



# **GUIDELINES FOR SUPPLY OF STORMPOND WATER FOR IRRIGATION USE**

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## **1.1 Stormwater Supply Systems**

The following section provides the pipe design and submission requirements for Stormwater Supply Systems conveying non-potable water from City Storm ponds to City of Calgary Parks irrigation systems. These systems will be located within City of Calgary roadways and shall never be directly connected to the potable water distribution system.

Stormwater Supply Systems include piping, valves, drains and air release valves located in storm manholes, system isolation valves and Parks water services. All Stormwater Supply System components shall be supplied and installed by the Developer on City ROW's.

Pump station design shall comply with the Parks Irrigation Pump Station Specifications and shall be supplied and installed by the Developer on Storm Water Pond sites as required and approved by the City of Calgary Parks Water Management unit and Water Resources.

### **1.1.1 Preliminary Design and Approvals**

Proposals incorporating a stormwater supply system shall be submitted as part of the SMDP to Water Resource Development Approvals, which will coordinate joint review of these submissions with COC Parks Water Management.

### **1.1.2 Detailed Design**

Subsequent to the approval of the preliminary Irrigation and pumphouse design, detailed underground design drawings will be required for each stage of the subdivision where irrigation infrastructure is installed within Roads ROW's. The detailed design submission for the irrigation system is part of the overall engineering design submission and therefore the design drawings and submission shall be provided in accordance with the Subdivision Development Agreement. The irrigation portion of the submission shall include, but is not limited to the following:

- Irrigation cover sheet drawing
- Profile drawings including pipe alignment, depth, length, slope, pipe size, pipe type and rating, bedding information, and stations for all valves, air releases, drain ports, and flushing assemblies
- Pipe sizes, materials, bedding classifications, slopes and directions, location of all valves/fittings, drain points, flushing locations, air release valves, and other details
- Details for service stubs into MR's, PUL's, and other areas to be irrigated, including connections to pumphouse and pond.
- Reference to the Master Drainage Report as the basis for design in the 'Notes' section.

### **1.1.3 System Layout and Design**

The stormwater irrigation supply system is to be installed in the road right of way between the storm and sanitary main. The line assignment is 1.50 metre offset from the storm main (centre line) in the direction of the water main alignment. Irrigation main lines shall be located in Residential, Industrial, or Collector road classifications within a Road cross section providing a minimum of a 2.5 metre separation between storm and water mains unless otherwise approved. Irrigation main lines shall not be located in roadways classified as Major, Arterial, or Highway Arterial.

The system alignment and grades shall be designed to facilitate gravity drainage of the entire supply system and irrigation lines to the storm system as part of the regular winterization process.

Design of the air relief system shall comply with the requirements of AWWA M51 and the Air Valve manufacturers' design parameters. Air release points shall be separated by no more than 500 metres. The first air relief valve shall be in the pumphouse immediately downstream of the check valve on the outflow piping. All other drainage and air relief points shall be designed to provide drainage from the low points directly into storm manholes above the invert of the storm piping at approved locations. Sufficient air relief must be provided from high points of the stormwater supply system

The minimum slope of this system to ensure gravity drainage shall be no less than .20%. The optimum lay out of the system will combine long ascents and long descents with the first drain point within 500 metres of the wet well of the pump house and with the last drain point at the storm main manhole within 500 metres of the final Parks space supplied.

Looped irrigation main line systems are not required, but may be submitted for approval where advantageous. System isolation valves are required to ensure each section of the irrigation main line system can be isolated to facilitate repairs and to efficiently undertake winterization maintenance.

Isolation valves shall be located:

- On both sides of each air valve installation at high points in the main and/or no more than 500 metres apart, or as required by the necessities below.
- As necessary to permit drainage of supply main sections while minimizing the required air flow for winterization.
- To facilitate the installation of new services or additional phases of main line system without shutting down any existing irrigation services;
- At tees and crosses. A three-way junction requires a minimum of two valves and a four-way junction requires a minimum of three valves.
- On every Parks irrigation service (Parks Service Valve) at entrance to a MR, PUL or other green space.

Where required, any irrigation supply system or part of a system shall be designed to serve not only the area within the development boundary, but also any area that requires a contributing flow from that system.

The minimum stormwater water supply pressure is 415 kPa (60 psi), throughout the main line system; unless irrigation is being supplied to a sports field where the required supply pressure is 485 kPa (70 psi). The maximum supply pressure is 690 kPa (100 psi) unless otherwise approved by the City.

