%; Minimum: 0.0%				

* Controlling design criteria (see Section 40-8.0).

Deviations from controlling design criteria should be addressed in an approved design exception. Also, any operational or maintenance changes, permanent or temporary, exclusive of work-zone traffic control that in fact create substandard conditions such as by re-striping to obtain added lane(s) by reducing existing lane widths or shoulders, must be addressed in design exceptions whether or not actual construction or reconstruction is involved.

Design exception requests for Level One design criteria require Chief, Design Division approval.

GEOMETRIC DESIGN CRITERIA FOR RURAL LOCAL ROAD[(1)]
(3R Project)

Table 55-3D (Continued)

GEOMETRIC DESIGN CRITERIA FOR RURAL LOCAL ROAD[(1)]
(3R Project)

Footnotes to Table 55-3D

(1) Applicability. This table is only applicable to a federal-aid funded project.

(2) Design Forecast Year. For a partial 3R project, the pavement should be designed for at least a 10-year design life.

(3) Design Speed. The minimum design speed should equal a) the anticipated posted speed limit after construction or b) the state legal limit (55 mph) on a non-posted highway.

(4) Travel Lane (Width). A 3.3-m travel lane should be used where truck volumes exceed 200 trucks per day. In addition, the following will apply:

a. Where V ≥ 80 km/h, the minimum width is 3.0 m.
b. Where V ≥ 80 km/h, the minimum width is 3.3 m.
c. Where V ≥ 80 km/h, the minimum width is 3.6 m.

(5) Shoulder Width. The following will apply:

a. The desirable guardrail offset is 0.3 m from the effective usable shoulder width. In a restrictive situation, the guardrail offset may be 0.3 m from the effective usable shoulder width. See Section 49-5.0 for more information.

b. If guardrail is present, the minimum offset from E.T.L. to face of guardrail should desirably be equal to the shy line offset distance, but not less than 1.2 m (see Section 49-5.0 for shy line offsets).

c. Usable shoulder width is defined as the distance from the edge of the travel lane to the shoulder break point.

(6) Cross Slope (Travel Lane). Cross slopes of 1.5% are acceptable on an existing bridge to remain in place.

(7) Cross Slope (Shoulder). Table values are for tangent sections. See Figure 45-1A(1) or Figure 45-1A(2) for more-specific information. See Figure 43-3M or Figure 43-3N for shoulder cross slope on a horizontal curve.

(8) Side Slopes. Section 55-4.05 provides additional information for side slope criteria.

(8a) Structural Capacity (New or Reconstructed Bridge). A bridge with design year average daily truck traffic (ADTT) greater than 1,000 should be designed for HS 25 live loads. A bridge with an ADTT less than or equal to 1,000 may be designed for HS 25 or HS 20, whichever the LPA elects.

(9) Width (New or Reconstructed Bridge). The width of a bridge of more than 30 m in length should be analyzed individually. At a minimum, the roadway width of such a bridge will be the width of travel lanes plus a 0.6-m right shoulder and 0.6-m left shoulder. Where shoulders are paved, it is desirable to provide the full roadway width across the bridge. See Section 59-1.0 for more information on bridge width.

(10) Structural Capacity (Existing Bridge to Remain in Place). If the AADT ≤ 50, an HS-10 loading is acceptable.

(11) Width (Existing Bridge to Remain in Place). A minimum clear width that is 0.6 m narrower than that shown in the table 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 5.4 m. For a bridge of more than 30 m in length, the value in the table do not apply. The acceptability of such a bridge will be assessed individually.

(12) Vertical Clearance (Local Under). Table values include an additional 150 mm allowance for a future pavement overlay. Vertical clearances apply from usable edge to usable edge of shoulders.

(13) Vertical Clearance (Local Over Railroad). See Chapter Sixty-nine for additional information on railroad clearance under a highway.

(14) Intersection Sight Distance. For left turn onto a 2-lane road, P = Passenger car; SU = single unit truck. See Figure 46-10G for values for combination trucks.

Design Element				Manual Section	Design Values (By Type of Area)		
					Suburban	Intermediate	Built-Up
Design Controls	Design Forecast Year			55-4.01	20 Years (1)	20 Years (1)	20 Years (1)
	*Design Speed (km/h) (2)			55-4.01	Posted Speed Limit	Posted Speed Limit	Posted Speed Limit
	Access Control			40-5.0	Partial Control / None	None	None
	Level of Service			40-2.0	Des: B; Min: D	Des: C; Min: D	Des: C; Min: D
	On-Street Parking			45-1.0	None	Optional (3)	Optional (3)
Cross Section Elements	Travel Lane	*Width (4)		55-4.05	Curbed: Des: 3.6 m; Min: 3.3 m Uncurbed: Des: 3.6 m; Min: 3.3 m	Curbed: Des: 3.6 m; Min: 3.3 m Uncurbed: Des: 3.6 m; Min: 3.3 m	Curbed: Des: 3.6 m; Min: 3.0 m
		Typical Surface Type (5)		Ch. 52	Asphalt / Concrete	Asphalt / Concrete	Asphalt / Concrete
	*Curb Offset (6)			55-4.05	Des: 0.6 m; Min: 0.3 m	Des: 0.6 m; Min: 0.3 m	Des: 0.6 m; Min: 0.3 m
	Shoulder	*Paved Width (7)		55-4.05	Curbed, Rt. Des: 3.0 m; Min 0.3 m Curbed, Lt. Des: 1.2 m; Min 0.3 m Uncurbed, Rt.: 3.0 m; Lt.: 1.2 m	Curbed, Rt. Des: 2.4 m; Min 0.3 m Curbed, Lt. Des: 0.9 m; Min 0.6 m Uncurbed, Rt.: 2.4 m; Lt.: 0.9 m	Right: 1.8 m; Left: 0.9 m
		Typical Surface Type (5)		Ch. 52	Asphalt / Concrete	Asphalt / Concrete	Asphalt / Concrete
	Cross Slope	*Travel Lane (8)		55-4.05	2% - 3%	2% - 3%	2% - 3%
		Shoulder (9)		55-4.05	Rt.: 4% - 6%; Lt.: 2% - 3%	Paved Width ≤ 1.2 m: 2%-3%; Paved Width > 1.2m: 4%-6%	Paved Width ≤ 1.2 m: 2%-3%; Paved Width > 1.2m: 4%-6%
	Auxiliary Lanes	Lane Width		55-4.05	Des: 3.6 m; Min: 3.3 m	Des: 3.6 m; Min: 3.0 m	Des: 3.6 m; Min: 3.0 m
		Curb Offset			Des: 0.3 m; Min: 0.0 m	Des: 0.3 m; Min: 0.0 m	Des: 0.3 m; Min: 0.0 m
		Shoulder Width			Des: 3.0 m; Min: 0.6 m	Des: 2.4 m; Min: 0.6 m	Des: 1.8 m; Min: 0.6 m
		Typical Surface Type (5)		Ch. 52	Asphalt / Concrete	Asphalt / Concrete	Asphalt / Concrete
	TWLTL Lane Width			46-5.0	Des: 4.8 m; Min. 4.2 m	Des: 4.8 m; Min: 3.6 m	Des: 4.2 m; Min: 3.3 m
	Parking Lane Width			45-1.04	N/A	Des: 3.0 m; Min: 2.4 (10)	Des: 3.0 m; Min: 2.4 m (10)
	Median Width	Depressed		55-4.05	Existing	Existing	N/A
		Raised Island			Des: 4.8 m; Min: 0.6 m	Des: 4.8 m; Min: 0.6 m	Des: 4.8 m; Min: 0.6 m
		Flush / Corrugated			Des: 4.8 m; Min: 0.6 m	Des: 4.8 m; Min: 0.6 m	Des: 4.8 m; Min: 0.6 m
	Sidewalk Width (11)			55-4.05	1.2 m with 1.5-m Buffer (Des)	Des: 1.8 m; Min: 1.2 m	Des: 1.8 m; Min: 1.2 m
	Bicycle Lane Width (12)			51-7.0	Curbed: 1.5 m Uncurbed: Shld. Width +1.2 m	Curbed: 1.5 m Uncurbed: Shld. Width +1.2 m	Curbed: 1.5 m
	Obstruction Free Zone			55-5.02	See Section 55-5.02	See Section 55-5.02	See Section 55-5.02
	Typical Curbing Type (where used) (13)			55-4.05	Sloping / Vertical	Sloping / Vertical	Sloping / Vertical
	Side Slopes (Uncurbed)	Cut	Foreslope	55-4.05	2:1 or Flatter	2:1 or Flatter (14)	N/A
			Ditch Width		(14)	(14)	N/A
			Backslope		2:1 or Flatter (14)	2:1 or Flatter (14)	N/A
		Fill			2:1 or Flatter (14)	2:1 or Flatter (14)	N/A
	Side Slopes (Curbed)	Cut (Backslope)		55-4.05	(15)	(15)	(15)
		Fill			2:1 or Flatter (14)	2:1 or Flatter (14)	2:1 or Flatter (14)
	Median Slopes (Depressed)			55-4.05	Desirable: 8:1; Maximum: 4:1	Desirable: 8:1; Maximum: 4:1	Desirable: 8:1; Maximum: 4:1

