Design Standard

Water

November 2025

City of Regina | REGINA Infinite Horizons

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1. General

1.1 Introduction

1.1.1 Water use efficiency and water conservation are key aspects of the City's future water supply planning. All water projects should employ conservation techniques and technology.

1.1.2 This design standard should be used in conjunction with the general design standard and the guiding documents listed below.

1.1.3 It shall be the designers' responsibility to be aware of the statutory requirements governing such works and comply with those requirements. The listing provided below is for guidance. Other statutory instruments not included here may be applicable.

1.1.4 Where acts, bylaws, regulations, and standards are referred to, they shall be currently amended and updated issues of such.

1.2 Reference Documents

1.2.1 All related references are noted in Design Standard: General Information.

1.3 Definitions

1.3.1. All definitions are noted in Design Standard: General Information.

2. Preliminary Design

2.1 Introduction

2.1.1 Water system extensions shall not degrade the existing distribution system's service level below the System Performance Criteria.

2.1.2 Water system extensions shall be designed with oversized watermains as needed for future extensions based on the city's input.

2.2 Hydraulic Network Analysis

2.2.1 Computerized modelling shall use WaterCAD® or WaterGEMS® by Bentley Systems Inc®.

2.2.2 The City of Regina will provide a WaterCAD® base model for analysis and design, considering system-wide implications.

2.2.3 Node elevations in the model shall be set to the design street elevation and not the design watermain elevation.

2.2.4 Projected water demands shall be distributed throughout the system following the proposed development adjacent to each node.

2.3 Design Fire Flow Criteria

2.3.1 Fire flow is to be assumed to occur concurrently with Peak Day Demand in the system.

2.3.2 Required Minimum Fire Flow is to be available at any given point in the water network.

2.3.3 When designing new greenfield areas, initial fire flow design requirements are as follows in Table 1 and are subject to adjustment on a case-by-case basis.

Table 1: Required Fire Flow

Required Fire Flow		
Zoning Designation	**Fire Flow Requirement Designation**	**Required Minimum Fire Flow**
FW, PUD, RU, R1	Level 1	90 Litres per second
ML, RN, RL, MH, OA, RH, RMH, DCD-TAN	Level 2	150 Litres per second
MLM, DCD-D, I, IL, IP, LP, RW, DCD-WH	Level 3	250 Litres per second
IH	Level 4	300 Litres per second
Airport, Airport Industrial	Not Applicable	Requirements as per Regina Airport Authority
Wascana Centre	Not Applicable	Requirements as per Provincial Capital Commission.
University of Regina	Not Applicable	Requirements as per Provincial Capital Commission
Note: Overlay Zones must be confirmed with the City of Regina.		

2.3.4 At the time of development permit, developments may be required to complete an evaluation of the required fire flow based upon “Water Supply for Fire Protection 2020 – Fire Underwriters” Survey”. Fire flow evaluation is required for applications with the following:

2.3.4.1 New residential developments with greater than 4 units.

2.3.4.2 Any new institutional, industrial or commercial development.

2.3.4.3 Any development with a land use change resulting in an occupancy hazard of +15% or greater as specified in Table 3 Recommended Occupancy/Contents Charges by Major Occupancy Examples within “Water Supply for Fire Protection 2020 – Fire Underwriters’ Survey”

2.3.4.4 Any proposed development that the City of Regina deems necessary.

2.3.5 Except when the occupancy hazard is +15% or greater as specified in Table 3 Recommended Occupancy/Contents Charges by Major Occupancy Examples within “Water Supply for Fire Protection 2020 – Fire Underwriters’ Survey”, a fire flow evaluation in accordance with Section 2.3.4 is not required if a minimum water capacity of 250 litres per second is provided to the proposed building(s) in accordance with the methodology in “Water Supply for Fire Protection 2020 – Fire Underwriters’.

2.3.6 If private hydrants are required for the development of a site (required due to hydrant coverage or National Building Code), calculations/modelling is required to determine if the private hydrants can provide sufficient fire flow for the site as dictated by 2.3.4.

2.4 Design Peaking Factors:

2.3.7 Average Day Demand: 390 Litres per capita per day

2.3.8 Peak Day Demand = 1.8 x Average Day Demand.

2.3.9 Peak Hour Demand = 2.9 x Average Day Demand.

2.5 Hazen-Williams C factors for all hydraulic modelling:

2.5.1 Asbestos-cement pipe – Design C factor = 120
2.5.2 Cast iron pipe – Design C factor = 100
2.5.3 PVC pipe – Design C factor = 130
2.5.4 HDPE pipe – Design C factor = 130
2.5.5 Steel pipe – Design C factor = 120
2.5.6 Other C factors for materials not listed are to be reviewed and approved by the City of Regina.

