



Town of
CORNWALL
so much to offer...

**TOWN OF CORNWALL –
WATER & SEWER UTILITY
CORPORATION**

MUNICIPAL SERVICING STANDARDS

July 2020

INTRODUCTION

General

The Town of Cornwall – Water & Sewer Utility Corporation (the Utility) has developed these servicing standards for the design and installation of water and sewer systems in the Town of Cornwall (the Town) to

- achieve the best combination of installation, maintenance and operating costs for water and sewer systems,
- allow developers to plan and budget with the prior knowledge of the Utility’s requirements,
- make the approval process more effective and efficient, and
- coordinate Utility requirements within the overall Town’s development approval process.

The Utility has the right to refuse service to any customer not meeting these requirements. It is also important that water meters are installed where required. Applicants must contact the Utility at 902-566-3234 before commencing construction.

SECTION A

This section details the installation standards for service connections from the main lines to the main domestic control valve and requirements for proper water meter installation.

Installation of Water, Sewer & Sprinkler Connections

For a new development within the Town of Cornwall, the applicant for water, sewer and/or sprinkler service must first apply for a development permit and meet all requirements of the development permit before a connection to the Utility services is permitted.

For an existing development, or for a connection outside of the Town of Cornwall, at the time of application for water, sewer and/or sprinkler service for new connections, the applicant must provide a site plan of the property and building requiring service. The site plan is to indicate:

- a) The location and dimensions of the building requesting service relative to the property being developed,
- b) Location and size of the services being requested relative to the building, and
- c) Location of service entrance within building including valves, water meters, backflow preventers, sewer cleanout and backwater valve.

The Contractor is required to follow the following installation requirements:

- a) All service pipes shall not be backfilled until a complete inspection is performed by the Utility and the installation found to meet the requirements of the Utility,
- b) Internal plumbing must be in accordance with the Canadian Plumbing Code, most recent edition,
- c) To protect from frost, required service pipe depth is 1800 mm, bedded in well-compacted sand or selected excavated materials for the entire trench width and length. With the Utilities approval, insulation will be permitted to be used if the proper cover cannot be obtained, and
- d) Trench excavation is to meet the requirements of the Occupational Health and Safety Act and Regulations.

1) Water Installation Requirements

All water services shall be installed in accordance with the typical service installation as described below:

- a) Inside valve is to be a high quality shut off value (with packing nut), an idler to meet the standards of a 16mm x 19mm (5/8" x 3/4") water meter after the check valve, and a 19mm (3/4") #7 Watts backflow preventer or approved equal shall be installed before activation of services.
- b) The connection of a homeowner's installation serviced by the Utility to any other source of water supply is prohibited.
- c) To protect the service from damages, construction of driveways and sidewalks over municipal water services is prohibited. In the event this cannot be avoided the developer shall make alterations to:
 - Relocate the existing water service control valve such that the valve is located greater than 1500 mm away from the proposed driveway or sidewalk,
 - Install a protective valve box and cover over the service box top within the driveway asphalt,
 - All alterations shall be in accordance with the standards established by the Cornwall Water and Sewer Utility and will be at the developer's cost.
- d) Minimum service pipe shall be 19-mm:
 - type "K" copper tubing to ASTM B 88, minimum pressure rating 1035 kPa (150 psi),
 - Cross Linked Polyethylene (i.e. Municipex PEXa) tubing for pressure applications: to ANSI/AWWA C904, CAN/CSA B137.5, minimum pressure rating 1035kpa. A

stainless-steel support liner installed inside the pipe shall be utilized at each compression joint and at corporation stop connections, or

- As approved by the Utility.
- e) Where service pipe is greater than 50 mm piping shall be PVC DR-18 (AWWA C900) or Ductile Iron (AWWA C151), minimum pressure rating 1035 kPa (150 psi) or as approved by the Utility.
- f) Joints are to be compression type, Mueller H-15403 or approved equal with a minimum pressure rating 1035 kPa (150 psi).
- g) Service box is to be fully extended and shall be 150mm-200mm above final grade when backfilled.
- h) Electrical grounding to the water service pipe is not permitted.
- i) In areas of the municipality where water pressure is in excess of 552 kPa (80 psi), the homeowner shall install and maintain a pressure-reducing valve properly adjusted for the individual service situation.
- j) With the installation of the pressure reducing valve, the homeowner is advised to supply and install, for the homeowner's safety and protection, a pressure relief valve on the hot water boiler or some other suitable location. This relief shall also be maintained in good working order by the homeowner.
- k) All piping is to be disinfected during installation and flushed. Water services over 50mm are required to be water quality tested and pressure tested prior to activation. This work shall be the responsibility of the homeowner and/or contractor to complete. Copies of water quality and pressure testing are required to be provided to the Utility prior to activation of new water service.

