

**GEOMETRIC DESIGN STANDARDS - URBAN MINOR ARTERIAL STREET SYSTEM (GS-6M)**

	DESIGN SPEED (km/h)	MINIMUM RADIUS		(12) STOPPING SIGHT DISTANCE	(11) MIN. WIDTH OF LANE	(3) STANDARD CURB & GUTTER (10)	BUFFER STRIP WIDTH	(4) MINIMUM SIDEWALK WIDTH	(5) SLOPE	(6) NEW AND RECONSTRUCTED MINIMUM BRIDGE WIDTHS AND VERTICAL CLEARANCES		
		U	ULS	MIN.								
STREETS WITH CURB & GUTTER	100	394	-	185	3.6m	CG-7	(10)	1.5m	2: 1	SAME AS CURB TO CURB OF APPROACHES		
	80	280	-	130								
	70	215	227	105	(1) (2) 3.3m	CG-6						
	60	150	149	85								
	50	99	94	65								
	DESIGN SPEED (km/h)	MINIMUM RADIUS		STOPPING SIGHT DISTANCE	MIN. WIDTH OF LANE	(7) MINIMUM WIDTH GRADED SHOULDERS		(8) PAVED SHOULDER WIDTH		(9) WIDTH OR DITCH (FRONT SLOPE)	(5) SLOPE	(6) NEW AND RECONSTRUCTED MINIMUM BRIDGE WIDTHS AND VERTICAL CLEARANCES
		U	ULS			MIN.	FILL W/GR	CUT & FILL	RT.			
STREETS WITH SHOULDER DESIGN	100	394	-	185	3.6m	3.9m	3.0m	2.4m	1.2m	3.0m	2: 1	3.0m + PAVEMENT WIDTH + 3.0m
	80	280	-	130		(1) (2) 3.3m	3.3m	2.4m	1.8m	1.2m		1.8m
	60	150	149	85								
	50	99	94	65								

**GENERAL NOTES**

Design Speeds for Urban Arterials generally range from 60 to 80 km/h and occasionally may be as low as 50 km/h. The lower (60 km/h and below) speeds apply in the central business district and intermediate areas. The higher speeds are more applicable to the outlying business and developing areas.

Standard TC-5.01R(M) superelevation based on 8% maximum is to be used for 100 km/h design speed.

Standard TC-5.01U(M) (Urban) superelevation based on 4% maximum is to be used for design speeds less than 100 km/h.

Standard TC-5.04ULS(M) (Urban Low Speed) superelevation based on 2% maximum may be used for design speeds less than or equal to 70 km/h (70 km/h = 211 m minimum radius).

Clear Zone and Recoverable Area information can be found in Appendix A(M), Section A-2(M) of the Road Design Manual.

If medians are included, see [Section 2E-3 of Chapter 2E](#) of the Road Design Manual.

A minimum 9.2 m width of surfacing or a minimum 9.2 m face to face of curb is to be used within incorporated cities or towns to qualify for maintenance payments.

**FOOTNOTES**

- (1) Lane width to be 3.6 m at all interchanges or if design year ADT exceeds 2000.
- (2) If heavy truck traffic is anticipated, an additional 0.3 m width is desirable.
- (3) Or equivalent City or Town design.
- (4) A width of 2.4 m or more may be needed in commercial areas.
- (5) 3:1 and flatter slopes may be used when the right of way is behind the sidewalk (or sidewalk space) in residential or other areas where slopes will be maintained by the property owner.
- (6) Vertical clearance at roadway underpasses for new and reconstructed bridges is to be 5.05 m (0.3 m additional clearance required for non-vehicular overpasses).
- (7) If graded median is used, the width of median shoulder is to be 2.4 m.
- (8) The Paved widths shown are the widths to be used if the Materials Division recommends the shoulders be paved or stabilized. When the mainline is 4 lanes (both directions) a minimum 2.4 m wide paved shoulder will be provided on the right of traffic and a minimum 1.2 m wide paved shoulder on the median side. Where the mainline is 6 or more lanes, both the right and median paved shoulders will be 2.4 m in width. If paved shoulders are not recommended by the Materials Division, the mainline pavement structure will be extended 0.3 m at the same slope into the shoulder to eliminate raveling of the pavement edge.
- (9) Ditch slope to be 6:1 - 3.0 m width and 4:1 - 1.8 m width.
- (10) If a buffer strip is used between the back of curb and sidewalk, it should be 0.6 m minimum.
- (11) Situations having restrictions on trucks may allow the use of lanes 0.3 m less in width.
- (12) For intersection sight distance requirements, see [Appendix C, Table C-1-5](#).