**Note: System supply pressures and flow rates are to be reviewed and approved by COC Parks Water Management.**

Pipes are to be sized such that stormwater supply system flows are not to exceed 1.5 m/s (5 ft/s) at the connection of the Parks Water Service and the stormwater supply main line during peak demands, as detailed the Master Irrigation Report. The minimum size permitted for use in the road right of way portion of these systems is 100mm.

The minimum depth of bury in public right of ways is 1.5 m. and the maximum is 2.5 m unless otherwise approved. Irrigation main line pipe must be placed below any road structure, and the pipe and pipe bedding shall be designed to permit construction of required road sub base as required/approved by current COC Roads Specifications.

Bedding materials installation and compaction shall be as per the Standard Specifications Waterworks Construction, Sections 504.03.01 through 504.03.08. Where granular pipe bedding materials are used, installation shall comply with Section 304.00.00 of the Standard Specifications for Roads Construction.

#### **1.1.3.1 Potable Water Source Connection**

1. A metered potable water service shall be supplied to the pond/pump house site for use as a backup source for stormwater irrigation supply systems
  - 1.1. Potable water shall flow into the wet well or directly into the storm pond and be supplied to the irrigation supply system(s) via a verifiable air gaped connection. This connection shall be valved before the air gap.

### **Stormwater Irrigation Supply Infrastructure Within Road Right of Ways**

#### **1.1.4 Pipe materials, Fittings and Installation**

Any piping system used shall be designed to accommodate a minimum of H2O live loading at the proposed depth of bury. All metallic elements of the pipe system shall be coated and protected by anodes and petrolatum tape wrap as specified in the applicable Sections of the Standard Specifications Waterworks Construction, latest edition.

Pipe and fittings for the irrigation main line system shall be either purple body PVC Series Pipe (IPSOD) SDR21, rated to a minimum pipe pressure rating of 200psi (Series 200) or HDPE 4710 resin with four extruded purple stripes, IPS DR11 rated for 200 psi as per Standard Specifications Waterworks Construction Section 503.02.04, or approved equal. HDPE system design shall be as per AWWA M55. PVC and HDPE Manufacturers shall be as listed in the Standard Specifications Waterworks Construction Section 503.01.00 and 503.02.05

Drain point tees 100mm and larger may be either in-line tees (metallic, HDPE or PVC) or hot tapped stainless steel tees with flanged outlets to accommodate drain control valves. Tee and stub fittings and hot tap tee materials, installation, cathodic protection and joint restraints shall be as approved in the Waterworks Specifications. Drain leads and control valves shall be size on size to the supply line unless otherwise approved. Fully restrained Drain point tees do not require thrust blocking against the stub flow.

Fittings must meet or exceed the SDR/DR rating of the pipe that they will be connected to and be manufactured to the equivalent standard of the approved piping being connected to.

PVC fittings shall be bell and spigot and shall be restrained by approved methods under the City of Calgary Standard Specification for Waterworks Construction as required. HDPE fittings shall be butt fused or joined by electro fused fittings installed by certified fusing personnel as per Section 503.02.05.

Installation and pressure testing shall be in accordance with the installation standards for waterworks system piping as per the City of Calgary Standard Specification for Waterworks Construction, Sections 504.04.00 through 504.10.01. Pressure testing shall be performed with potable water, super chlorination of the system is not required.

### 1.1.5 Parks Irrigation Services and Service Connections

Services shall be size to not exceed 1.5 m/s (5 ft/s) flow at peak demand, or as per the table below (whichever is greater). The minimum service size is 50mm:

<b>Minimum Nominal Service size (mm)</b>	<b>Maximum Irrigated Site size (ha)</b>
50	0.83
100	3.02
150	6.79
<b>200</b>	<b>11.17</b>

Parks Water services connected from the Stormwater Irrigation Supply system shall be as per Standard Specifications Waterworks Construction Sheet 28.

### 1.1.6 Valves

Isolation valves are required on the main line system to allow the system to be isolated for repair, maintenance and operational considerations. All valves installed shall be as approved in the City of Calgary Standard Specifications for Waterworks Construction.

Valves are required as follows:

- A service valve shall be located on every irrigation service entering an MR, PUL or other green space. Parks service valves (50mm and less) shall be self-draining curb stops.
- Isolation valves shall be located on the irrigation supply main line system to facilitate drainage and the required air flow for this operation. Valves on drain stubs into the manholes for the main line system shall be fused in-line, flanged or mechanically restrained in an approved fashion as necessary.