2) Sprinkler Installation Requirements

All sprinkler services shall be installed in accordance with the typical service installation as described below:

- a) The connection of a homeowner's installation serviced by the Utility to any other source of water supply is prohibited.
- b) Where service pipe is 50 mm or less piping shall be
 - type "K" copper tubing to ASTM B 88, or
 - Cross Linked Polyethylene (example Municipex PEXa) tubing for pressure applications: to ANSI/AWWA C904, CAN/CSA B137.5, minimum pressure rating 1035kpa. A stainless-steel support liner installed inside the pipe shall be utilized at each compression joint and at corporation stop connections, or

- As approved by the Utility.
- c) Where service pipe is greater than 50 mm piping shall be PVC DR-18 (AWWA C900) or Ductile Iron (AWWA C151), minimum pressure rating 1035 kPa (150 psi) or as approved by the Utility.
- d) Joints and fittings shall be mechanical joint or push on (AWWA C110 and C111) with a minimum pressure rating 1035 kPa (150 psi) complete with appropriate thrust restraint.
- e) Electrical grounding to the water service pipe is not permitted.
- f) All piping is to be disinfected during installation and flushed. Water services over 50 mm are required to be water quality tested and pressure tested prior to activation. This work shall be the responsibility of the homeowner and/or contractor to complete. Copies of water quality and pressure testing are required to be provided to the Utility prior to activation of new water service.
- g) All sprinkler services shall include the installation of an approved backflow protection device as described in the Conditions and Requirements for Cross Connection Control Fire Protection Systems (NPC 2.6.2).

3) Sewer Installation Requirements

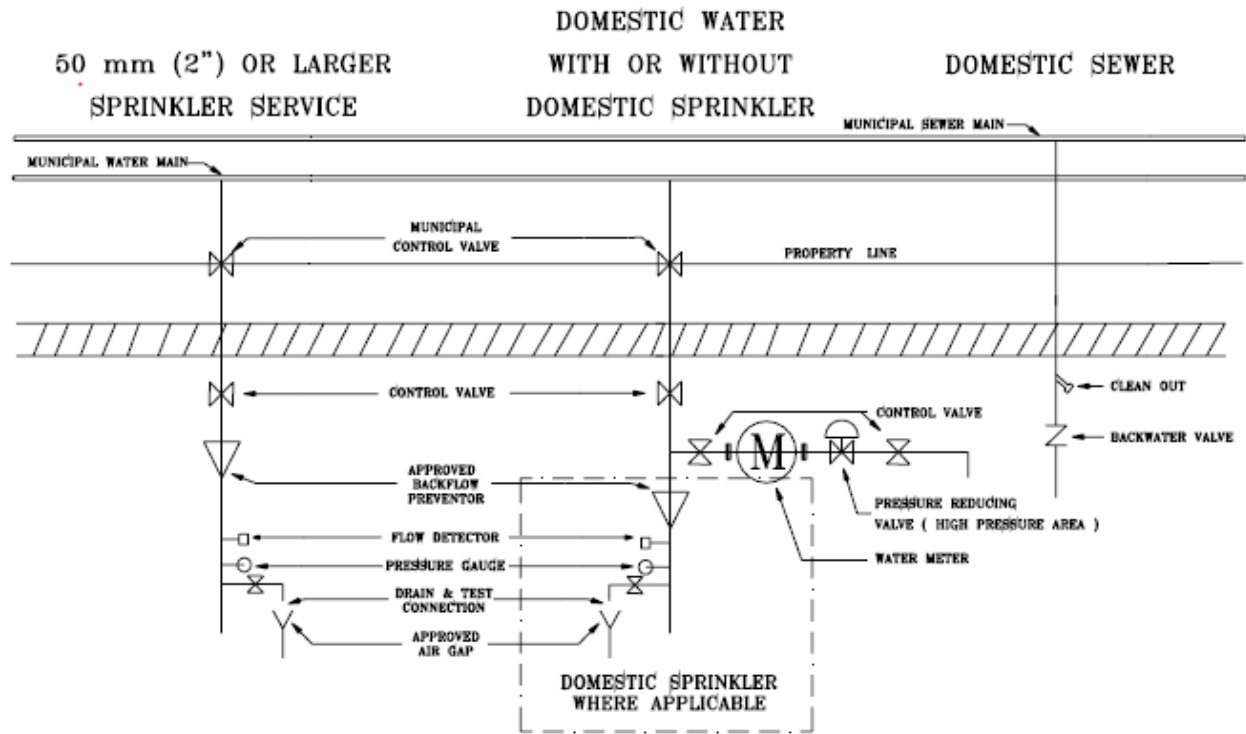
Underfooting service is not guaranteed by the Utility. Elevations must be verified by the Applicant before construction begins.

All sewer services shall be installed in accordance with the typical service installation and the minimum standard of acceptability as described below:

- a) Service pipe and fittings shall be 100 mm (minimum) PVC SDR 35 to ASTM Spec. D-3034 or CSA B-182.2 and installed to manufacturer's instructions. Pipe to be bedded in well-compacted sand or selected excavated materials for the entire trench width and length.
- b) Pipes are to be installed with a uniform grade of 2%. Long sweeps are to be used for changes in pipe direction.
- c) All sewer services shall be installed with a 100 mm (minimum) clean out immediately inside the foundation wall and a 100 mm back water valve installed on the upstream side of the clean out as indicated on the Typical Service Installation. The clean out and backwater valve are to be accessible for maintenance by the homeowner and exposed for inspection. Additional outside cleanouts shall be installed at 30-meter intervals along the length of sewer laterals exceeding 30 meters in length between the sewer main and the building being serviced.

- d) It is not permissible to connect foundation drainage, roof drainage, sump pump drainage, heat pumps or geothermal waste into the sanitary sewer lateral.

