



Construction and Infrastructure Design Standards

The Developer and or contractor shall be governed by the latest versions of the City of Calgary's Design Guidelines for Subdivision Servicing Standard Specifications: Sewer Construction, Standard Specifications: Waterworks Construction, Standard Specifications: Roads Construction, Development Guidelines and Standard Specifications: Landscape Construction and the Stormwater Management and Design manual, but not so as to restrict the generality of the foregoing, the following special clauses noted shall have precedence.

1. GENERAL

- 1.1.1. The Developer shall notify the Town of award of construction contracts for the various municipal improvements and shall state the name of the Contractor, address, phone number and contact. The Developer shall ensure that the Contractor(s) are properly bonded for the performance of the work and that the Contractor carries Liability, Course of Construction and Equipment Insurance as required by the Town and names the Town and the Town Engineers as insured parties.
- 1.2. All local improvements constructed under this Agreement shall be extended to area boundaries, and through or along adjacent boundary roads, lanes or rights-of-way as necessary to accommodate a continuity of infrastructure with adjacent lands.

2. SPECIAL CONSIDERATIONS

2.1. Sanitary Sewer

- 2.1.1. Sewer mains shall be polyvinyl chloride (PVC) and shall meet CSA designations.
- 2.1.2. Alberta Environment and Parks – Wastewater Systems Standards for Performance and Design shall apply to minimum pipe grades.
- 2.1.3. Separation of water and sewer lines shall conform to Alberta Environment and Parks – Standards for Municipal Waterworks.

- 2.1.4. Design flows for residential developments shall be calculated using a per capita flow of 320 litres per person per day with a peaking factor utilizing the Harmon's formula plus an infiltration and inflow rate of 0.2 litres per second per ha of development.
 - 2.1.5. Manhole covers shall not have the name of the City of Calgary on them.
 - 2.1.6. Connection of foundation weeping tile to the sanitary sewers is not permitted. Weeping tile, if required, shall be by sump pump discharge to the surface of the yard.
- 2.2. Storm Sewer
- 2.2.1. Sewer mains shall be polyvinyl chloride (PVC) meeting CSA designations or concrete meeting A.S.T.M. designations.
 - 2.2.2. Alberta Environment and Parks – Stormwater Management Guidelines shall apply to minimum pipe grades.
 - 2.2.3. Separation of water and sewer lines shall conform to Alberta Environment and Parks – Standards for Municipal Waterworks.
 - 2.2.4. Surface water should not be permitted to run a distance greater than 150m in streets and 200m in lanes or swales without interception by a catch basin.
 - 2.2.5. Manhole covers shall not have the name of the City of Calgary on them.
 - 2.2.6. Connection of foundation weeping tile to the storm sewers is not permitted. Weeping tile, if required, shall be by sump pump discharge to the surface of the yard.
 - 2.2.7. Catch basin leads shall be 300mm-concrete or PVC pipe installed at minimum grades of 1.0%.
 - 2.2.8. Surface drainage from any public area shall not flow over any sidewalk.
 - 2.2.9. Catch basins for rolled curb and gutter shall be Type "K" storm back.
Catch basins for standard curb shall be Type "C" Two Piece
 - 2.2.10. Extend drainage pipe from catch basins at all lows for the full width of the roadway. The pipe shall be 150 mm minimum complete with screened rock and filter cloth.
 - 2.2.11. Culverts shall be 450mm minimum diameter where open ditches are used.

- 2.2.12. Drainage swales across roadways shall be 2m in width and conform to specifications set out in Appendix B.
- 2.3. Water Mains
- 2.3.1. Water valves shall open counter clockwise and have dust covers installed in all valve boxes.
- 2.3.2. Hydrants shall be compression type as manufactured by Clow with triangular operating units. Hydrants shall be yellow with black caps and top in color and shall have the pumper connection size of 4.925”.
- 2.3.3. Hydrant spacing shall be a maximum of 150m.
- 2.3.4. Water mains shall be PVC in accordance with the latest AWWA and CSA Standards.
- 2.3.5. All valves, fittings and hydrants shall be coated in accordance with the latest version of the City of Calgary Standard Specifications: Waterworks Construction and catholically protected with zinc anodes and cad welded to each fitting.
- 2.3.6. Design flows for residential developments shall be based on a per capita consumption of 320 litres per person per day.
- 2.3.7. Alberta Environment and Parks – Guidelines for Municipal Waterworks shall apply for operating pressures of the water distribution system.
- 2.3.8. In areas where sidewalks are only required on one side of the roadway, the fire hydrant shall be installed on the opposite side.
- 2.4. Service Connections
- 2.4.1. Water service lines shall be series Pex Pipe (Crosslinked Polyethylene Pipe), minimum 25mm in size.
- 2.4.2. Sewer service lines shall be PVC.
- 2.4.3. Lots for semi-detached and multiple units shall have one separate service for each unit.
- 2.4.4. Curb stands shall be marked with a wooden 2X4 extended 1m above finished grade.
- 2.4.5. Services shall generally be installed in the center of the lot avoiding installation under any driveways. The service shall be terminated a minimum of 3m into the lot, beyond any shallow utility installation and shall be protected by utility right-of-way providing access to the Town.