Table 2: Design Population Table

Design Population Table	
Zoning	**Population**
Single Family Residential	3.3 persons/unit
Multi-Family Residential	2.3 persons/unit
High Rise Residential	235 persons/hectare
Commercial, Mixed*	65 persons/hectare
Institutional*	50 persons/hectare
Industrial*	25 persons/hectare
*Consideration will be given to alternate populations, provided alternative populations can be demonstrated to the City's satisfaction.	

2.6 Development of Water Supply Staging Requirements

2.6.1 For subdivisions ≥ 2 hectares and < 10 hectares in the total final area, provide a minimum of two independent connections to the distribution system within 5 years from the date of execution of the servicing agreement or issuance of the development permit.
2.6.2 For subdivisions ≥ 10 hectares and < 20 hectares in the total final area, provide a minimum of two independent connections to the distribution system within 3 years from the date of execution of the servicing agreement or issuance of the development permit.
2.6.3 For subdivisions ≥ 20 hectares in the total final area, provide a minimum of two independent connections to the distribution system within 2 years from the servicing agreement's date of execution.
2.6.4 All subdivisions shall adhere to the requirements of the Watermain Chapter of The Environmental Management and Protection Regulations.
2.6.5 All subdivisions shall conduct disinfection and flushing of watermains per The Waterworks and Sewage Works Regulations and comply with the procedures set out in the City of Regina Standard Construction Specification Section 02519.
2.6.6 Each connection must be minimum feedermain classification or approved by the City of Regina.

2.7 System Performance Criteria

2.7.1 Simulate and verify the following maximum pressure drop requirements corrected for node elevation differences under Peak Hour and Peak Day plus Fire Flow conditions. Pressure drops are calculated between the City of Regina tie-in node(s) and the node with the lowest hydraulic grade line in the complete development, not in a partial system. Pressure drops should be calculated in the form of a hydraulic grade line.

- 2.7.1.1 Peak Hour Demand maximum allowable pressure drop ≤ 27.6 kilopascals.
- 2.7.1.2 Peak Hour Demand minimum allowable pressure corrected to proposed ground elevation ≥ 269.4 kilopascals.
- 2.7.1.3 Peak Day Demand minimum allowable residual pressure at any point in the system within 500 m of the fire site under Fire Flow condition corrected to proposed ground elevation ≥ 140 kilopascals.

2.7.2 Simulate and verify the following maximum pipe velocities:

- 2.7.2.1 ≤ 1.5 metres per second at Peak Hour Demand
- 2.7.2.2 ≤ 3.2 metres per second at Peak Day Demand plus Fire Flow

3. Detailed Design

3.1 Modelling

3.1.1 Network design shall be based on a Hydraulic Network Analysis completed using WaterCAD® or WaterGEMS® by Bentley Systems Inc® and parameters made available during detailed design of the proposed development.

3.2 Watermain Location

3.2.1 Watermains shall be designed without high points where air can become trapped within the pipe.

3.2.2 Watermains should cross above sewer mains. If the water mains cross above the sewer mains, they shall maintain a minimum clear vertical separation of 0.3 meters.

3.2.3 If the water mains cross below the sewer mains, the crossings should be designed as close to 90 degrees as possible with a minimum clear vertical separation of 0.5 meters.

3.2.4 Locate watermains a minimum of 3.0 metres horizontally from sewermains measured from the edge of the pipe to the edge of the pipe.

3.2.5 Locate watermains in the street right-of-way at an offset of 3.0 metres from the centerline to the edge of the pipe. If the street contains a sewer pipe in the street centreline, then the offset shall be measured from the edge of the sewermain to the edge of the watermain.

3.2.6 Locate watermains on the no-parking side of streets with parking on only one side to ensure street parking is not reduced.

3.2.7 For installation in walkway or easement:

- 3.2.7.1 Easements shall be a minimum width of 6.0 metres for watermains 400 millimetres or less in diameter.
- 3.2.7.2 Easements shall be a minimum width of 10.0 metres for watermains larger than 400 millimetres.