TYPICAL SERVICE INSTALLATION



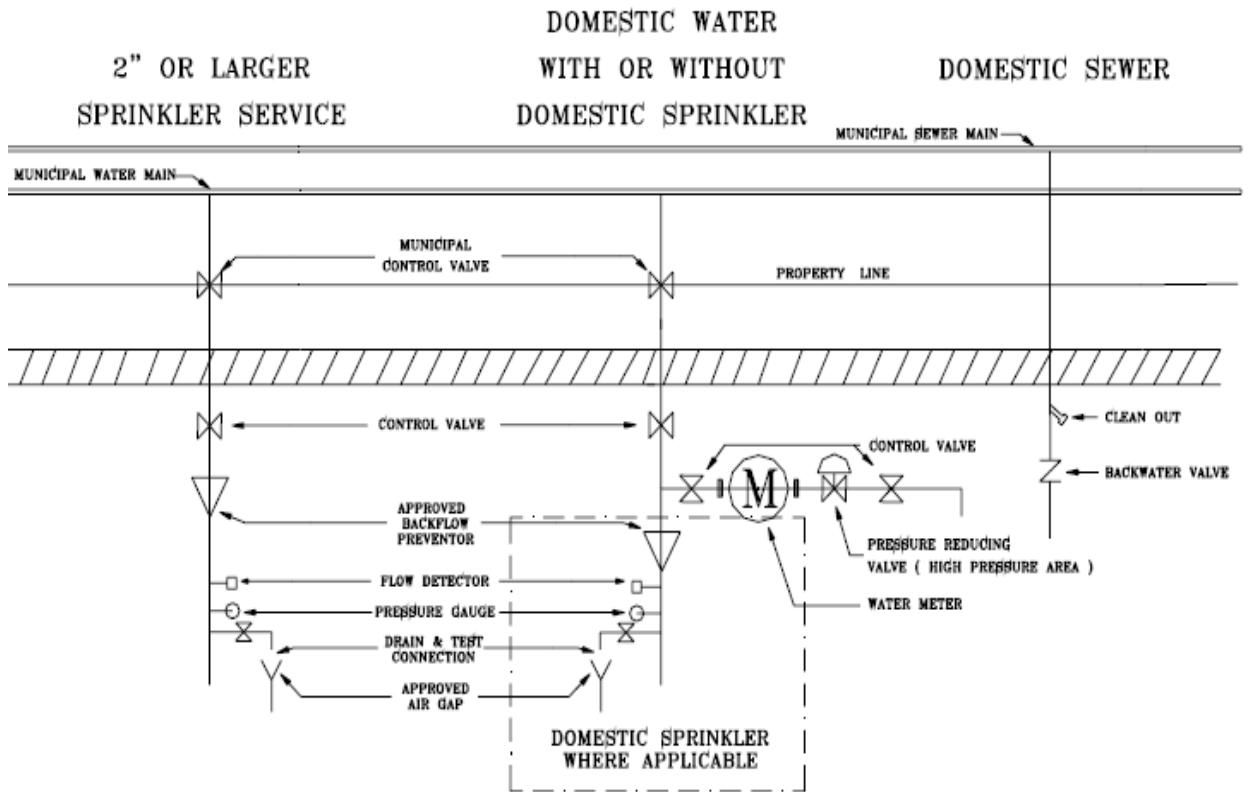
4) Water Meter Installation (5/8" to 2"; 17 mm to 50 mm)

Requirements for an acceptable meter installation are:

- Connections must be leak-tight.
- The meter will be positioned in a horizontal plane for optimum performance and that it provide an upstream (high quality) shut off valve and downstream (regular quality) shut off valve. (NOTE: all services above 25 mm (1") shall require slow closing gate or globe shut off valves).
- That the meter be located as near as possible to the point of entry of the service line and be accessible for service and inspection.
- That it provide for easy reading, either directly or via a remote reading device.
- That it be well protected against frost, mechanical damage and tampering.
- That all meters shall be installed before water is turned on.

NOTE: (1) Water Meter supplied by the Utility.

Typical Meter Installation



5) Water Meter Installation - Larger than 50mm (2") (Bypass may be required)