- Isolation valves shall be installed at lateral connections to the stormwater supply main similar to a water distribution system. A three-way junction requires a minimum of two valves and a four-way junction requires a minimum of three valves. The maximum distance between isolation valves on the stormwater supply main line shall be 500 metres.
- A valve shall be installed to permit the installation of new services or additional phases of main line system without shutting down any existing irrigation services;
- Parks service valves for services smaller than 100mm shall be brass service valves conforming to the City of Calgary Standard Specification for Waterworks Construction. Parks service valves for mains 100mm and larger shall be resilient seat gate valves as per the Waterworks Specifications.
- All bell and spigot valves 100mm and larger are to be installed complete with cathodic protection and valve anchoring as required for an equivalent Waterworks valve.

### **1.1.7 Air Relief Valves**

Air Release valves are to be located at high points as required to facilitate draining, filling and safe operation of the system. They are to be connected to a 50mm line (fused hdpe or 50mm copper c/w cathodic protection) connected to a tapping saddle or tapped PVC in-line fitting from the crown of the stormwater supply line. The air relief line will be let into the storm manhole, turn vertically and terminate with an air valve. The air relief valve shall be secured to the manhole structure with a 304 stainless steel bracket and insert/bolts. Air valves shall be 50mm combination type epoxy coated ductile iron body valves by Valmatic or ARI conforming to AWWA C512-07.

### **1.1.8 Flushing/Draining Points**

Flushing/Draining points are to be connected to the City of Calgary storm drainage system. Drain point inverts shall be let into the drain manhole above the crown of the storm pipe in the manhole. All drain points are to be size on size to match the supply line diameter, directed into the storm system and be capable of providing gravity drainage to both adjacent sections of main. Drain points shall be provided using a restrained tee, valve and stub. Fused HDPE, mechanically thrust restrained PVC tee, valve and stub, or hot tapped tee and mechanically restrained coated DI stub are all acceptable. An approved gate valve shall be located between the drain point tee and the drain entry into the storm manhole.

### **1.1.9 Thrust Restraints**

Thrust blocking, integral or mechanical restraint is required for the stormwater supply system as per the Calgary Waterworks specification. Thrust blocking is required for all changes of direction in unrestrained bell and spigot jointed piping, at in-line pipe size reducers and to support isolation valves. Mechanically restrained drain stubs do not require thrust blocks. General installation shall be in accordance with installation standards for Waterworks system piping as per the Calgary Waterworks Specifications.

### **1.1.10 Hydrostatic Testing**

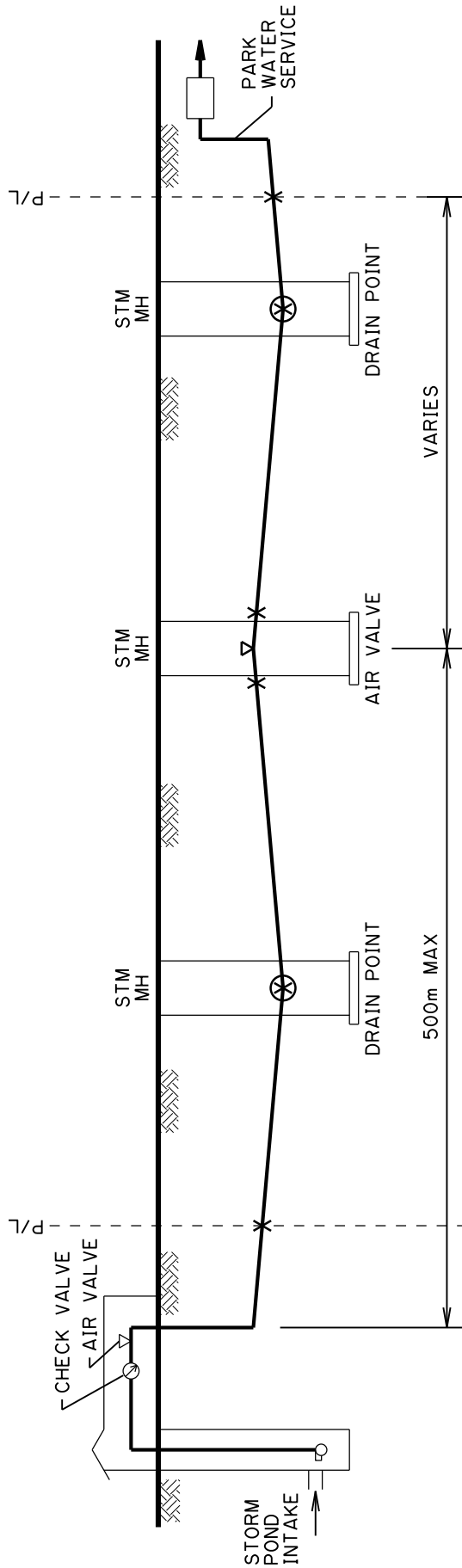
City of Calgary Waterworks Pressure Testing Procedures, Section 504.09.03 shall be followed for all new irrigation main installations.