Des: Desirable; Min: Minimum

* Controlling design criteria (see Section 40-8.0).

GEOMETRIC DESIGN CRITERIA FOR MULTI-LANE URBAN ARTERIAL
(3R Project)

Table 55-3E

Design Element			Manual Section	Design Values (By Type of Area)				
				Suburban	Intermediate	Built-Up		
Bridges	New or Reconstructed Bridge	*Structural Capacity (16)	Ch. 60	HS-25	HS-25	HS-25		
		*Clear Roadway Width(17)	55-6.03	Curbed: Full Approach Curb-to-Curb Width Uncurbed: Full Approach Width				
	Existing Bridge to Re-main in Place	*Structural Capacity	Ch. 72	HS-20	HS-20	HS-20		
		*Clear Roadway Width	55-6.02	Curbed: Full Approach Curb-to-Curb Width; Uncurbed: Travelway Plus 0.6 m on Each Side				
	*Vertical Clearance (Arterial Under)	New or Replaced Overpassing Bridge (18a & 18c)	55-6.0	5.05 m	5.05 m (18b)	5.05 m (18b)		
		Existing Overpassing Bridge (19)		4.30 m	4.30 m	4.30 m		
		Sign Truss / Pedestrian Bridge (18a & 18c)		New: 5.35 m; Existing: 5.20 m	New: 5.35 m; Existing: 5.20 m	New: 5.35 m; Existing: 5.20 m		
	Vertical Clearance (Arterial over Railroad) (20)		Ch. 69	7.00 m				
Alignment Elements	Design Speed		---	50 km/h	60 km/h	70 km/h	80 km/h	90 km/h
	*Stopping Sight Distance		55-4.02	65 m	85 m	105 m	130 m	160 m
	Decision Sight Distance	Speed / Path / Direction Change	42-2.0	U: 195 m SU: 170 m	U: 235 m SU: 205 m	U: 275 m SU: 235 m	U: 315 m SU: 270 m	U: 360 m SU: 315 m
		Stop Maneuver		155 m	195 m	235 m	280 m	325 m
	Intersection Sight Distance, -3% to +3% (21)		55-4.06	P: 105 m SU: 135 m	P: 125 m SU: 160 m	P: 150 m SU: 185 m	P: 190 m SU: 235 m	P: 230 m SU: 280 m
	*Minimum Radii		55-4.03	See Section 55-4.03				
	*Superelevation Rate		55-4.03	See Section 55-4.03				
	*Horizontal Sight Distance		55-4.03	See Section 55-4.03				
	*Vertical Curvature (K-values)	Crest	55-4.04	See Section 55-4.04				
		Sag		See Section 55-4.04				
	*Maximum Grade	Level	55-4.04	10%	9%	8.5%	8%	7%
		Rolling		11%	10%	9.5%	9%	8%
	Minimum Grade		44-1.03	Curbed Des: 0.5%; Curbed Min: 0.3% Uncurbed: 0.0%				

* Controlling design criteria (see Section 40-8.0). SU: Suburban U: Urban
See note at bottom of Table 55-3A for approval authority for Level One design exceptions.

GEOMETRIC DESIGN CRITERIA FOR MULTI-LANE URBAN ARTERIAL (3R Project)

Table 55-3E (Continued)

GEOMETRIC DESIGN CRITERIA FOR MULTI-LANE URBAN ARTERIAL (3R Project)

Footnotes to Table 55-3E

(1) Design Forecast Year. For a partial 3R project, the pavement should be designed for at least a 10-year design life.

(2) Design Speed. The minimum design speed should equal a) the anticipated posted speed limit after construction, or b) the state legal limit on a non-posted highway. The legal limit is 30 mph, but with an engineering study may be raised to a maximum of 55 mph.

(3) On-Street Parking. In general, on-street parking is discouraged.

(4) Travel Lane (Width). For an arterial on the National Truck Network, the right lane must be 3.6m in width. For a non-National Truck Network route, a minimum 3.3-m travel lane should be used where truck volumes exceed 200 trucks a day. See Section 55-4.05.

(5) Surface Type. The pavement type selection will be determined by the Materials and Tests Division's pavement design engineer or by the local jurisdiction.

(6) Curb Offset. Vertical curbs which are either continuous or introduced intermittently may be offset 0.3 m.