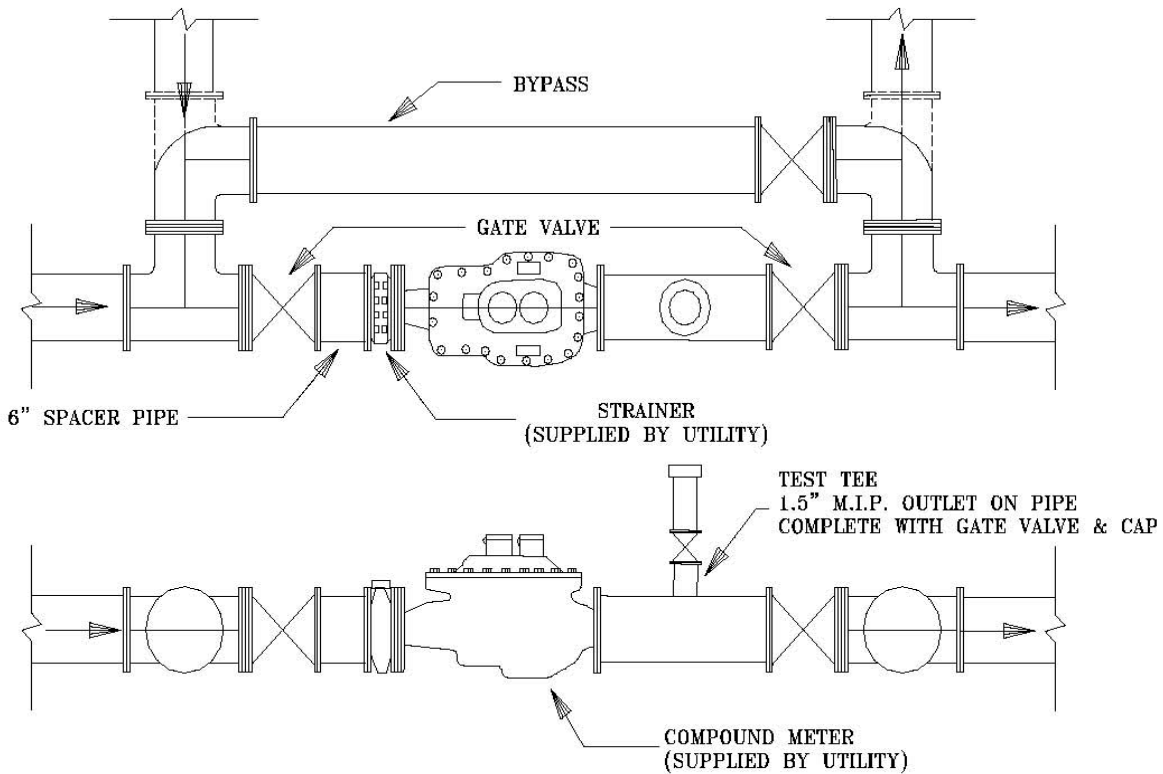
Requirements for an acceptable meter installation, larger than 50mm (2") are:

- a) Connections must be leak-tight.
- b) Provide an upstream and downstream shut-off valve (slow closing) gate or globe of high quality and low-pressure loss. All valves used shall meet the requirements of the Canadian Plumbing Code, most recent edition.
- c) That it positions the meter in a horizontal plane for optimum performance.
- d) That the meter be located as near as possible to the point of entry of the service line and be accessible for service and inspection.
- e) That it provides for easy reading, either directly or via a remote reading device.

- f) That it be well protected against frost, mechanical damage and tampering.
- g) If a bypass is used, the bypass must be closed and have a tamper proof seal installed by the Utility.

- NOTE: 1) Water Meter supplied by the Utility.
 2) Test Tee's may be required if the water meter supplied has no testing port built in on the body of the water meter.

Typical Meter Installation Larger Than 50mm (3"), (Bypass may be required)



SECTION B

This section details the design and installation standards for development of new water and sewer systems, lift stations and water pumping stations within the Town of Cornwall.

Development of Water and Sewer Systems

All water and sewer systems constructed in the Town must be designed and stamped by a qualified professional engineer. The design engineer must inspect the work and sign off on the construction to be in accordance with these servicing standards. These standards are not

meant to limit or impair good judgment and ingenuity nor are they intended to eliminate the need for detailed engineering design. Alternatives may be reviewed and permitted or required by the Utility as technology and industry standards change.

a) Design

The design of water and sewer systems must be carried out by a Professional Engineer (the Consultant) licensed to practice in the Province of P.E.I. The Consultant shall consult with the Utility at an early stage in the design to ensure that the proposed design is consistent with the Utility's overall servicing strategy and to allow for any over-sizing to be included to meet future developments (at the Utility's cost in accordance with these standards). The Consultant shall submit detailed design drawings and specifications for water and sewer systems for review and approval by the Utility prior to tendering of the project. Once approved by the Utility, drawings and specifications issued for construction shall be signed, dated and sealed by the Consultant, and submitted to the Town.

Where, in the judgment of the Consultant, variations from this document are justified or required and where the Consultant can show that alternate approaches can produce the desired results, the alternate approaches will be considered for approval upon submission of appropriate documentation to the Utility. Approval of any variations by the Utility does not remove the responsibility for proper design from the Consultant.

b) Other Requirements

The design and installation of water and sewer systems shall meet all federal and provincial requirements and shall conform to good engineering practice using the following guidelines:

- i American Water Works Association Standards;
- ii Atlantic Canada Guidelines for the Supply, Treatment, Storage, Distribution, and Operation of Drinking Water Supply Systems prepared by Atlantic Environment Departments;
- iii Atlantic Canada Wastewater Guidelines Manual for the Collection, Treatment & Disposal prepared by Atlantic Environment Departments; and
- iv Fire Underwriters Survey Requirements.

All contract documents prepared for municipal services work in the Town shall contain a clause requiring the contractor to carry out all work in compliance with all applicable municipal, provincial and federal regulations including, but not limited

to, the Occupational Health & Safety Act for the Province of Prince Edward Island.

c) Revisions to Servicing Standards

These standards are subject to change without notice and it is the responsibility of the Consultant to ensure that they are in possession of the latest revision.

d) Other Services

Other work, including road construction, storm drainage, electrical and communication services, shall be coordinated with the work herein.