3.2.8 Locate watermains in the centre of the walkway or easement unless specifically approved otherwise.

3.2.9 Locate watermains a minimum of 3.0 metres horizontally from landscaped medians.

3.2.10 Where possible, watermains should be located on the opposite side of the road right- of-way as the shallow utilities.

3.2.11 No permanent structure shall be erected over a City watermain or an easement to accommodate such.

3.2.12 Maintain a minimum horizontal and vertical clearance of 1.5 metres and 0.6 metres, respectively, between the water main and other service utilities, including cable, conduit, duct, or duct bank.

3.3 Watermain Depth of Cover

3.3.1 Watermains shall be uninsulated unless approved by the City.

3.3.2 The minimum depth of cover on distribution watermains shall be 2.7 metres to the top of the pipe.

3.3.3 The minimum depth of cover on feeder and trunk watermains shall be 2.3 metres to the top of the pipe.

3.3.4 The proposed depth of cover shall not exceed 3.2 metres to the top of the pipe.

3.3.5 Watermains shall be designed to withstand superimposed live loads and dead loads.

3.4 Watermain Sizing

3.3.1 The sizing of watermains will be determined by hydraulic network analysis.

3.3.2 The minimum size of a distribution main shall be 200 millimetres.

3.3.3 After the last hydrant tee on a dead-end, the watermain diameter shall be reduced to 150 mm or the appropriate required size to achieve fire flows.

3.5 Watermain Looping

3.5.1 Design of dead-end watermains is permissible only in cul-de-sacs and locations specifically approved by the City of Regina.

3.5.2 A flush out shall be provided at the end of all dead-end watermains. See City of Regina Standard Construction Specifications Water Standard Drawing Detail for Deadend Watermain Flush out.

3.5.3 Hydrants may be used as flush-outs where the watermain has been stubbed to allow for future extension.

3.5.4 The maximum allowable length of a dead-end watermain is 150 metres.

3.5.5 Interconnect 200 millimetres diameter mains in Level 1 areas at least every 300 metres.

3.5.6 Interconnect 200 millimetre diameter mains in Level 2 and higher areas at least every 200 metres.

3.5.7 Where street layout does not permit interconnection every 200 metres, isolation valves, spaced as per Section 3.9 Valves to a maximum spacing of 200 metres, can be utilized to extend the interconnection distance to a maximum of 300 metres.

3.5.8 Provide watermains spaced such that no point in the system is more than 2000 metres from a minimum 400-millimetre diameter feeder main measured linearly along the pipe.

3.6 Fire Hydrant Design

1.2.1 Fire hydrant design and layout shall be per NFPA Standards and the City of Regina Fire Department.

1.2.1 Use minimum 150-millimetre diameter pipe for hydrant leads or as required to limit pressure loss between the connection points to the main and the hydrant to less than 21 kilopascals at a flow rate of not less than 90 Litres per second at the hydrant.

3.7 Fire Hydrant Location

3.7.1 Fire hydrants shall be located:

- 3.7.1.1 On the watermain side of the street.
- 3.7.1.2 At the entrances to the streets.
- 3.7.1.3 At the right-hand side when entering at the entrance to cul-de-sacs,
- 3.7.1.4 Within 3.0 metres of the property line.
- 3.7.1.5 With a minimum of 300 millimetres clearance from the back of the walk.
- 3.7.1.6 With a minimum of 1.5 metres from the back of the curb on streets designated as local.
- 3.7.1.7 With a minimum of 1.8 metres from the back of the curb on all other streets
- 3.7.1.8 Between the curb and sidewalk in areas with a separated sidewalk.

3.8 Fire Hydrant Spacing

3.8.1 In Level 1 areas, fire hydrants shall be spaced so that there is a maximum of 150 metres of unobstructed distance between hydrants.

3.8.2 In Level 2 and higher areas, fire hydrants shall be spaced so that there is a maximum of 90 metres of unobstructed distance between hydrants.

3.9 Valves

3.9.1 Valves shall conform to the subsequent criteria within this section.

3.9.2 Equal to the nominal size of the watermain.

3.9.3 Located on or in line with property lines and within the paved portion of streets.

3.9.4 Located at all street intersections and additional locations in residentially zoned areas so that the closure of adjacent valves will not result in an interruption of service to:

- 3.9.4.1 More than 26 individual residential addresses, including those within detached single- family, duplex, townhouse or other multi-home units.
- 3.9.4.2 Apartment block(s) containing a total of 52 or more individual apartment units.
- 3.9.4.3 Any combination of the above.