(7) Shoulder Width. The table values apply to paved shoulder width. The following will also apply:

a. For an uncurbed section, the shoulder is paved to the face of guardrail. The desirable guardrail offset is 0.6 m from the effective usable shoulder width. See Section 49-5.0 for more information.

b. For an uncurbed section, a desirable additional 0.3 m of compacted aggregate will be provided.

c. If guardrail is present, the minimum offset from E.T.L. to face of guardrail should desirably be equal to the shy line offset distance, but not less than 1.2 m (see Section 49-5.0 for shy line offsets). In a restrictive situation, the guardrail offset may be 0.3 m from the effective usable shoulder width.

d. For a curbed section, the curb offset is included in the paved shoulder width.

(8) Cross Slope (Travel Lane). Cross slopes of 1.5% are acceptable on an existing bridge to remain in place.

(9) Cross Slope (Shoulder). Table values are for tangent sections. See Figure 45-1A(1) or Figure 45-1A(2) for more-specific information. See Figure 43-3M or Figure 43-3N for shoulder cross slope on a horizontal curve.

(10) Parking Lane Width. The following will apply:

a. Where the parking lane will be used as a travel lane during peak hours or may be converted to a travel lane in the future, the width should be equal to the travel lane width plus the curb offset width (if present).

b. A parking lane for residential usage may be 0.3 m narrower.

c. The cross slope for a parking lane is typically 1% steeper than that of the adjacent travel lane.

(11) Sidewalk Width. Table values are for the installation of new sidewalks. An existing sidewalk width of 0.9 m or greater (with or without a buffer) may be retained. A buffer strip of 1.2 m or more is desirable.

(12) Bicycle Lane Width. The widths in the table are in addition to the width of a parking lane, if present. See Section 51-7.0 for additional details.

(13) Curbing Type. Vertical curbs may only be used with design speed lower than 80 km/h.

(14) Side Slopes. Section 55-4.05 provides additional information for side slope criteria.

(15) Side Slope (Curbed) Cut. Typically, a shelf or sidewalk will be present immediately behind the curb before the toe of the backslope. The minimum width of a shelf desirably should be 1.8 m. Where a sidewalk is present, the toe of the backslope will typically be 0.3 m beyond the edge of sidewalk. See Section 45-3.0 for more information.

(16) Structural Capacity (New or Reconstructed Bridge). The following will apply:

a. Each bridge on a facility with greater than 600 trucks per day should be checked using the Alternate Military Loading.
b. Each State highway bridge within 25 km of a Toll Road gate must be designed for Toll Road Loading.
c. Each bridge on an Extra Heavy Duty Highway must be designed for the Michigan Train truck loading configuration.
d. See Chapter Sixty for additional information on the loading criteria.

(17) Width (New or Reconstructed Bridge). Widths are minimums for a 3R project. See Section 59-1.0 for additional information on bridge width.

(18) Vertical Clearance (Arterial Under Railroad). The following will apply:

a. Table values include an additional 150-mm allowance for a future pavement overlay.
b. In a highly urbanized area, a minimum clearance of 4.30 m may be provided if there is at least one route with a 4.90-m clearance.
c. Vertical clearances apply from usable edge to usable edge of shoulder.

(19) Vertical Clearance (Existing Bridge). See Section 55-6.02 for additional information on minimum allowable vertical clearances.

(20) Vertical Clearance (Arterial Over Railroad). See Chapter Sixty-nine for additional information on railroad clearance under a highway.

(21) Intersection Sight Distance. For left turn onto a 2-lane road, P = Passenger car; SU = single unit truck. See Figure 46-10G for values for combination trucks.

Design Element				Manual Section	Design Values (By Type of Area)		
					Suburban	Intermediate	Built-up
Design Controls	Design Forecast Year			55-4.01	20 Years (1)	20 Years (1)	20 Years (1)
	*Design Speed (km/h) (2)			55-4.01	Posted Speed Limit	Posted Speed Limit	Posted Speed Limit
	Access Control			40-5.01	Partial Control / None	None	None
	Level of Service			40-2.0	Des: B; Min: D	Des: C; Min: D	Des: C; Min: D
	On-Street Parking			45-1.0	None	Optional (3)	Optional (3)
Cross Section Elements	Travel Lane	*Width (4)		55-4.05	Curbed: Des: 3.6 m; Min: 3.3 m Uncurbed: Des: 3.6 m; Min: 3.3 m	Curbed: Des: 3.6 m; Min: 3.3 m Uncurbed: Des: 3.6 m; Min: 3.3 m	Curbed Des: 3.6m Curbed Min: 3.0 m
		Typical Surface Type (5)		Ch. 52	Asphalt / Concrete	Asphalt / Concrete	Asphalt / Concrete
	*Curb Offset (6)			55-4.05	Des: 0.6 m; Min: 0.3 m	Des: 0.6 m; Min: 0.3 m	Des: 0.6 m; Min: 0.3 m
	Shoulder	*Paved Width (7)		55-4.05	Curbed Des: 3.0 m; Min. 0.3 m Uncurbed: Des: 3.0 m; Min. 1.8 m	Curbed: Des: 2.4 m; Min: 0.3 m Uncurbed: Des: 2.4 m; Min. 1.2 m	Des: 1.8 m; Min: 0.6 m
		Typical Surface Type (5)		Ch. 52	Asphalt / Concrete	Asphalt / Concrete	Asphalt / Concrete
	Cross Slope	*Travel Lane (8)		55-4.05	2%-3%	2%-3%	2%-3%
		Shoulder (9)		55-4.05	4%-6%	Paved Width ≤ 1.2 m: 2%-3%; Paved Width > 1.2m: 4%-6%	Paved Width ≤ 1.2 m: 2%-3%; Paved Width > 1.2m: 4%-6%
	Auxiliary Lanes	Lane Width		55-4.05	Des: 3.6 m; Min: 3.3 m	Des: 3.6 m; Min: 3.3 m	Des: 3.6 m; Min: 3.0 m
		Curb Offset			Des: 0.3 m; Min: 0.0 m	Des: 0.3 m; Min: 0.0 m	Des: 0.3 m; Min: 0.0 m
		Shoulder Width			Des: 3.0 m; Min: 0.6 m	Des: 2.4 m; Min: 0.6 m	Des: 1.8 m; Min: 0.6 m
		Typical Surface Type (5)		Ch. 52	Asphalt / Concrete	Asphalt / Concrete	Asphalt / Concrete
	TWLTL Lane Width			46-5.0	Des: 4.8 m; Min. 4.2 m	Des: 4.8 m; Min: 3.6 m	Des: 4.8 m; Min: 3.3 m
	Parking Lane Width			45-1.04	N/A	Des: 3.0 m; Min: 2.4 m (10)	Des: 3.0 m; Min: 2.4 m (10)
	Sidewalk Width (11)			45-1.06	1.2 m with 1.5-m Buffer (Des)	Des: 1.8 m; Min: 1.2 m	Des: 1.8 m; Min: 1.2 m
	Bicycle Lane Width (12)			51-7.0	Curbed: 1.5 m Uncurbed: Shld. Width +1.2 m	Curbed: 1.5 m Uncurbed: Shld. Width +1.2 m	Curbed: 1.5 m
	Obstruction Free Zone			55-5.02	See Section 55-5.02	See Section 55-5.02	See Section 55-5.02
	Typical Curbing Type (where used) (13)			55-5.0	Sloping / Vertical	Sloping / Vertical	Sloping / Vertical
	Side Slopes (Uncurbed)	Cut	Foreslope	55-5.0	2:1 or Flatter (14)	2:1 or Flatter (14)	N/A
			Ditch Width		(14)	(14)	N/A
			Backslope		2:1 or Flatter (14)	2:1 or Flatter (14)	N/A
		Fill			2:1 or Flatter (14)	2:1 or Flatter (14)	N/A
	Side Slopes (Curbed)	Cut (Backslope)		55-4.05	(15)	(15)	(15)
		Fill			2:1 or Flatter (14)	2:1 or Flatter (14)	2:1 or Flatter (14)