RELATIONSHIP OF MAXIMUM GRADES TO DESIGN SPEEDS					
TYPE OF TERRAIN	DESIGN SPEED (km/h)				
	50	60	70	80	100
	GRADES (PERCENT)				
LEVEL	8	7	6	6	5
ROLLING	9	8	7	7	6
MOUNTAINOUS	11	10	9	9	8

**FIGURE A - 1 - 6M\***

**GEOMETRIC DESIGN STANDARDS FOR URBAN COLLECTOR STREET SYSTEM (GS-7M)**

	DESIGN SPEED (km/h)	MINIMUM RADIUS		(11) STOPPING SIGHT DISTANCE	MIN. WIDTH OF LANE	(3) STANDARD CURB & GUTTER (10)	BUFFER STRIP WIDTH	(4) MINIMUM SIDEWALK WIDTH	(5) SLOPE	(8) (9) NEW AND RECONSTRUCTED MINIMUM BRIDGE WIDTHS AND VERTICAL CLEARANCES
		U	ULS	MIN.						
STREETS WITH CURB & GUTTER	80	280	-	130	3.6m	CG-7	(10)	1.5m	2: 1	SAME AS CURB TO CURB OF APPROACHES
	70	215	227	105	(1) (2)	CG-6				
	60	150	149	85						
	50	99	94	65	3.3m					
	DESIGN SPEED (km/h)	MINIMUM RADIUS		(11) STOPPING SIGHT DISTANCE	MIN. WIDTH OF LANE	(7) MINIMUM WIDTH GRADED SHOULDERS		(10) WIDTH OR DITCH (FRONT SLOPE)	(5) SLOPE	(8) (9) NEW AND RECONSTRUCTED MINIMUM BRIDGE WIDTHS AND VERTICAL CLEARANCES
		U	ULS	MIN.		FILL W/GR	CUT & FILL			
STREETS WITH SHOULDER DESIGN	80	280	-	130	3.6m	3.3m	2.4m	1.8m	2: 1	2.4m + PAVEMENT WIDTH + 2.4m
	60	150	149	85	(1) (2)					
	50	99	94	65	3.3m	2.1m	1.2m	1.2m		1.2m + PAVEMENT WIDTH + 1.2m

**GENERAL NOTES**

A minimum design speed of 50 km/h or higher should be used for collector streets, depending on available right of way, terrain, adjacent development and other area controls.

In the typical street grid, the closely spaced intersections usually limit vehicular speeds and thus make the effect of design speed of less significance. Nevertheless, the longer sight distances and curve radii commensurate with design speeds higher than the value indicated result in safer highways and should be used to the extent practicable.

Standard TC-5.01U(M) (Urban) superelevation based on 4% maximum.

Standard TC-5.04ULS(M) (Urban-Low Speed) superelevation based on 2% maximum may be used with a design speed of 70 km/h or less (70 km/h = 211 m minimum radius).

A minimum 9.2 m width of surfacing or a minimum 9.2 m curb to curb is to be used within incorporated cities or towns to qualify for maintenance payments.

Clear zone and Recoverable Area information can be found in Appendix A(M), Section A-2(M) of the Road Design Manual.

Maximum grades of short lengths (less than 150 m) and one-way down grades may be 2% steeper.

RELATIONSHIP OF MAXIMUM GRADES TO DESIGN SPEEDS				
TYPE OF TERRAIN	DESIGN SPEED (MPH)			
	30	40	45	50
	GRADES (PERCENT)			
LEVEL	9	9	8	7
ROLLING	11	10	9	8
MOUNTAINOUS	12	12	11	10

**FOOTNOTES**

- (1) 3.6m when Design year ADT exceeds 2000. Where feasible, lanes should be 3.6m in industrial areas; however, where available or attainable R/W imposes severe limitations 3.3m lanes can be used in residential areas, based upon design speed and traffic volumes. (See AASHTO Green Bk., Exhibit 6-5).
- (2) Lane width to be 3.6 m at all interchange locations.
- (3) Or equivalent City or Town Design.
- (4) A width of 2.4 m or more may be needed in commercial areas.
- (5) 3:1 and flatter slopes may be used when right of way is behind the sidewalk (or sidewalk space) in residential or other areas where the slopes will be maintained by the property owner.
- (6) Ditch slopes to be 4:1 - 1.8 m width and 3:1 - 1.2 m width.
- (7) When Design year ADT exceeds 2000VPD, with greater than 5% total truck and bus usage: Provide 1.2 m wide paved shoulders when the graded shoulder is 1.5 m wide or greater or provide 1 m wide paved shoulders when the graded shoulder is 1.2 m wide. All shoulders not being paved will have the mainline pavement structure extended 0.3 m, on the same slope, into the shoulder to eliminate raveling at the pavement edge.
- (8) Where the approach roadway width (traveled way plus shoulder) is surfaced, that surfaced width shall be carried across all structures if that width exceeds the width shown in this table.
- (9) Vertical clearance at roadway underpasses for new and reconstructed bridges is to be 5.05 m desirable and 4.45 m minimum (0.3 m additional clearance required for non-vehicular overpasses).
- (10) If a buffer strip is used between the back of curb and sidewalk, it should be 0.6 m minimum.
- (11) For intersection sight distance requirements, see [Appendix C, Table C-1-5](#).

**FIGURE A - 1 - 7M\***