1. Approval Requirements

a. Approval Process

The following is the approval process for the installation of water and sewer systems within the Town:

- i. Developers must first obtain preliminary subdivision approval from the Town.
- ii. Developers must enter into a Development Agreement with the Town in which the Town and the Utility shall set out the responsibilities and obligations of the Developer and the Utility.
- iii. Developers or their Consultants shall submit detailed design drawings and specifications as outlined herein for approval by the Town before tender.
- iv. Developers construct the water and/or sewer systems in accordance with the approved drawings and specifications unless approval to deviate from the approved drawings and specifications is obtained from the Utility in advance of any deviations from the approved drawings and specifications. The design engineer is required to be present for testing of the system and the contractor will provide 24-hour notice of testing to the Utility before proceeding, the design engineer will provide a report of the testing to the Utility.
- v. Developer obtains final subdivision approval from the Town; and
- vi. The Utility accepts the water and sewer systems after substantial completion of the work and upon receipt of Acceptance Requirements outlined in 1. (c).

b. Town Development Agreement

The Town Development Agreement shall set out the Developer's responsibilities for design and construction supervision, cost responsibility, timelines, approval prior to completion of the work, security, insurance etc. The final agreement must

be signed before the developer commences work.

c. Acceptance Requirements

The following items shall be submitted to the Utility prior to acceptance of the work and the Utility assuming responsibility of the system:

- i. One paper, one plastic reproducible and one digital copy (in PDF and AutoCAD) of the project record drawings prepared by the Consultant (dated, and stamped) which includes the original design information plus any site changes thereto, tie ins for valves, stub lines, manholes, bends, tees, noted repairs to existing infrastructure and anything encountered on the site that was not shown on the design drawings (rock, other services etc.) AutoCAD must be compatible with Arc GIS and the current Utility version of AutoCAD.
- ii. Copies of video inspection of the sewer system so that the picture quality, in colour, is a continuous 600-line resolution picture showing entire periphery of pipe. Correct any pipe joint which displays a gap or spread, offset, gasket, or signs of infiltration, any section of pipeline which is crushed, broken or displays cracks, any variance in grade of pipeline, any gravel, roots, or foreign material which may impede flow or any deformation in shape of pipe.
- iii. Two operation and maintenance manuals for any mechanical or electrical equipment or specialized equipment.
- iv. List of materials used with manufacturer and model number.
- v. A list of any deficiencies or outstanding work.
- vi. Easements where required in accordance with clause (e).
- vii. Test results.
- viii. Any cost or deposit required including water supply contribution in accordance with clause (f), financial guarantee required for acceptance prior to completion in accordance with clause (g) or the maintenance period security deposit required for the one year maintenance period in accordance with clause (h); and
- ix. Confirmation there is no outstanding financial obligation by the Developer to the Consultant, contractor or any other party associated with the work.

d. Cost Responsibility

The Developer is responsible for the cost of water and sewer systems sized to service the subdivision. The Utility will pay the cost of over-sizing systems to serve adjacent areas where the Utility deems the over-sizing necessary and upon submission of acceptable information showing the cost to be reasonable and in line with the Utility's estimates based on similar works.

e. Easements

All water, and sanitary sewer, (Utility Systems) are to be constructed within a street right-of-way. Easements agreements are only permitted when there are no alternative servicing routes and option of locating a street over a servicing corridor has been precluded.

Easement widths are governed by pipe separations set by the PEI Department of Environment and this specification as well as the ability to excavate, remove and replace Utility Systems utilizing a safe trench to the requirements of PEI Occupational Health and Safety.

The design engineer will determine the placement of the underground infrastructure, on center or offset, within the easement. The minimum easement widths required for Utility Systems are as follows:

Utility Systems	Minimum Easement Width
One main	6.0 meters
One main > 3.7 meters in depth	7.5 meters
Two mains	9.0 meters
Three or more mains, no closer than 3.0 meters to easement limits	Add 3.0 meters for each additional main

All Applications that include Utility Systems proposed to be within an easement are to be accompanied with a profile (cross-section) of the arrangement demonstrating conformance to separations and the ability to excavate a safe trench. Any excavation within the proposed easement cannot undermine other structures outside the easement boundary.

Depending upon the length and location of the easement, a travel way within the easement may be required for maintenance. This travel way is to be a gravel surface for grades up to 6% and asphalt for grades 6% to 8%.

All Utility easements are Easement Agreements that require the signature and seal

of both the Grantor and Grantee and be registered with the Province.

f. Water Supply

Where the Developer is required to install a central water system as a condition of a development or subdivision approval pursuant to the Town's Development Bylaw, the Utility will, at its discretion, extend the municipal water supply to the subdivision. Where the Utility opts not to extend municipal water service, the Developer shall install a water supply in the subdivision at his or her cost in accordance with the requirements herein.

g. One Year Warranty Period

The Developer shall guarantee all work done in connection with the installation of the water and/or sewer system (the Work) for one year after substantial completion of the Work (One Year Warranty Period). At the time of Utility acceptance, the Developer shall submit a security deposit (an unconditional letter of credit or other credit in a form acceptable to the Utility) equal to 3.75% of the value of the Work plus the value of any uncompleted Work. The Developer shall correct any deficiencies identified during the One Year Warranty Period and shall complete any uncompleted Work to the satisfaction of the Utility.

If the deficiencies identified are not completed to the satisfaction of the Utility or if the Developer does not complete any uncompleted Work, the Utility shall give written notice to the Developer and the Developer shall have 14 days to correct the deficiencies or complete the Work to the satisfaction of the Utility. If, after the 14 day period, the deficiencies are not corrected or the Work is not completed to the satisfaction of the Utility, the Utility shall correct the deficiencies and/or complete the uncompleted Work and deduct the cost from the security deposit to the Developer at the end of the one year warranty period.

h. Acceptance Prior to Completion

Where the Developer requests final subdivision approval prior to completion of the installation of the water and/or sewer system (the Work) or prior to achieving the acceptance requirements so that building permits can be issued, the Developer shall submit a financial guarantee (an unconditional letter of credit or other credit in a form acceptable to the Utility) equal to 110% of the value of the remaining Work and/or the cost of meeting the acceptance requirements. The Utility shall then accept ownership of the water and/or sewer system and shall return the financial guarantee upon satisfactory completion of the Work and/or the acceptance requirements.