- 2.4.6. For industrial lots, minimum service size shall be 150mm sanitary and 50mm water unless the size of the lot or proposed land use requires a larger size. Water valves shall be located a minimum of 3m into the lot, beyond any shallow utilities installation and shall remain closed and uncharged until the property is developed.

2.5. Roadway

- 2.5.1. Roadway and right-of-way widths shall follow the guidelines set out in Appendix A:
- 2.5.2. Roadway widths shall be measured from face of curb.
- 2.5.3. Structural sections of roadway shall meet or exceed the following:

Residential roadways:

- 80mm of asphalt concrete
- 100mm of crushed gravel
- 200mm of pit run gravel
- Geo textile under all roadway gravels

Collector roadways:

- 140mm of asphalt concrete
- 100mm of crush gravel
- 200mm of pit run gravel
- Geo textile under all roadway gravels

Major Collector and Industrial roadways:

- 160mm of asphalt concrete
- 100mm of crush gravel
- 300mm of pit run gravel
- Geo textile under all roadway gravels

The proposed structural design section may be reduced if supported by an investigative report and recommendations from a qualified Geotechnical Engineer and approved by the Town.

2.6. Sidewalks, Curb and Gutter

- 2.6.1. In residential areas curb and gutter shall be low profile rolled section except adjacent to reserves where standard faced curbs shall be constructed. For commercial, industrial or major collector roadways with no driveway accesses, standard faced curb shall be constructed.

- 2.6.2. In residential areas sidewalks shall be low profile rolled monolithic curb and gutter with a sidewalk width of 1.1m. Where standard faced curbs are required, the width shall increase to 1.31m. Adjacent to school sites or commercial areas, the sidewalk width shall be increased by 0.4m to 1.5m and 1.71m accordingly. Collector roads shall have a sidewalk width of 1.5m.
- 2.6.3. Sidewalks are required on both sides of the street for Arterial and Collector roads, local roadways shall have sidewalks on one side of the road, crescents shall have a sidewalk on one side if there are more than 40 dwelling units and cul-de-sacs shall have a sidewalk on one side if there are more than 20 dwelling units.
- 2.6.4. Surface drainage from any public area shall not flow over any sidewalk.
- 2.6.5. Industrial developments do not require sidewalks unless the type of development or the need to connect a pathway to other areas, dictates the need for sidewalks.
- 2.6.6. Wheelchair ramps are required at all intersections and designated crosswalks.
- 2.6.7. Class A concrete is required for all sidewalks, curbs and gutters.
- 2.6.8. Gutter widths shall be 0.25m except for major collector roadways which shall be 0.5m.
- 2.6.9. The structural gravel pit run section shall be placed beneath all concrete sidewalks, curb and gutter with a top layer of 20mm crushed road gravel to a minimum distance of 150mm behind the concrete structure.
- 2.6.10. In areas in which a sidewalk will be constructed on only one side of the roadway, the watermain and fire hydrant will be installed on the opposite side of the roadway.
- 2.6.11. Radii for curb returns shall be 9m for residential local roadways, 10m for collector roadways and 15m for major collectors and industrial roadways.

2.7. Landscaping

- 2.7.1. All municipal reserves (MR), walkways, boulevards and public utility lots (PUL), shall be loamed with a minimum of 150mm of suitable topsoil, graded to the design grades and hydro-seeded or sodded accordingly to the latest version of the City of Calgary Parks Development Guidelines and Standard Specifications – Landscape Construction.