Des: Desirable; Min: Minimum.
* Controlling design criteria (see Section 40-8.0).

GEOMETRIC DESIGN CRITERIA FOR TWO-LANE URBAN ARTERIAL
(3R Project)

Table 55-3F

Design Element			Manual Section	Design Values (By Type of Area)					
				Suburban		Intermediate		Built-up	
Bridges	New or Reconstructed Bridge	*Structural Capacity (16)	Ch. 60	HS-25		HS-25		HS-25	
		*Clear Roadway Width(17)	55-6.03	Curbed: Full Approach Curb-to-Curb Width Uncurbed: Full Approach Paved Width					
	Existing Bridge to Re-main in Place	*Structural Capacity	Ch. 72	HS-20		HS-20		HS-20	
		*Clear Roadway Width	55-6.02	Curbed: Full Approach Curb-to-Curb Width; Uncurbed: Travelway Plus 0.6 m on Each Side					
	*Vertical Clearance (Arterial Under)	New or Replaced Overpassing Bridge (18a & 18c)	44-4.0	5.05 m		5.05 m (18b)		5.05 m (18b)	
		Existing Overpassing Bridge (19)		4.30 m		4.30 m		4.30 m	
		Sign Truss / Pedestrian Bridge (18a & 18c)		New: 5.35 m; Existing: 5.20 m		New: 5.35 m; Existing: 5.20 m		New: 5.35 m; Existing: 5.20 m	
	Vertical Clearance (Arterial over Railroad) (20)		Ch. 69	7.00 m					
Alignment Elements	Design Speed			40 km/h	50 km/h	60 km/h	70 k/h	80 km/h	90 km/h
	*Stopping Sight Distance		55-4.02	50 m	65 m	85 m	105 m	130 m	160 m
	Decision Sight Distance	Speed / Path / Direction Change	42-2.0	U: 160 m SU: 130 m	U: 195 m SU: 170 m	U: 235 m SU: 205 m	U: 275 m SU: 235 m	U: 315 m SU: 270 m	U: 360 m SU: 315 m
		Stop Maneuver		130 m	155 m	195 m	250 m	270 m	325 m
	Intersection Sight Distance		55-4.06	P: 85 m SU: 110 m	P: 105 m SU: 135 m	P: 125 m SU: 160 m	P: 150 m SU: 185 m	P: 180 m SU: 235 m	P: 230 m SU: 280 m
	*Minimum Radii		55-4.03	See Section 55-4.03					
	*Superelevation Rate		55-4.03	See Section 55-4.03					
	*Horizontal Sight Distance		55-4.03	See Section 55-4.03					
	*Vertical Curvature (K-values)	Crest	55-4.04	See Section 55-4.04					
		Sag		See Section 55-4.04					
	*Maximum Grade	Level	55-4.04	11%	10%	9%	8.5%	8%	7%
		Rolling		12%	11%	10%	9.5%	9%	8%
	Minimum Grade		44-1.03	Curbed Des: 0.5%; Curbed Min: 0.3% Uncurbed: 0.0%					

* Controlling design criteria (see Section 40-8.0). U: Urban; SU: Suburban. Des: Desirable; Min: Minimum.
See note at bottom of Table 55-3A for approval authority for Level One design exceptions.

GEOMETRIC DESIGN CRITERIA FOR TWO-LANE URBAN ARTERIAL (3R Project)

Table 55-3F (Continued)

GEOMETRIC DESIGN CRITERIA FOR TWO-LANE URBAN ARTERIAL (3R Project)

Footnotes to Table 55-3F

(1) Design Forecast Year. For a partial 3R project, the pavement should be designed for at least a 10-year design life.

(2) Design Speed. The minimum design speed should equal a) the anticipated posted speed limit after construction, or b) the state legal limit on a non-posted highway. The legal limit is 30 mph, but with an engineering study may be raised to a maximum of 55 mph.

(3) On-Street Parking. In general, on-street parking is discouraged.

(4) Travel Lane (Width). For an arterial on the National Truck Network, the right lane must be 3.6-m in width. For a non-National Truck Network route, a minimum 3.3-m travel lane should be used where truck volumes exceed 200 trucks a day. See Section 55-4.05.

(5) Surface Type. The pavement type selection will be determined by the Materials and Tests Division's pavement design engineer or by the local jurisdiction.

(6) Curb Offset. The curb offset should be 0.6 m. Vertical curbs which are either continuous or introduced intermittently may be offset 0.3 m.

(7) Shoulder Width. The table values apply to paved shoulder widths. The following will also apply:

a. For an uncurbed section, the shoulder is paved to the face of guardrail. The desirable guardrail offset is 0.6 m from the effective usable shoulder width. See Section 49-5.0 for more information.

b. For an uncurbed section, a desirable additional 0.3 m of compacted aggregate will be provided.

c. If guardrail is present, the minimum offset from E.T.L. to face of guardrail should desirably be equal to the shy line offset distance, but not less than 1.2 m (see Section 49-5.0 for shy line offsets). In a restrictive situation, the guardrail offset may be 0.3 m from the effective usable shoulder width.

d. For a curbed section, the curb offset is included in the paved shoulder width.

(8) Cross Slope (Travel Lane). Cross slopes of 1.5% are acceptable on an existing bridge to remain in place.

(9) Cross Slope (Shoulder). Table values are for tangent sections. See Figure 45-1A(1) or Figure 45-1A(2) for more-specific information. See Figure 43-3M or Figure 43-3N for shoulder cross slope on a horizontal curve.

