

**CITY OF WHITEHORSE SERVICING STANDARDS MANUAL
PART 2 - CONSTRUCTION DESIGN CRITERIA
SECTION 2.7 - ROADS**

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2.7.1 GEOMETRIC DESIGN STANDARDS

2.7.1.1 ROAD CLASSIFICATION

Road classification and designation are to be in accordance with the classification system outlined in the Roads and Transportation Association of Canada (TAC) manual, Geometric Design Guide for Canadian Roads.

Corresponding Typical Road Cross Sections are included in Section 4 of this manual.

**TABLE 2.7.1.1
ROAD CLASSIFICATION AND DESIGNATION**

ROAD CLASSIFICATION	ROAD CLASS	LANE WIDTH (m)	R.O.W. WIDTH (m)	POSTED SPEED (km / h)
URBAN ROADWAYS				
Local	ULU 50	9.0	20.0	50
Minor Collector	UCU 50	11.5	22.5	50
Minor Collector	UCU 50	11.5	24.5	50
Major Collector	UCU 60	15.0	25.0	60
Industrial Local	ULU 50	10.0	20.0	50
Industrial Collector	UCU 60	12.5	22.5	60
Lane		5.8	6.0	
RURAL ROADWAYS				
Local	RLU 50	8.0	25.0	50
Local	RLU 50	8.0	30.0	50
Collector	RCU 60	9.0	25.0	60
Collector	RCU 60	9.0	30.0	60
Industrial Local	RLU 50	9.0	25.0	50
Industrial Collector	RCU 60	10.0	30.0	60

Modifications in right of way width may be reviewed on a project specific basis. Should the road right of way be reduced provisions must be made to accommodate all utility infrastructure such as easements on private property.

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Roadway width is from lip of gutter to lip of gutter for urban roads and from shoulder to shoulder for rural roads.

2.7.1.2 DESIGN REQUIREMENTS

2.7.1.2.1 GENERAL

In conjunction with road classifications noted in this Section, typical urban cross sections are to acknowledge the placement and clearances required for the following:

- Shared Roadways (multi-use);
- On-street parking;
- Multi-use trails;
- Bus Routes;
- Bicycle Lanes adjacent to curb; and
- Bicycle Lanes adjacent to on-street parking.

2.7.1.2.2 BICYCLE LANES

Bicycle lane width is measured from the edge of the travelled lane to the lip of gutter.

Minimum required width for buffered bicycle lanes is 1.5 m.

Minimum required width for un-buffered bicycle lanes is 1.8m.

2.7.1.2.3 PEDESTRIAN TRAFFIC

All sidewalks, curbs and gutters are to be constructed in accordance with the Standard Details in Sections 4 and 3.15 of this Manual.

In areas subject to pedestrian traffic, road designs are to acknowledge and incorporate pedestrian and accessibility requirements in accordance with the current edition of the TAC Geometric Design Guide for Canadian Roads, Chapter 6 – Pedestrian Integrated Design.

Monolithic sidewalks are to be a 1.8m wide in commercial zones or areas subject to high volume pedestrian traffic.

2.7.1.2.4 DRIVEWAYS AND VEHICLE ACCESS POINTS

All driveways are to be constructed to give a minimum of 1.5 m clearance from structures such as hydrants, light standards and service pedestals, and are to be constructed in accordance with the standard drawings in Section 4.

Driveway locations are to be a minimum 8.0 m offset from the termination of curb return from the nearest street intersection.

Desired driveway grades are to be between 2% - 6%.

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2.7.1.2.5 SURFACE TREATMENTS

Rural roads that are constructed with a rural cross section (ditches no curb and gutter) will requirement BST or Asphalt surfacing as follows:

- Developments with less than 5 lots will be evaluated by the City Engineer who will determine what surfacing is required;
- Developments with more than 5 lots will require BST surfacing with Asphalt surfacing in the cul-de-sac bulbs and intersections.

2.7.1.2.6 DESIGN SPEED

Design speed is to be greater than or equal to posted speed.

2.7.1.2.7 CUL-DE-SACS

As outlined in the National Building Code of Canada, turnaround facilities are required for any dead-end portion of the access route more than 90m long.

R.O.W. width in cul-de-sacs to be sufficient to provide the same separation from edge of shoulder or face of curb to property line as on straight roads.

2.7.2 VERTICAL ALIGNMENT

Minimum gutter grades on concrete structures to be:

- 0.8% around curves; and
- 0.5% along tangents .

Minimum grade on asphalt surface to be 1%.

Maximum centerline roadway and gutter grades are to be in accordance with the current edition of the TAC Geometric Design Guide for Canadian Roads.

All roads are to be crowned or are to have a crossfall as shown on the applicable standard drawings in Section 4.

All vertical curves are to be designed to meet the following minimum requirements:

**TABLE 2.7.2
K VALUE**

DESIGN SPEED (km / h)	CREST (m)	(m)
50	7	6
60	15	10
70	22	15

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80	35	20
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$K = L/A$

L = length of vertical curve in meters

A = algebraic difference in grades percent

The minimum length of a vertical curve is to be as specified in the current edition of the TAC Geometric Design Guide for Canadian Roads for the given road design speed.

The degree of curvature is relative to the road classification and its design speed.

Vertical curves are required when grade differences at change in grade is greater than the following:

- Arterial – 1%
- Collector and Local – 1.5%
- Alley / Laneway – 2.0%
- Multi-use Trails – 6.0%

2.7.3 HORIZONTAL ALIGNMENT

2.7.3.1 GENERAL

All horizontal curves are to be designed to meet the following minimum design requirements:

**TABLE 2.7.3.1
HORIZONTAL CURVE DESIGN REQUIREMENTS**

STREET CLASSIFICATION	DESIGN SPEED (km / h)	MINIMUM RADIUS OF CURVE (m)
LOCAL	50	100
MINOR COLLECTOR	60	150
MAJOR COLLECTOR	70	200
ARTERIAL	80	280

The minimum cul-de-sac radius is 18m for bus traffic and 14m for streets without bus traffic.

On local roads, a minimum 20 m straight tangent is required between reverse curves.

2.7.3.2 CURB RETURNS

For the design of local and collector intersection curb returns, the minimum curb radius is to be based on the horizontal turning movement for the anticipated vehicle traffic as outlined in the current edition

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of the TAC Geometric Design Guide for Canadian Roads, Chapter 2 – Design Controls, Classification and Consistency.

Curb returns at residential street intersections are to be constructed to a radius of 6m - 10 m and in accordance with the standard drawings in Section 4.

In industrial/commercial areas, the min. curb return radius is to be 15 m to accommodate truck-turning movements.

Curb return radii at local and collector intersections are subject to review and reduction from the minimum recommended in the current edition of the TAC Geometric Design Guide for Canadian Roads. Reduced radii will be considered in locations requiring improved traffic control and optimization of pedestrian comfort and safety.

2.7.4 ROAD STRUCTURES

All road structures are to be designed as recommended by a geotechnical investigation and report.

2.7.5 PAVEMENT MARKINGS

All pavement markings are to be designed and installed as per the current edition of the TAC Manual of Uniform Traffic Control Devices for Canada, TAC Bikeway Traffic Control Guidelines for Canada and Section 3.16 of this Manual.

2.7.6 STREET SIGNS

All street signs are to be designed and installed as per the current edition of the TAC Geometric Design Guide for Canadian Roads and Section 3.21 of this manual.

The Developer is to sign a work order for the purchase and installation of all street signs by the City of Whitehorse Sign Shop.