**The City of Calgary shall be given at least two full working days' notice prior to the testing being undertaken. The Developer shall not operate any existing water valves.**

Should any test disclose leakage greater than the allowable, the Contractor shall, at his own expense, locate and repair the defect. Any failed test attempt must be rescheduled with at least two full working days' notice. The main may not be put into service until the test results have been forwarded to and accepted by Engineering Services. Where approved, pressure testing may be undertaken on the irrigation main line system if the Irrigation Pump Station is not yet in operation. Water supply, pumping, and pressure testing equipment to facilitate the pressure test will be the responsibility of the Developer.

### **1.1.11 Acceptance**

Acceptance of a new irrigation main line system will follow the current City of Calgary Construction Completion Certificate (CCC) and Final Acceptance (FAC) process. Inspections will be carried out by the City of Calgary as per the Standard Specifications Waterworks Construction.



**NOTE:**  
MATERIALS AND INSTALLATION AS PER CURRENT STANDARD SPECIFICATIONS WATERWORKS CONSTRUCTION.

DIMENSIONS ARE IN MILLIMETRES  
UNLESS OTHERWISE NOTED

No.	Date	Revision	App'd

Date  
2017/03/02

Scale  
N.T.S

Approved by

for The City of Calgary

THE CITY OF  
**CALGARY**

SEWER CONSTRUCTION

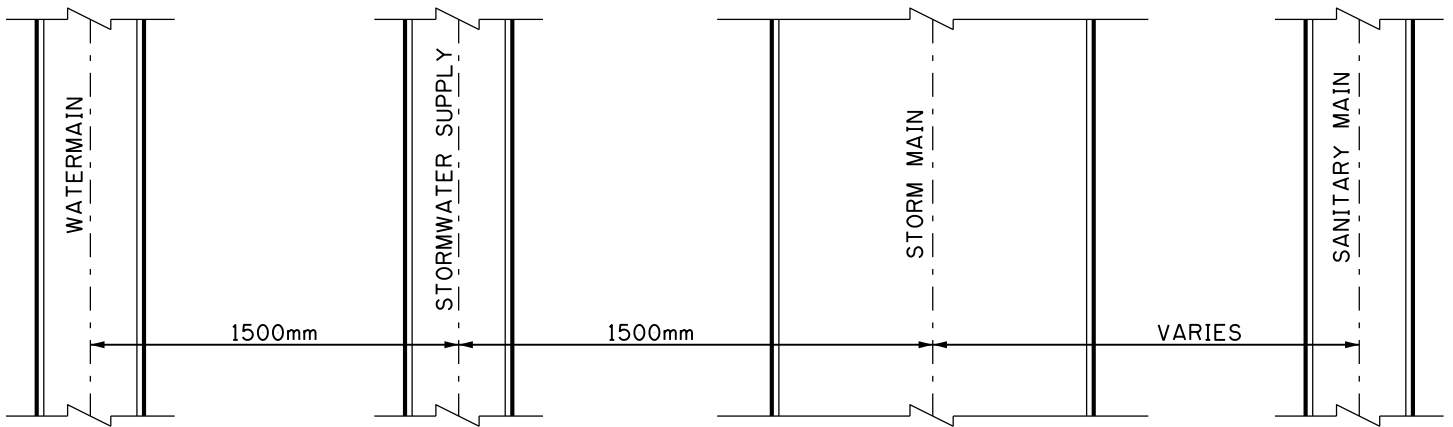
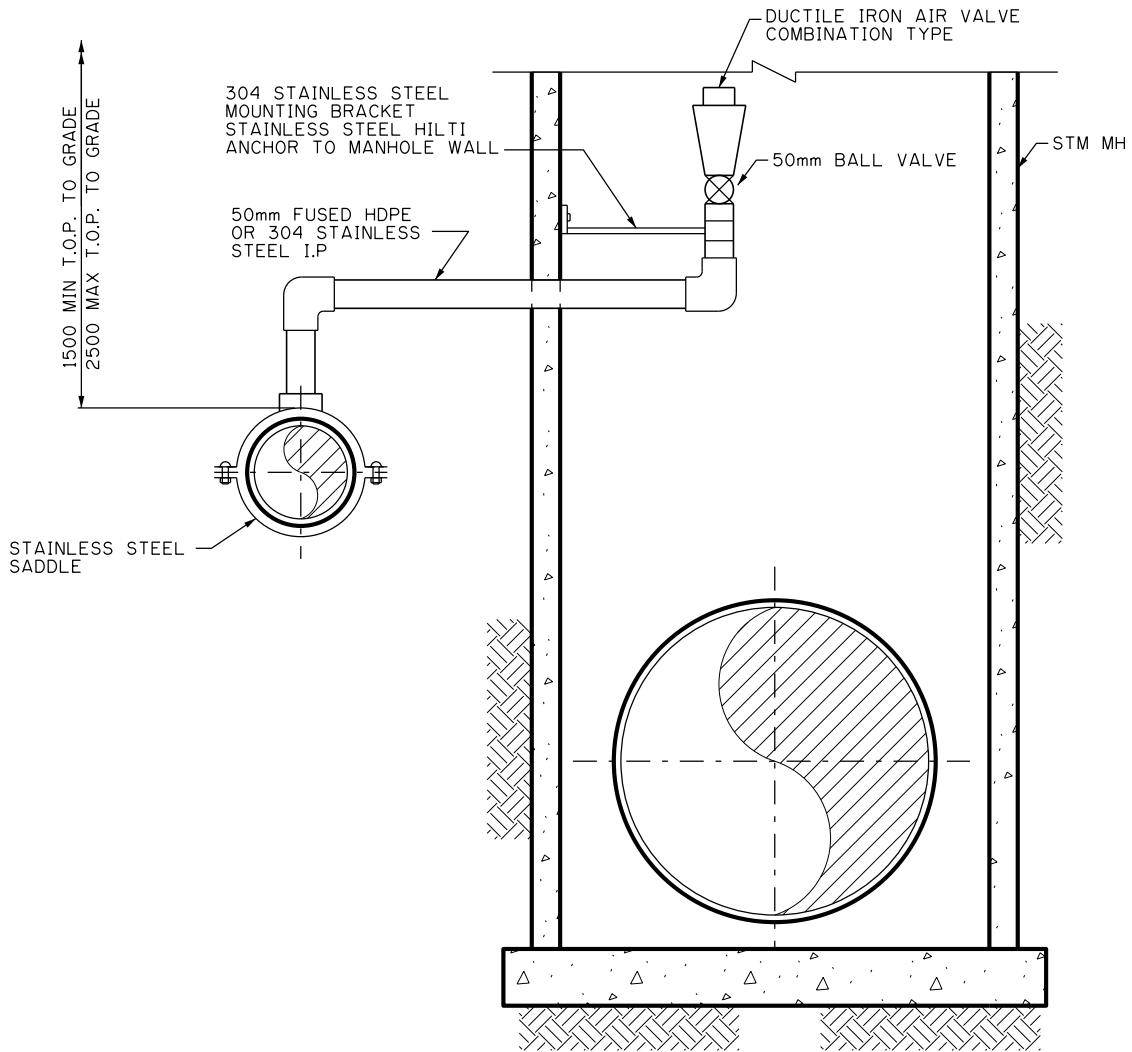
**STORMWATER SUPPLY  
GENERAL PIPING ARRANGEMENT  
FOR FILLING & DRAINING**