3.9.5 Located in Fire Flow Level 1 areas so that a maximum of two hydrants would be out of service by the nearest adjacent valve's closure on either side of any point on the watermain.

3.9.6 Located in Fire Flow Level 2 or higher areas so that a maximum of one hydrant would be out of service by the nearest adjacent valve's closure on either side of any point on the watermain.

3.9.7 Located on every hydrant lead.
3.9.8 Located on all interconnections to feeder and trunk watermains.
3.9.9 Spaced at a maximum of 1000 metres along trunkmains. Valve chambers shall be installed to access the valves, and access ports 400 millimetres diameter or larger shall be installed inside each chamber.
3.9.10 Located at either end of sections of watermain passing through an easement or walkway.
3.9.11 Located such that the closure of a maximum of four valves will isolate any section of the watermain.

3.10 Service Connections General

3.10.1 Service connections shall only connect to a distribution watermain or feeder watermain.
3.10.2 Service Connections shall consist of: a corporation stop, water service pipe and, a curb stop located on the property line.
3.10.3 Service connections shall connect to the watermain at a perpendicular angle.
3.10.4 Service connections shall have a minimum of 2.7 metres of cover to the top of the pipe.
3.10.5 A separate service connection to the distribution system is required for each lot with distinct certificates of title. Water service pipes are not permitted to traverse any private property other than that on which the building the piping serves is located as per the National Plumbing Code of Canada (Section #2.1.2.4)
3.10.6 Each condominium building shall have separate service connections to the public watermain. Condominium units are serviced from a private watermain within the building.
3.10.7 In the case of Bareland Condominium, separate service connections are made to a private watermain. The private water main shall have a single connection to the public watermain, except where looping is required.
3.10.8 Larger commercial, residential or industrial parcels that cannot be serviced from the public right of way may require a shared services easement agreement registered on the affected properties' title. Each of these parcels would require isolated services from the shared private main.
3.10.9 Private developments containing more than 26 residences require a service connection from at least two separate water distribution mains to create a looped system. If this is not possible, isolation valves shall be located on either side of the service connection on the watermain being connected to.
3.10.10 Service connections may not pass within a horizontal distance of 1.5 metres from other underground utility infrastructure either owned by the City or a third-party provider.
3.10.11 No building shall be erected over a service connection or on an easement.
3.10.12 A service connection shall not be installed under a building.
3.10.13 Existing service connections that are redundant, unused, lead, or polybutylene (Poly- B) material shall be disconnected and capped at the distribution main.

3.11 Service Connections Size

3.11.1 Service connections for residential lots shall not be less than 25 millimetres in diameter and sized according to peak demand flow. Refer to National Plumbing Code of Canada Section 2.6.3.4.

3.11.2 Service connections for commercial and industrial zoned applications are to be a minimum of 50 millimetres in diameter and sized according to peak demand flow and NFPA standards. Refer to National Plumbing Code of Canada Section 2.6.3.4.

3.11.3 Size shall be as specified by NFPA standards where sprinkler service mains are required.

3.11.4 Service connections to the City of Regina trunk watermain system known as the 'City Loop' must be a minimum of 300 millimetres in diameter.

3.12 Service Connections for Open Space

3.12.1 Service connections for open space shall conform to the preceding Service Connections General section.

3.12.2 Open space service connections shall conform to the City of Regina Standard Construction Specifications Manual and consist of:

- 3.12.2.1 a corporation stop
- 3.12.2.2 a curb stop located on the property line
- 3.12.2.3 a water service pipe
- 3.12.2.4 a curb stop inside the open space, and
- 3.12.2.5 a drain located inside the open space for 100-millimetre diameter service connections

3.12.3 Open space irrigated areas of 1.25 hectares or less shall have a single service connection of 50 millimetres in diameter.

3.12.4 Open space irrigated areas greater than 1.25 hectares and less than 2.5 hectares shall have a single service connection of 100 millimetres in diameter.

3.12.5 Open space irrigated areas of 2.5 hectares or greater shall have a service connection of 100 millimetres in diameter for every 2.5 hectares of area.

3.12.6 Each community garden space shall have a separate water service connection.

3.12.7 Community gardens smaller than 2.0 hectares shall have a 50-millimetre diameter service connection.

3.12.8 Community gardens 2.0 hectares or larger shall have a 100-millimetre diameter service connection.

3.12.9 Each standard multipurpose athletic field shall have a separate service connection of 100 millimetres in diameter.