(10) Parking Lane Width. The following will apply:

a. Where the parking lane will be used as a travel lane during peak hours or may be converted to a travel lane in the future, the width should be equal to the travel lane width plus the curb offset width (if present).

b. A parking lane for residential usage may be 0.3 m narrower.

c. The cross slope for a parking lane is typically 1% steeper than that for the adjacent travel lane. Buffered strips of 1.2 m or more are desirable.

(11) Sidewalk Width. Table values are for the installation of new sidewalks. An existing sidewalk width of 0.9 m or greater (with or without a buffer) may be retained. A buffer strip of 1.2 m or wider is desirable.

(12) Bicycle Lane Width. The widths in the table are in addition to the width of parking lane, if present. See Section 51-7.0 for additional details.

(13) Curbing Types. Vertical curbs may only be used with design speed lower than 80 km/h.

(14) Side Slopes. Section 55-4.05 provides additional information for side slope criteria.

(15) Side Slopes (Curbed) Cut. Typically, a shelf or sidewalk will be present immediately behind the curb before the toe of the backslope. The minimum width of a shelf desirably should be 1.8 m. Where a sidewalk is present, the toe of the backslope will typically be 0.3 m beyond the edge of sidewalk. See Section 45-3.0 for more information.

(16) Structural Capacity (New or Reconstructed Bridge). The following will apply:

a. Each bridge on a facility with greater than 600 trucks per day should be checked using the Alternate Military Loading.
b. Each State highway bridge within 25 km of a Toll Road gate must be designed for Toll Road Loading.
c. Each bridge on an Extra Heavy Duty Highway must be designed for the Michigan Train truck loading configuration.
d. See Chapter Sixty for additional information on the loading criteria.

(17) Width (New or Reconstructed Bridge). Widths are minimums for a 3R project. See Section 59-1.0 for additional information on bridge width.

(18) Vertical Clearance (Arterial Under Railroad). The following will apply:

a. Table value includes an additional 150 mm allowance for a future pavement overlay.
b. In a highly urbanized area, a minimum clearance of 4.30 m may be provided if there is at least one route with a 4.90-m clearance.
c. Vertical clearances apply from usable edge to usable edge of shoulder.

(19) Vertical Clearance (Existing Bridge). See Section 55-6.02 for additional information on minimum allowable vertical clearance.

(20) Vertical Clearance (Arterial Over Railroad). See Chapter Sixty-nine for additional information on railroad clearance under a highway.

(21) Intersection Sight Distance. For left turn onto a 2-lane road. P = Passenger car; SU = single unit truck. See Figure 46-10G for values for combination trucks.

Design Element				Manual Section	Design Values (By Type of Area)		
					Suburban	Intermediate	Built-Up
Design Controls	Design Forecast Year			55-4.01	20 Years (1)	20 Years (1)	20 Years (1)
	*Design Speed (km/h) (2)			55-4.01	Posted Speed Limit	Posted Speed Limit	Posted Speed Limit
	Access Control			40-5.0	None	None	None
	Level of Service			40-2.0	Desirable: C; Minimum: D	Desirable: C; Minimum: D	Desirable: C; Minimum: D
	On-Street Parking			45-1.0	Optional (3)	Optional (3)	Optional (3)
Cross Section Elements	Travel Lane	*Width (4)		55-4.05	Curbed: Des: 3.6 m; Min: 3.0 m Uncurbed: Des: 3.6 m; Min: 3.0 m	Curbed: Des: 3.6 m; Min: 3.0 m Uncurbed: Des: 3.6 m; Min: 3.0 m	Curbed Des: 3.6 m Curbed Min: 3.0 m
		Typical Surface Type (5)		Ch. 52	Asphalt / Concrete	Asphalt / Concrete	Asphalt / Concrete
	Curb Offset (6)			55-4.05	Des: 0.6 m; Min: 0.3 m	Des: 0.6 m; Min: 0.3 m	Des: 0.6 m; Min: 0.3 m
	Shoulder	*Paved Width (7)		55-4.05	Curbed Des: 2.4 m; Min. 0.3 m Uncurbed: Des: 2.4 m; Min. 1.2 m	Curbed Des: 1.8 m; Min. 0.3 m Uncurbed: Des: 1.8 m; Min. 0.9 m	Des: 1.2 m; Min: 0.6 m
		Typical Surface Type (5)		Ch. 52	Asphalt / Concrete	Asphalt / Concrete	Asphalt / Concrete
	Cross Slope	*Travel Lane (8)		55-4.05	2%-3%	2%-3%	2%-3%
		Shoulder (9)		55-4.05	Paved Width ≤ 1.2 m: 2%-3%; Paved Width > 1.2m: 4%-6%	Paved Width ≤ 1.2 m: 2%-3%; Paved Width > 1.2m: 4%-6%	Paved Width ≤ 1.2 m: 2%-3%; Paved Width > 1.2m: 4%-6%
	Auxiliary Lanes	Lane Width		55-4.05	Des: 3.6 m; Min: 3.0 m	Des: 3.6 m; Min: 3.0 m	Des: 3.6 m; Min: 2.7 m
		Curb Offset			Des: 0.3 m; Min: 0.0 m	Des: 0.3 m; Min: 0.0 m	Des: 0.3 m; Min: 0.0 m
		Shoulder Width			Des: 2.4 m; Min: 0.6 m	Des: 1.8 m; Min: 0.6 m	Des: 1.2 m; Min: 0.6 m
		Typical Surface Type (5)		Ch. 52	Asphalt / Concrete	Asphalt / Concrete	Asphalt / Concrete
	TWLTL Lane Width			46-5.0	Des: 4.8 m; Min: 3.6 m	Des: 4.2 m; Min: 3.3 m	Des: 4.2 m; Min: 3.0 m
	Parking Lane Width			45-1.04	Des: 3.0 m; Min: 2.4 m	Des: 3.0 m; Min: 2.4 m (10)	Des: 3.0 m; Min: 2.4 m (10)
	Median Width	Raised Island		55-4.05	Des: 4.8 m; Min: 0.6 m	Des: 4.8 m; Min: 0.6 m	Des: 4.8 m; Min: 0.6 m
		Flush / Corrugated			Des: 4.8 m; Min: 0.6 m	Des: 4.8 m; Min: 0.6 m	Des: 4.8 m; Min: 0.6 m
	Sidewalk Width (11)			55-4.05	1.2 m with 1.5-m Buffer (Des)	Des: 1.8 m; Min: 1.2 m	Des: 1.8 m; Min: 1.2 m
	Bicycle Lane Width (12)			51-7.0	Curbed: 1.5 m Uncurbed: Shld. Width +1.2 m	Curbed: 1.5 m Uncurbed: Shld. Width +1.2 m	Curbed: 1.5 m
	Obstruction Free Zone			55-5.02	See Section 55-5.02	See Section 55-5.02	See Section 55-5.02
	Typical Curbing Type (where used) (13)			55-4.05	Sloping / Vertical	Sloping / Vertical	Sloping / Vertical
	Side Slopes (Uncurbed)	Cut	Foreslope	55-4.05	2:1 or Flatter (14)	2:1 or Flatter (14)	N/A
			Ditch Width		(14)	(14)	N/A
			Backslope		2:1 or Flatter (14)	2:1 or Flatter (14)	N/A
		Fill			2:1 or Flatter (14)	2:1 or Flatter (14)	N/A
	Side Slopes (Curbed)	Cut (Backslope)		55-4.05	(15)	(15)	(15)
		Fill			2:1 or Flatter (14)	2:1 or Flatter (14)	2:1 or Flatter (14)

Des: Desirable; Min: Minimum.
* Controlling design criteria (see Section 40-8.0).