Sheet

File Number

ISC: Unrestricted






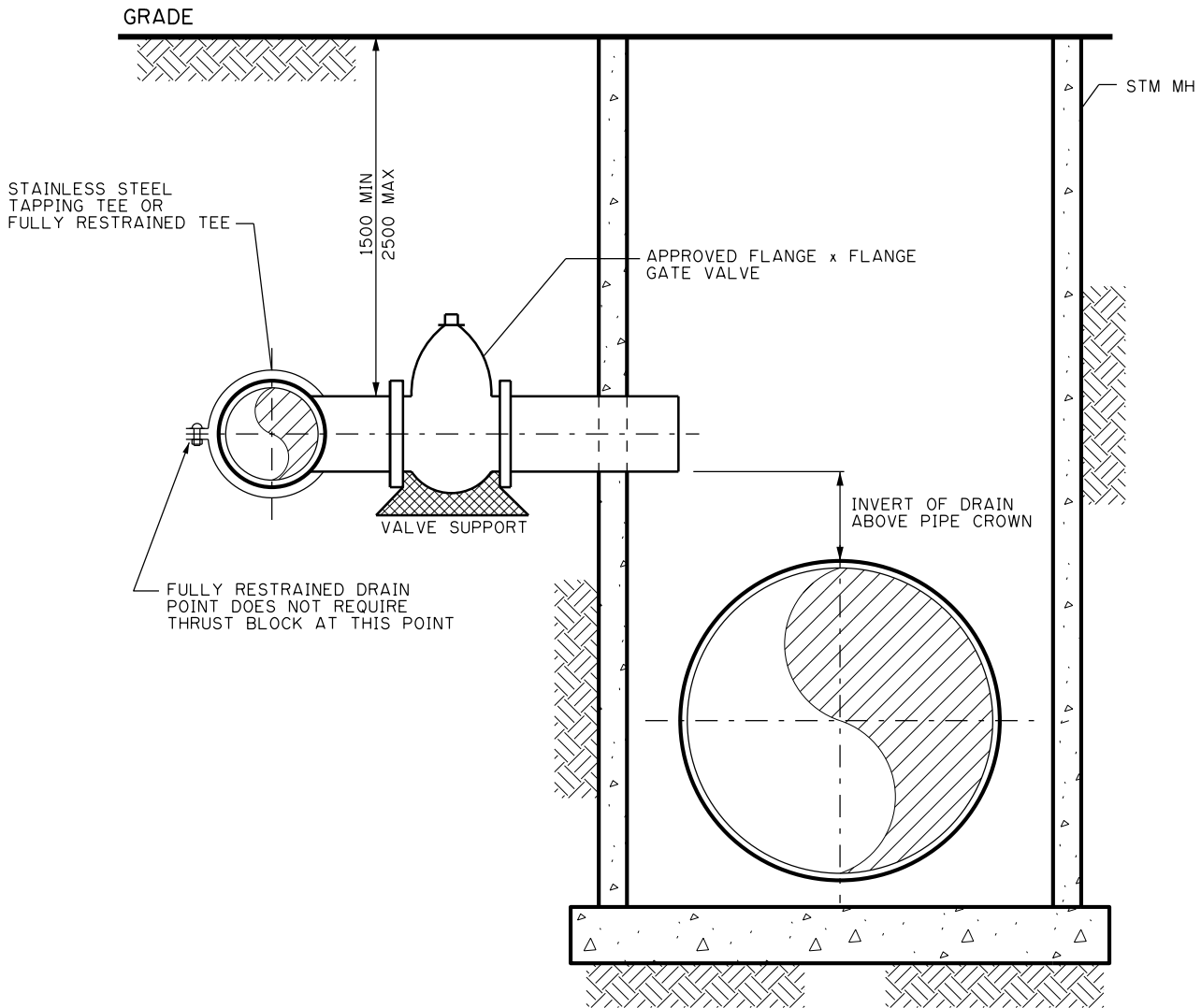
**STORMWATER SUPPLY ALIGNMENT IN R.O.W**

**NOTE:**

MATERIALS AND INSTALLATION AS PER CURRENT STANDARD SPECIFICATION WATERWORKS CONSTRUCTION

DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED

		Date 2017/03/23			THE CITY OF <b>CALGARY</b>	SEWER CONSTRUCTION	Sheet
		Scale N.T.S			<b>STORMWATER SUPPLY AIR RELIEF POINT</b>		File Number
		Approved by					
No.	Date	Revision	App'd	for The City of Calgary			




**DRAIN POINT MATERIAL OPTIONS:**

1. ALL PVC. HUB BY HUB MAIN VALVE C/W MECHANICAL JOINT RESTRAINT.
2. ALL HDPE. FUSED MAIN VALVE WITH HDPE ENDS BY AVK.
3. COMBINATION OF STAINLESS STEEL TAPPING VALVE & FUSED HDPE FLANGE, VALVE & STUB (SHOWN)

**NOTE:**

MATERIALS AND INSTALLATION AS PER CURRENT STANDARD SPECIFICATION WATERWORKS CONSTRUCTION

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		Date 2017/03/02			THE CITY OF <b>CALGARY</b>		SEWER CONSTRUCTION		Sheet
		Scale N.T.S			<b>STORMWATER SUPPLY DRAIN POINT</b>				File Number
		Approved by							
No.	Date	Revision	App'd for The City of Calgary						