If the Work and/or the acceptance requirements are not completed to the satisfaction of the Utility, the Utility shall give written notice to the Developer and the Developer shall have 14 days to complete the Work and/or the acceptance requirements to the satisfaction of the Utility. If, after the 14 day period, the Work and/or the acceptance requirements are not completed to the satisfaction of the Utility, the Utility shall complete the Work and/or the acceptance requirements and deduct the cost from the financial guarantee and then return any unused portion of the financial guarantee to the Developer. Record drawings for the portion of work completed must be submitted to the Utility prior to the Utility accepting ownership and prior to building permits being issued.

2. Submission Requirements

This section summarizes some of the information that must be submitted in order for the Utility to properly evaluate and approve the construction drawings and specifications. Drawings must be developed using NAD 83 CSR2010 Vertical Datum CGG2013 and be done in metric at scales of 1:500 horizontal and 1:50 vertical. Any application for approval of the installation of municipal services must include project cost and the following:

a. Water System

- i. plan and profile drawings indicating the existing and proposed water distribution system, including mains and the location of valves, lot laterals, fire hydrants, and appurtenances;
- ii. specifications and contract documents;
- iii. cross sections and detail drawings; and
- iv. water pump station details including pump data, well construction specification, pumphouse building specification and detailed material specification.

b. Sanitary Sewerage System

- i. plan and profile drawings indicating the existing and proposed sewer collection system, including mains indicating flow direction and the location of manholes, pump stations, lot laterals and appurtenances;
- ii. specifications and contract documents;
- iii. cross sections and detail drawings; and
- iv. sewage lift station and forcemain details including forcemains, pump data, wet and dry well specifications and detailed material specification.

c. Design Brief

- i. water supply design brief including groundwater allocation, well pumping

- capacity and storage capacity;
- ii. water distribution design brief including fire flow calculations and domestic water supply calculations;
- iii. sewage lift station design brief including sewer shed design criteria, station pumping capacity and design calculations and peak flow calculations and;
- iv. sewer collection design brief including flow and infiltration calculations;

d. Approvals

- i. groundwater exploration and extraction permit;
- ii. approval from the Provincial department of Environment;
- iii. approval from the Provincial department of Transportation; and
- iv. any other approvals required.

1. Water System Standards

a. Design Criteria

Water systems shall be designed to meet the following criteria:

- i. fire flows being a single occurrence;
- ii. using a pipeline roughness coefficient of 120;
- iii. basic fire flow of 3000 liters per minute (800 USGPM) for 2.4 hours in single and two family residential areas or 8000 liters per minute (2440 USGPM) for all other areas;
- iv. minimum system pressure under fire flow conditions following fire event is 137.9 kpa (20 psi);
- v. minimum 241.3 kpa (35 psi) pressure under non fire flow conditions; and
- vi. accommodate maximum day domestic demand of 680 liters (180 USG) per capita per day, in combination with fire flows.

b. Watermains

Watermains shall:

- i. be blue PVC DR18, PVCO class235, ductile iron class 250 or the equivalent;
- ii. include hydrants for flushing at low points and dead ends and as required by the Utility;
- iii. be looped wherever possible and as required by the Utility;
- iv. be at least 200 mm in diameter, except for short loops;
- v. be installed with at least 1800 mm of cover or be insulated to the satisfaction of the Utility where 1800 mm of cover is not possible;
- vi. be connected to existing watermains using tapping sleeve and valve;

- vii. include air relief/air vacuum valves where high points are created;
- viii. include thrust blocks at changes in direction, changes in size and dead ends;
- ix. include at least one length of pipe installed downstream of dead end valves;
- x. include cathodic protection on valves, hydrants and services where applicable;
- xi. be identified with metallic warning tape buried 450 mm below finished grade; and
- xii. be inclusive of copper trace wire RWU90 number 10 gauge attached to top of watermains and accessible at valves and hydrants.

c. Location

Watermains and appurtenances shall:

- i. be located within the street right-of-way on the opposite side of the street to the sanitary sewer;
- ii. be bored under existing streets unless prior written approval for an open cut is obtained from the Provincial Department of Transportation;
- iii. be extended to the edge of the property boundary for future street extensions or connections through easements;
- iv. include easements where necessary for inter-connections, future extensions or looping; and
- v. not be installed with isolated high and low points except as shown on the design drawings.

d. Valves

Valves shall be installed:

- i. at the interconnection(s) with the existing watermains;
- ii. at street intersections;
- iii. at hydrants;
- iv. at stubs for future street or easement connections;
- v. at service lateral terminations at the property line;
- vi. on sprinkler services;
- vii. at maximum spacings per Fire Underwriters Survey; and
- viii. at other locations identified by the utility for system control and isolation.

e. Hydrants

Hydrants to be located according to Fire Underwriters Survey specifications and shall:

- i. be installed 1 meter from the edge of the street right-of-way at:
 - (1) low points,
 - (2) dead ends, and