GEOMETRIC DESIGN CRITERIA FOR URBAN COLLECTOR
(3R Project)

Table 55-3G

Design Element			Manual Section	Design Values (By Type of Area)					
				Suburban		Intermediate		Built-Up	
Bridges	New or Reconstructed Bridge	*Structural Capacity (16)	Ch. 60	HS-25		HS-25		HS-25	
		*Clear Roadway Width(17)	55-6.03	Curbed: Full Approach Curb-to-Curb Width Uncurbed: Full Approach Paved Width					
	Existing Bridge to Re-main in Place	*Structural Capacity	Ch. 72	HS-15		HS-15		HS-15	
		*Clear Roadway Width	55-6.02	Curbed: Full Approach Curb-to-Curb Width Uncurbed: Travelway Plus 0.6 m on Each Side				Curbed: Full Approach Curb-to-Curb Width Uncurbed: Travelway + 0.3 m on Each Side	
	*Vertical Clearance (Collector)	New or Replaced Overpassing Bridge (18)	55-6.0	4.45 m		4.45 m		4.45 m	
		Existing Overpassing Bridge (19)		4.30 m		4.30 m		4.30 m	
	Vertical Clearance (Collector over Railroad) (20)		Ch. 69	7.00 m					
Alignment Elements	Design Speed		---	40 km/h	50 km/h	60 km/h	70 km/h	80 km/h	90 km/h
	*Stopping Sight Distance		55-4.02	50 m	65 m	85 m	105 m	130 m	160 m
	Decision Sight Distance	Speed / Path / Direction Change	42-2.0	U: 160 m SU: 130 m	U: 195 m SU: 170 m	U: 235 m SU: 205 m	U: 275 m SU: 235 m	U: 315 m SU: 270 m	U: 360 m SU: 315 m
		Stop Maneuver		130 m	155 m	195 m	235 m	280 m	325 m
	Intersection Sight Distance, -3% to +3% (22)		55-4.06	P: 85 m SU: 110 m	P: 105 m SU: 135 m	P: 125 m SU: 160 m	P: 150 m SU: 185 m	P: 190 m SU: 235 m	P: 230 m SU: 280 m
	*Minimum Radii		55-4.03	See Section 55-4.05					
	*Superelevation Rate (24)		55-4.03	See Section 55-4.05					
	*Horizontal Sight Distance		55-4.03	See Section 55-4.05					
	*Vertical Curvature (K-values)	Crest	55-4.04	See Section 55-4.04					
		Sag		See Section 55-4.04					
	*Maximum Grade (21)	Level	55-4.04	11%	11%	11%	10%	9%	8%
		Rolling		14%	13%	12%	11%	10%	9%
	Minimum Grade		44-1.03	Curbed Des: 0.5%; Curbed Min: 0.3% Uncurbed: 0.0%					

* Controlling design criteria (see Section 40-8.0). SU: Suburban; U: Urban. Des: Desirable; Min: Minimum.
For a state-route project, see note at bottom of Table 55-3B for approval authority for Level One design exceptions.
For a federally-funded local project, see note at bottom of Table 55-3C for approval authority for Level One design exceptions.

GEOMETRIC DESIGN CRITERIA FOR URBAN COLLECTOR
(3R Project)

Table 55-3G (Continued)

GEOMETRIC DESIGN CRITERIA FOR URBAN COLLECTOR
(3R Project)

Footnotes to Table 55-3G

(1) Design Forecast Year. For a partial 3R project, the pavement should be designed for at least a 10-year design life.

(2) Design Speed. The minimum design speed should equal a) the anticipated posted speed limit after construction, or b) the state legal limit on a non-posted highway. The legal limit is 30 mph, but with an engineering study may be raised to a maximum of 55 mph.

(3) On-Street Parking. In general, on-street parking is discouraged.

(4) Travel Lane (Width). A minimum 3.3-m travel lane should be used where truck volumes exceed 200 trucks per day. See Section 55-4.05.

(5) Surface Type. The pavement type selection will be determined by the Materials and Tests Division's pavement design engineer or by the local jurisdiction.

(6) Curb Offset. The curb offset should be 0.6 m. Vertical curbs which are either continuous or introduced intermittently should be offset 0.3 m.

(7) Shoulder Width. The table values apply to paved shoulder widths. The following will also apply:

a. For an uncurbed section, the shoulder is paved to the face of guardrail. The desirable guardrail offset is 0.6 m from the effective usable shoulder width. See Section 49-5.0 for more information.

b. For an uncurbed section, a desirable additional 0.3 m of compacted aggregate will be provided.

c. If guardrail is present, the minimum offset from the E.T.L. to face of guardrail should desirably be equal to the shy line offset distance, but not less than 1.2 m (see Section 49-5.0 for shy line offsets). In a restrictive situation, the guardrail offset may be 0.3 m from the effective usable shoulder width.

d. For a curbed section, the curb offset is included in the paved shoulder width.

(8) Cross Slope (Travel Lane). Cross slopes of 1.5% are acceptable on an existing bridge to remain in place.

(9) Cross Slope (Shoulder). Table values are for tangent sections. See Figure 45-1A(1) or Figure 45-1A(2) for more-specific information. See Figure 43-3M or Figure 43-3N for shoulder cross slope on a horizontal curve.

(10) Parking Lane Width. A parking lane for residential usage may be 0.3 m less. The cross slope for a parking lane is typically 1% steeper than that for the adjacent travel lane. In a residential area, a parallel parking lane from 2.1 to 2.4 m in width should be provided on one or both sides of the street. In a commercial or industrial area, the parking lane width should range from 2.4 to 3.3 m, and should usually be provided on both sides of the street. Where curb-and-gutter sections are used, the gutter pan width may be considered as part of the parking lane width. Where practical, the parking lane width should be in addition to the gutter pan width.

(11) Sidewalk Width. Table values are for the installation of new sidewalks. An existing sidewalk width of 0.9 m or greater (with or without a buffer) may be retained. A buffer strip of 1.2 m or wider is more desirable.

(12) Bicycle Lane Width. The widths in the table are in addition to the width of parking lane, if present. See Section 51-7.0 for additional details.