- 2.7.2. Each residential lot shall receive a minimum of one 35mm caliper tree in the front yard.
 - 2.7.3. For all MR, walkways, major collector boulevards and PUL's, the developer shall prepare a detailed landscaping plan for approval by the Town.
 - 2.7.4. Major collector roadways shall require one 35 mm caliper deciduous tree for every lot.
 - 2.7.5. For MR's and walkways as a minimum, the Developer shall install one 35mm caliper tree and 10 shrubs for every 100 square meters of area and as a minimum, no less than 10 per parcel. Tree and shrubs shall be planted in bed clusters with mulch and edging for ease of grass cutting. For PUL's shrubs will be required but large caliper trees will not be permitted.
 - 2.7.6. Ratio of deciduous to coniferous trees shall be 3 to 1. Poplar trees will not be permitted. The type of trees and shrubs selected shall be town approved trees. The full listing is attached – Appendix C. Any trees or shrubs not on the listing shall require approval through the town, and listed in the developer's agreement.
- 2.8. Pedestrian Walkways
- 2.8.1. Pedestrian walkways where required shall be asphalt, 2.5m or 3m in width, in accordance with the latest version of the City of Calgary's Design Guidelines for Subdivision Servicing.
- 2.9. Traffic Control and Signage
- 2.9.1. The Developer's Consulting Engineer shall prepare a design drawing outlining traffic signs, street signs and pavement markings conforming to the Manual of Uniform Traffic Control Devices for the Town to approve.
 - 2.9.2. Upon approval by the Town and following construction of the roadways, the Town shall install the signs and pavement markings according to the approved design and standard practices. The Developer will be invoiced for all the labour and material costs.
- 2.10. Shallow Utility Servicing
- 2.10.1. The Developer shall contact each shallow utility company to determine servicing requirements for the development including alignments, right-of-ways requirements and location of poles, pedestals, transformers, and lot services drops.

- 2.10.2. Final alignments for shallow utilities require approval by the Town. As part of the detailed design submission for municipal improvements, the Consulting Engineer shall supply a design drawing noting the above plus supply the Town with a letter from each shallow utility company agreeing to these requirements.
- 2.10.3. Upon approval of the design drawings, the Developer shall arrange for design and installation of shallow utility servicing either with the shallow utility provider or if acceptable, with private sector contractors according to current provincial or federal codes for the utility.
- 2.10.4. Testing, inspections and installation monitoring shall either be provided by the shallow utility company or the consulting engineer and upon completion, shall verify the installation was completed to the proper code or standard.
- 2.10.5. Charging or energizing the lines shall be done by or in cooperation with the shallow utility companies.
- 2.10.6. As built drawings will be required for each shallow utility service.

2.11. Park & Recreation Facilities and Development

- 2.11.1. Park and Recreation facilities shall be developed in accordance with the approved overall landscaping plan prepared during the concept plan stage.
- 2.11.2. All park areas shall be loamed, graded, grassed and landscaped according to the standards outlined herein and approved design drawings.
- 2.11.3. For park areas, walkways or PUL's Town approved fencing shall be installed according to current standards along all roadways and lanes preventing vehicle access to the area other than maintenance equipment and pedestrians.
- 2.11.4. For lots backing onto park areas, the Developer should consider specifying and installing uniform fencing.
- 2.11.5. In park areas, the Town may request recreational facilities including construction of tot lots, playground equipment, playing fields or other facilities deemed necessary to service the development area and if required, the Developer shall prepare a detailed drawing outlining the recreational facilities for approval by the Town. The recreational facilities shall be in accordance with the latest version of the City of Calgary's Development Guidelines and Standard Specifications: Landscape Construction.

Once approved, the Developer shall install the recreational park, playground, playing field or any other facilities according to the approved plan and specifications when Building Permits have been issued on 50% of the lots within the development area and they shall maintain the facilities for a period of two (2) years.

2.12. Fencing

- 2.12.1. Uniform fencing may be required for noise attenuation along railway tracks, screening, perimeter fencing or along backs of lots adjacent to park areas. When required, the fencing shall consider its intended use and shall be designed accordingly considering heights, construction material, spacing, appearance and maintenance. The Developer shall consider all the factors and shall prepare a detailed design drawing according to the latest version of the City of Calgary's Development Guidelines and Standard Specifications: Landscape Construction for approval by the Town.
- 2.12.2. Once approved, the Developer shall construct the fencing according to the approved design drawings and specifications and maintain the fencing for a period of two (2) years.
- 2.12.3. The selection of fencing material will be one of the critical factors in the Town's approval and shall consider yearly maintenance, life cycle replacement and graffiti. The Town encourages such fencing to be located on private property where practical and if installed on private property, shall be covered by a caveat on the property limiting the modifications, removal or changing of color by the property owner.