- (3) other locations identified by the Utility for flushing and maintenance of the system.
- ii. be installed in streets with open ditches, include driveway access via a culvert with a 3-meter level space and side slopes not exceeding 2.5 horizontal to 1 vertical;
- iii. be installed at a maximum spacing of 180m in single family residential areas;
- iv. be installed at intersections where practical;
- v. include a breaking flange 150 mm above shoulder elevation;
- vi. be marked with fluorescent orange markers, 40 mm diameter polyethylene pipe with ductile iron base plate; and
- vii. be designed without drains if susceptible to groundwater contamination.

f. Water Supply

Where required, water supply systems shall include:

- i. at least two wells, each sized for full design capacity, with a minimum of 20 meters of casing, a drive shoe at the bottom of the casing and pressure grouting between the casing and bore hole from the drive shoe to grade, a pitless adapter and vermin proof well caps;
- ii. flow metering and running time meter for each well;
- iii. sample ports for each well;
- iv. pressurized storage to meet domestic flow requirements;
- v. well pumps sized for domestic flow requirements only;
- vi. piping and appurtenances to make a complete system;
- vii. provision for future connection of chlorination including:
 - (1) space of three square meters for future chlorinator, pump tank and potential eye wash, shower and hot water heater,
 - (2) tees installed at the proposed location for the future chlorine injectors, and
 - (3) a power outlet be installed at the proposed location of the future chlorination pump.
- viii. provisions for connection to the Utility SCADA system including the provision of Remote Terminal Units (RTU's) to facilitate monitoring and/or control of identified system parameters. The RTU hardware and related instrumentation shall be included in the work along with an empty 25 mm PVC conduit to the nearest service pole for leased line communication to the Utility SCADA central. The RTU shall be control microsystems SCADAPACK or approved equal, configured to communicate on Modbus protocol. Hardware design and layout shall be consistent with existing facilities. Integration to the central site is not included in the scope of work;
- ix. a heated building to house the equipment with ample working space, a gravel floor for drainage and ventilation specifically designed for the damp

application of water storage.

g. Sprinkler Connection

Where required, connections for sprinklers shall be installed directly from the main with a gate valve at the public right of way boundary.

h. Testing and Inspection

Watermains may be tested in phases provided that each phase is clearly identified and isolated to the satisfaction of the Utility. Watermain testing shall include:

- i. pressure and leakage testing between adjacent valves to AWWA standards; and
- ii. bacteriological tests at all locations per AWWA standards so that there is zero E. coli, zero coliform bacteria and less than 200 ppm background growth (or as required by Department of Environment) in all samples for two consecutive days.

2. Sewer System Standards

a. Design Criteria

Sewer systems shall be designed to meet the following criteria:

- i. population density of 6 persons per acre in low density residential developments, population density for other areas proposed by the Consultant for approval by the Utility;
- ii. domestic sewage flows per the Atlantic Canada Wastewater Guidelines Manual for Collection, Treatment & Disposal;
- iii. extraneous flow of 0.21 liters/second/gross hectare; and
- iv. shall consider adjacent future developments in the sewer shed when setting sewer main elevations and locating easements.

b. Gravity Sewer Mains

Gravity Sewer Mains shall:

- i. be green PVC DR35 pipe;
- ii. be at least 200 mm in diameter;
- iii. be installed straight between manholes in plan and profile and at a uniform slope between manholes;
- iv. be installed at a minimum grade of 0.5%;
- v. be installed at a depth, where possible, to provide under footing service to all serviced properties (nominally 3 meters below centerline elevation of the road);

- vi. where shallow, be installed with at least 1500 mm of cover or be insulated to the satisfaction of the Utility where 1500 mm of cover is not possible; and
- vii. achieve a watertight connection when connected to existing sewer mains.

c. Forcemains

Forcemains shall:

- i. be PVC series pipe, minimum pressure class DR25 or ductile iron.
- ii. be installed with at least 1800 mm of cover or be insulated to the satisfaction of the Utility where 1800 mm of cover is not possible;
- iii. include air relief/air vacuum valves where high points are created;
- iv. include thrust blocks at changes in direction and changes in size; and
- v. be identified with metallic warning tape buried 450 mm below finished grade; and
- vi. be inclusive of copper trace wire RWU90 number 10 gauge attached to top of forcemains and accessible at valves, liftstation and discharge location.

d. Location

Sewer mains shall:

- i) be located within the street right-of-way on the opposite side of the street to the watermain;
- i. be bored under existing streets unless prior written approval for an open cut is obtained from the Provincial department of Transportation;
- ii. be extended to the edge of the property boundary for existing or future street extensions or connections through easements; and
- iii. include easements where necessary for inter-connections or future extensions.

e. Manholes

Manholes shall:

- i. be installed at the intersections with the existing sewer mains;
- ii. be installed at maximum intervals of 120 meters or as directed by the Utility for flushing and maintenance of the system;
- iii. be installed at changes in direction or elevation;
- iv. be installed at future street or easement connections complete with capped stubs for future pipe connections;
- v. be installed at dead ends;
- vi. have a minimum diameter of 1050 mm;
- vii. be the same diameter from top to bottom;
- viii. be either concentric or eccentric in shape at the top depending on location