(13) Curbing Type. Vertical curbs may only be used with design speed lower than 80 km/h.

(14) Side Slopes. Section 55-4.05 provides additional information for side slope criteria.

(15) Side Slope (Curbed) Cut. Typically, a shelf or sidewalk will be present immediately behind the curb before the toe of the backslope. The minimum width of a shelf desirably should be 1.8 m. Where a sidewalk is present, the toe of the backslope will typically be 0.3 m beyond the edge of sidewalk. See Section 45-3.0 for more information.

(16) Structural Capacity (New or Reconstructed Bridge). The following will apply:

a. Each bridge on a facility with greater than 600 trucks per day should be checked using the Alternate Military Loading.
b. Each State highway bridge within 25 km of a Toll Road gate must be designed for Toll Road Loading.
c. Each bridge on an Extra Heavy Duty Highway must be designed for the Michigan Train truck loading configuration.
d. See Chapter Sixty for additional information on the loading criteria.

(17) Width (New or Reconstructed Bridge). Widths are minimums for a 3R project. See Section 59-1.0 for additional information on bridge width.

(18) Vertical Clearance (Collector Under Railroad). Table value includes an additional 150 mm allowance for a future pavement overlay. Vertical clearances apply from usable edge to usable edge of shoulder.

(19) Vertical Clearance (Existing Bridge). See Section 55-6.02 for additional information on minimum allowable vertical clearance.

(20) Vertical Clearance (Arterial Over Railroad). See Chapter Sixty-nine for additional information on railroad clearance under a highway.

(21) Maximum Grades. For a grade of less than 150 m in length (PVT to PVC), a one-way downgrade, or a street with AADT < 400, the maximum grade may be 2% steeper than table value. Where adjacent sidewalks are present, the maximum desirable grade is 5%.

(22) Intersection Sight Distance. For left turn onto a 2-lane road, P = Passenger car; SU = single unit truck. See Figure 46-10G for values for combination trucks.

Design Element				Manual Section	Design Values (By Type of Area)		
					Suburban	Intermediate	Built-Up
Design Controls	Design Forecast Year			55-4.01	20 Years (1)	20 Years (1)	20 Years (1)
	*Design Speed (km/h) (2)			55-4.01	See Section 55-4.01	See Section 55-4.01	See Section 55-4.01
	Access Control			40-5.0	None	None	None
	Level of Service			40-2.0	Desirable: C; Minimum: D	Desirable: C; Minimum: D	Desirable: C; Minimum: D
	On-Street Parking			45-1.0	Optional (3)	Optional	Optional
Cross Section Elements	Travel Lane	*Width (4)		55-4.05	Curbed: Des: 3.3 m; Min: 3.0 m Uncurbed: Des: 3.3 m; Min: 3.0 m	Curbed: Des: 3.0 m; Min: 2.7 m Uncurbed: Des: 3.3 m; Min: 3.0 m	Curbed Des: 3.0 m Curbed Min: 2.7 m
		Typical Surface Type		Ch. 52	Asphalt / Concrete	Asphalt / Concrete	Asphalt / Concrete
	*Curb Offset (5)			55-4.05	Des: 0.6 m; Min: 0.3 m	Des: 0.6 m; Min: 0.3 m	Des: 0.6 m; Min: 0.3 m
	Shoulder	*Usable Width		55-4.05	Curbed Des: 1.2 m; Min. 0.3 m Uncurbed: Des: 1.2 m; Min. 0.6 m	Curbed Des: 1.2 m; Min. 0.3 m Uncurbed: Des: 1.2 m; Min. 0.6 m	Des: 1.2 m; Min: 0.6 m
		Typical Surface Type		Ch. 52	Asphalt / Concrete / Aggregate / Earth	Asphalt / Concrete / Aggregate / Earth	Asphalt / Concrete / Aggregate / Earth
	Cross Slope	*Travel Lane (6)		55-4.05	2%-3%	2%-3%	2%-3%
		Shoulder (7)		55-4.05	2%-3% Asphalt / Concrete; 6%-8% Aggregate; 8% Earth	2%-3% Asphalt / Concrete; 6%-8% Aggregate; 8% Earth	2%-3% asphalt / Concrete; 6%-8% Aggregate; 8% Earth
	Auxiliary Lanes	Lane Width		55-4.05	Des: 3.3 m; Min: 3.0 m	Des: 3.3 m; Min: 2.7 m	Des: 3.0 m; Min: 2.7 m
		Curb Offset			Des: 0.3 m; Min: 0.0 m	Des: 0.3 m; Min: 0.0 m	Des: 0.3 m; Min: 0.0 m
		Shoulder Width			Des: 1.2 m; Min: 0.3 m	Des: 1.2 m; Min: 0.3 m	Des: 1.2 m; Min: 0.3 m
		Typical Surface Type		Ch. 52	Asphalt / Concrete / Aggregate / Earth	Asphalt / Concrete / Aggregate / Earth	Asphalt / Concrete / Aggregate / Earth
	Parking Lane Width (3)			45-1.04	Des: 2.7 m; Min: 2.1 m	Des: 2.7 m; Min: 2.1 m	Des: 2.7 m; Min: 2.1 m
	Sidewalk Width (8)			55-4.05	1.2 m with 1.5-m Buffer (Des)	Des: 1.8 m; Min: 1.2 m	Des: 1.8 m; Min: 1.2 m
	Bicycle Lane Width (9)			51-7.0	Curbed: 1.5 m Uncurbed: Shld. Width +1.2 m	Curbed: 1.5 m Uncurbed: Shld. Width +1.2 m	Curbed: 1.5 m
	Obstruction Free Zone			55-5.02	See Section 55-5.02	See Section 55-5.02	See Section 55-5.02
	Typical Curbing Type (where used) (5)			55-4.05	Sloping / Vertical	Sloping / Vertical	Sloping / Vertical
	Side Slopes (Uncurbed)	Cut	Foreslope	55-4.05	2:1 or Flatter (10)	2:1 or Flatter (10)	N/A
			Ditch Width		(10)	(10)	N/A
			Backslope		2:1 or Flatter (10)	2:1 or Flatter (10)	N/A
		Fill			2:1 or Flatter (10)	2:1 or Flatter (10)	N/A
	Side Slopes (Curbed)	Cut (Backslope)		55-4.05	(11)	(11)	(11)
		Fill			2:1 or Flatter (10)	2:1 of Flatter (10)	2:1 or Flatter (10)

Des: Desirable; Min: Minimum.

* Controlling design criteria (see Section 40-8.0).