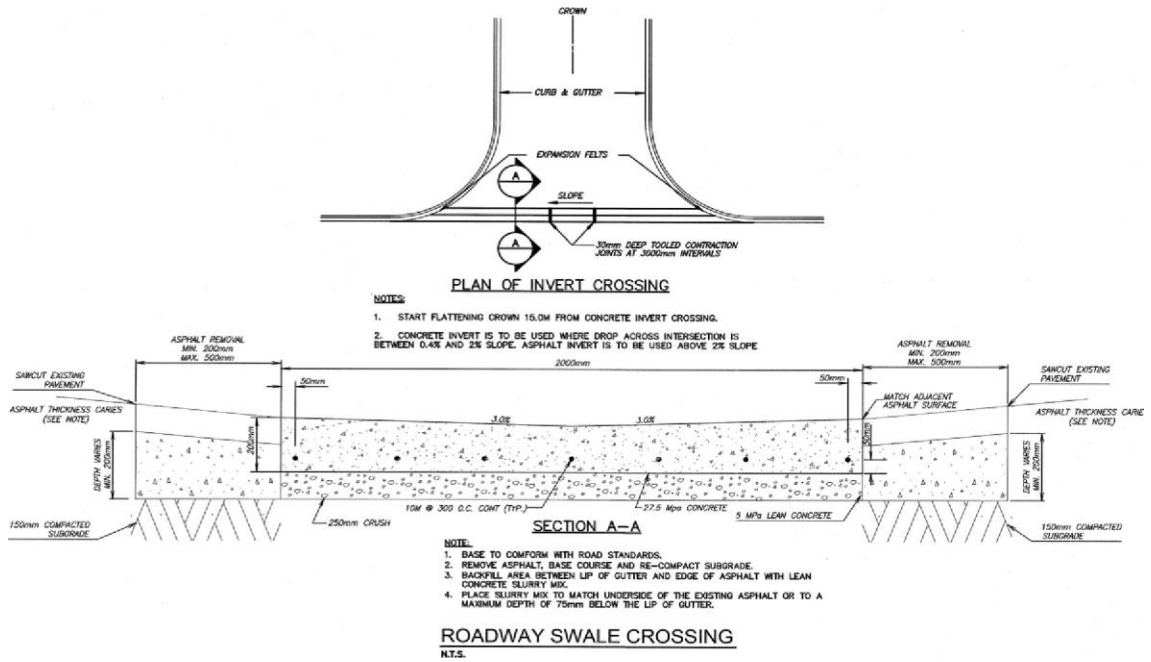
Appendix A
Town of Carstairs
Construction and Infrastructure Design Standards

Classification	Width	Right of Way
Pathway	2.5m to 3m	6.0m (unless required to accommodate utilities)
Lane	6.0m	6.0m (10.0m where lane is serviced)
Residential Local	11.0m	15.0m
Residential Collector Undivided	12.5m	21.0m
Major Collector Divided	With Parking – 19.0m W/O Parking – 15.0 m Median – 3.5 m	With Parking – 32.0m W/O Parking – 27.0m
Cul-de-sac Bulbs	25.0m	30.0m

Appendix B

Town of Carstairs

Construction and Infrastructure Design Standards



Appendix C

Town of Carstairs

Construction and Infrastructure Design Standards

Approved Tree List

Bur Oak

Brandon Elm

Siberian Larch – in groups

Linden

Douglas Fir

Cut Leaf Weeping Birch – moist areas

Clump Paper Birch – moist naturalized areas

Toba Hawthorn

Paper Birch – large sites and moist areas

Dakota Pinnacle Birch – moist areas

Ohio Buckeye

Lodgepole Pine

Ponderosa Pine

Ivory Silk Tree Lilac

Amur Cherry

Trembling Aspen

Swedish Columnar Aspen

Makamik Flowering Crab

Prairie Spire Green Ash

Mountain Ash

Snowbird Harthorn

Sutherland Caragana – in groups

Colorado Blue Spruce

White Spruce

Scotch Pine