- and have the final 200 mm (but not more than 450 mm) made up of as few as possible grade rings;
- ix. have the top of the concrete structure, including grade rings and cover, level with the finished grade;
 - x. have grade rings 75 mm or larger must be made of precast reinforced concrete and grade rings less than 75 mm must be made of recycled rubber;
 - xi. have the top of the concrete structure, including grade rings and cover, level with the finished grade. Sloped rubber rings are to be used where required to ensure covers sit flush with the road service especially on a crowned surface;
 - xii. be watertight where manholes are in ditch inverts, swales or cannot be kept at grade for other reasons;
 - xiii. have all joints sealed with single component, hydrophobic, flexible sealant/adhesive, such as XSEAL by Fernco. Butyl rubber gaskets are not acceptable;
 - xiv. be pressure tested. If pressure test fails, leaks are to be sealed using a hydrophobic polyurethane grout, such as HyperFlex by Fernco, only grouting of seams is permitted;
 - xv. have piping sealed externally of gaskets with hydrophilic, expanding butyl rubber;
 - xvi. be externally waterproofed with self-adhered SBS rubberized membrane, elastomeric bitumen emulsion or rubberized asphalt emulsion products from bottom of base to the top of all adjuster rings;
 - xvii. have pressure testing accomplished without the use of surface grout on seams;
 - xviii. be equipped with in-flow dishes directly below cast-iron cover to reduce inflow from surface. In flow dish to be equipped with handle for extraction and gas valve; and
 - xix. be locked in remote locations or at the discretion of the Utility.

f. Service Laterals

Service Laterals shall:

- i. be SDR 35 PVC pipe, minimum 100 mm diameter, minimum slope of 2% installed from the mains to the edge of the street right-of-way for all approved lots;
- ii. terminate in a full pipe length with a bell end and plug;
- iii. be marked at the termination with a 50 mm x 100 mm wooden marker extending from the pipe to 600 mm above finished grade with the depth to the pipe invert from grade painted in red on the marker;
- iv. be teed off of the mains or directly into the manhole matching obvert elevation.

g. Pumping Stations

Sewage lift stations shall include:

- i. Flygt duplex submersible pumping systems;
- ii. submersible level sensor installed in the pumping chamber;
- iii. a precast concrete wet well minimum 150 mm above grade to prevent inflow;
- iv. a separate valve chamber;
- v. a stainless-steel control panel attached to air vents;

- vi. piping and appurtenances to make a complete system;
- vii. a manual power transfer switch to allow connection to mobile emergency generation or automatic transfer switch and standby power generation included where applicable; and
- viii. pump controllers arranged for remote monitoring at the Utility central SCADA system. To facilitate communication to the central, an empty 25 mm PVC conduit shall be provided from the controller to the nearest service pole. Integration to the central site is not included in the scope of work.

h. Testing and Inspection

Sewer system testing and inspection shall include, but not be limited to, the following:

- i. Gravity Sewer lines shall undergo:
 - (1) Water tightness testing by an air test after backfilling to finish grades between consecutive manholes to pass pressure drop requirements specified by manufacturer,
 - (2) Deflection testing 1 month after substantial completion using a "Go-No-Go" -mandrel gauge designed to measure a 5% deflection from manhole to manhole. Correct any deflection exceeding 5%, and
 - (3) Provide copies of video inspection at time of Acceptance and at 11 months after substantial completion so that the picture quality, in colour, is a continuous 600-line resolution picture showing entire periphery of pipe. Correct any pipe joint which displays a gap or spread, offset, gasket, or signs of infiltration, any section of pipeline which is crushed, broken or displays cracks, any variance in grade of pipeline, any gravel, roots, or foreign material which may impede flow or any deformation in shape of pipe.
- ii. Manholes shall be leak tested after the structure has developed sufficient strength to withstand stresses produced by the test so that a vacuum of 250 mm Hg drops to 225 mm Hg in 45, 50, 65 and 80 seconds for manhole diameters of 1050, 1200, 1500 and 1800 mm respectively. For manholes deeper than 6 m, the test times shall be increased by 2 seconds per 300 mm of additional manhole depth. Cement grout will not be permitted for sealing the manhole if test fails. A hydrophobic polyurethane grout, such as HyperFlex by Fernco, is permitted for grouting the seams only. Correct any leakage in excess of that specified;
- iii. Pump station chambers shall be leakage tested after the structure has developed sufficient strength to withstand stresses produced by the test so that water loss in the structure after 72 hour is not more than an amount consistent with normal evaporation and absorption, and in any case, not more than standard practice of 5L/1000mm diameter/1000mm height.

Cement grout will not be permitted for sealing the manhole if test fails. A hydrophobic polyurethane grout, such as HyperFlex by Fernco, is permitted for grouting the seams only; and

- iv. Pump stations shall be tested and certified acceptable by the pumping equipment manufacturer and the Consultant and Utility maintenance personnel shall be trained in the operation and maintenance of the station by the pumping equipment manufacturer.

3. Operation and Maintenance Manuals

Three copies of operation and maintenance manuals shall be provided for water supply stations and sewage pumping stations. The maintenance manuals shall include:

- a. startup certification from the equipment supplier (certifying that the equipment has been satisfactorily installed and is in proper working order),
- b. approved shop drawings,
- c. equipment descriptions, wiring or other diagrams, materials list and parts list,
- d. details of equipment operation and maintenance,
- e. warranty and service contact information; and
- f. any other information which will assist the Utility in the operation and maintenance of the equipment.

EFFECTIVE DATE

The effective date of these Municipal Servicing Standards of Town of Cornwall is July 15, 2020. These Standards shall be reviewed and updated every four (4) years.