** Table applies only to a project with federal-aid funds.

GEOMETRIC DESIGN CRITERIA FOR URBAN LOCAL STREET
(3R Project)

Table 55-3H

Design Element			Manual Section	Design Values (By Type of Area)					
				Suburban		Intermediate		Built-Up	
Bridges	New or Reconstructed Bridge	*Structural Capacity	Ch. 60	HS-25(11a)		HS-25(11a)		HS-25(11a)	
		*Clear Roadway Width	55-6.03	Curbed: Full Approach Curb-to-Curb Width Uncurbed: (12)					
	Existing Bridge to Re-main in Place	*Structural Capacity (13)	Ch. 72	HS-15		HS-15		HS-15	
		*Clear Roadway Width	55-6.02	Existing Width (14)					
	*Vertical Clearance (Local Under)	New or Replaced Overpassing Bridge (15)	44-4.0	4.45 m		4.45 m		4.45 m	
		Existing Overpassing Bridge (16)		4.30 m		4.30 m		4.30 m	
	Vertical Clearance (Local over Railroad) (17)		Ch. 69	7.00 m					
Alignment Elements	Design Speed			40 km/h	50 km/h	60 km/h	70 km/h	80 km/h	90 km/h
	*Stopping Sight Distance		55-4.02	50 m	65 m	85 m	105 m	130 m	160 m
	Decision Sight Distance	Speed / Path / Direction Change	42-2.0	U: 160 m SU: 130 m	U: 195 m SU: 170 m	U: 235 m SU: 205 m	U: 275 m SU: 235 m	U: 315 m SU: 270 m	U: 360 m SU: 315 m
		Stop Maneuver		130 m	155 m	195 m	235 m	280 m	325 m
	Intersection Sight Distance, -3% to +3% (18)		55-4.06	P: 85 m SU: 110 m	P: 105 m SU: 135 m	P: 125 m SU: 160 m	P: 150 m SU: 185 m	P: 170 m SU: 235 m	P: 190 m SU: 280 m
	*Minimum Radii		55-4.03	See Section 55-4.03					
	*Superelevation Rate		55-4.03	See Section 55-4.03					
	*Horizontal Sight Distance		55-4.03	See Section 55-4.03					
	*Vertical Curvature (K-values)	Crest	55-4.04	See Section 55-4.04					
		Sag		See Section 55-4.04					
	*Maximum Grade	Level	55-4.04	In a residential area, the maximum grade should not exceed 15%. In an industrial or commercial area, the maximum grade should not exceed 8%.					
		Rolling							
	Minimum Grade		55-4.04	Curbed Des: 0.5%; Curbed Min: 0.3% Uncurbed: 0.0%					

U: Urban; SU: Suburban. Des: Desirable; Min: Minimum.
* Controlling design criteria (see Section 40-8.0).
** Table applies only to a project with federal-aid funds.

See note at bottom of Table 55-3D for approval authority for Level One design exceptions.

GEOMETRIC DESIGN CRITERIA FOR URBAN LOCAL STREET **
(3R Project)

Table 55-3H (Continued)

GEOMETRIC DESIGN CRITERIA FOR URBAN LOCAL STREET
(3R Project)

Footnotes to Table 55-3H

(1) Design Forecast Year. For a partial 3R project, the pavement should be designed for at least a 10-year design life.

(2) Design Speed. The minimum design speed should equal a) the anticipated posted speed limit after construction, or b) the state legal limit on a non-posted highway. The legal limit is 30 mph, but with an engineering study may be raised to a maximum of 55 mph.

(3) On-Street Parking. In general, on-street parking is discouraged. However, if parking lanes are used, cross slopes are typically 1% steeper than that of the adjacent travel lane. In a residential area, a parallel parking lane from 2.1 to 2.4 m in width should be provided on one or both sides of the street. In a commercial or industrial area, parking lane width should range from 2.4 to 3.3 m, and should usually be provided on both sides of the street. Where curb-and-gutter sections are used, the gutter pan width may be considered as part of the parking lane width. Where practical, the parking lane width should be in addition to the gutter pan width.

(4) Travel Lane (Width). A minimum 3.3-m travel lane should be used where truck volumes exceed 200 trucks per day. See Section 55-4.05.

(5) Curb Offset. A vertical-curb offset should be 0.6 m. Vertical curbs which are either continuous or introduced intermittently may be offset 0.3 m. A sloping-curb offset may be zero. For a curbed section, the curb offset is included in the paved shoulder width. Vertical curbs may only be used with design speed lower than 80 km/h.

(6) Cross Slope (Travel Lane). Cross slopes of 1.5% are acceptable on an existing bridge to remain in place.

(7) Cross Slope (Shoulder). Table values are for tangent sections; see Section 43-3.06 for shoulder cross slopes on a horizontal curve.

(8) Sidewalk Width. Table values are for the installation of new sidewalks. An existing sidewalk width of 0.9 m or greater (with or without a buffer) may be retained. A buffer strip of 1.2 m or wider is desirable.

(9) Bicycle Lane Width. The widths in the table are in addition to the width of parking lane, if present. See Section 51-7.0 for additional details.

(10) Side Slopes. Section 55-4.05 provides additional information for side slope criteria.

(11) Side Slope (Curbed) Cut. Typically, a shelf or sidewalk will be present immediately behind the curb before the toe of the backslope. The minimum width of a shelf desirably should be 1.8 m. Where a sidewalk is present, the toe of the backslope will typically be 0.3 m beyond the edge of sidewalk. See Section 45-3.0 for more information.

(11a) Structural Capacity (New or Reconstructed Bridge). A bridge with design year average daily truck traffic (ADTT) greater than 1,000 should be designed for HS 25 live loads. A bridge with an ADTT less than or equal to 1,000 may be designed for HS 25 or HS 20, whichever the LPA elects.

(12) Width (New or Reconstructed Bridge) Uncurbed. The following will apply:

Volume	Minimum Clear Width
$0 < AADT < 400$	Travelway + 0.6 m each side
$400 \leq AADT < 5000$	Travelway + 0.9 m each side
$AADT \geq 5000$	Approach Roadway Width (Travelway Plus Shoulders)

See Section 59-1.0 for more information on bridge width.

(13) Structural Capacity (Existing Bridge to Remain in Place). For a street with AADT ≤50, an HS-10 loading is acceptable.

(14) Width (Existing Bridge to Remain in Place). If the width of the existing bridge is less than the approach travelway width, strong consideration should be given to widening the bridge to at least the travelway width.

(15) Vertical Clearance (Local Under Railroad). Table values include an additional 150 mm allowance for a future pavement overlay. Vertical clearances apply from usable edge to usable edge of shoulder.

(16) Vertical Clearance (Existing Bridge). See Section 55-6.02 for additional information on minimum allowable vertical clearance.

(17) Vertical Clearance (Local Over Railroad). See Chapter Sixty-nine for additional information on railroad clearance under a highway.

(18) Intersection Sight Distance. For left turn onto a 2-lane road, P = Passenger car; SU = single unit truck. See Figure 46-10G for values for combination trucks.