3.12.10 Service connections for open space shall be located to minimize the distances from the connection to the irrigation area within the open space it is to serve.

4. Site Design

4.1 Duplexes

4.1.1 Individual services from the watermain shall be provided to the side-by-side duplex units.

4.1.2 Superimposed duplexes shall be serviced from a single connection to the watermain. The main service shall be split into two individual services immediately inside the building, and a lockable main shutoff valve must be provided on each branch.

4.1.3 Front-to-back duplexes shall be serviced from a single connection to the watermain. The main service shall be split into two individual services immediately inside the property line as per the Standard Construction Specifications Manual. Curb stops must be spaced a minimum of 750 millimetres apart.

4.2 Private Developments

4.2.1 Private developments containing more than one multi-residence building require a shutoff valve installed on each building's water service branch.

4.2.2 Private developments containing more than one multi-residence building or more than 26 residences connected to an un-looped watermain require the provision of a flush out or hydrant located to enable the private watermain to be flushed out over its entire length.

4.3 Properties Containing Underground Hazardous Materials Storage Tanks

4.3.1 Copper pipes must be used for services 50 millimetres diameter or smaller.

4.3.2 Ductile Iron Pipe or a City approved equivalent must be used for 100 millimetres in diameter or larger.

4.3.3 An impermeable barrier of bentonite must be installed in the service trench at the property line per the City of Regina Standard Construction Specifications Manual.

4.4 Service Connections

4.4.1 Service connections and curb boxes are to be located within the landscaped portion of a lot when possible.

4.4.2 Service connections and curb boxes must be offset a minimum distance of 1.5 metres from existing or proposed trees and shrubs.

4.4.3 The maximum length of a single connection is 150 metres.

4.5 Building Service and Fire Systems Booster Pumps

4.5.1 Service lines are to be designed, so that booster pumping is not required.

4.5.2 Where use of a booster pump is unavoidable, design the service and booster pump per the following:

4.5.2.1 With backflow preventer assembly and water meter on the upstream (suction) side of the booster pump. Water meters are not required on fire booster pumps.

4.5.2.2 The minimum pressure at pump suction connections shall be greater than 140 kilopascals at a flow rate of 110% of the booster pump design flow.

4.5.2.3 Where the operation of a domestic supply booster pump at the above criteria results in a pressure less than 245 kilopascals at the service connection point to the watermain, as determined by WaterCAD® modelling with the system operating at Peak Day Demand, provide a modulating suction pressure sustaining valve set to preserve a minimum 245 kilopascals pressure as measured at the watermain connection point. Provide modelling results for review and approval.

4.5.2.4 Where the operation of a fire system booster pump at the above criteria results in a pressure less than 140 kilopascals at the service connection point to the watermain, as determined by WaterCAD® modelling with the system operating at Peak Day Demand, provide a modulating suction pressure sustaining valve set to preserve a minimum 140 kilopascals pressure as measured at the watermain connection point. Provide modelling results for review and approval.

4.6 Water Meter Installation and Backflow Prevention

4.6.1 Metering is required on each water service connection to the City of Regina supply or distribution systems. Water meters are sized, supplied, and installed by the City of Regina and remain City of Regina property.

4.6.2 All new residential water services that will be providing water to a property with more than two and a half baths must consult the Water Meter Program to ensure the City of Regina can determine the appropriate meter size.

4.6.3 All new multi-residential, commercial or industrial water services require the completion of a Meter Sizing Form so that the City of Regina can determine the appropriate meter size.

4.6.4 A Premise Isolation device (testable backflow assembly) is required to be installed, maintained, and tested on an annual basis for all multi-residential, commercial and industrial facilities. Additional backflow prevention devices may be required as determined by the City’s Cross Connection Control Program.

Tables

Table 1: Required Fire Flow
Table 2: Design Population

Charts
None

Figures
None

Appendices
None

Revisions

Description	Notes	Date
Conversion from Development Standards Manual and Update	See List of Specific Changes for 2021	January 2021
Changed Definitions & References	Migrated the content to the General Section.	May 2022
Sections 3.2.2 and 3.2.3 updated	Update sections 3.2.2 and 3.2.3 to avoid contradiction and be in line with Provincial Standards	Sep 2023
Section 2.3	Fire Flow calculation methodology changed to be in line with Water Supply for Fire Protection 2020 – Fire Underwriters' Survey	November 2025