

Water and Sewer Service Policy

4B.010

Section: 4.0 Infrastructure Services
- B. Utilities

Authority: General Manager of Infrastructure Services

Statement

The Municipal District of Bonnyville (M.D.) shall have a policy regarding the standards and specifications for municipal water and sewer systems.

Purpose

To ensure that municipal water sewer systems will provide safe and adequate service for those residents connected to the systems.

Procedure

New Utility Servicing

- (1) The developer applies for a water and sewer service connection at the time of the development and building permit stage. At time of permit application, the developer shall notify the M.D. of the proposed sanitary sewer and water service sizes. The developer can apply for a water account and water connection for construction water.
- (2) The developer is issued the development/building /utility permit. At time of permit issuance, the developer shall notify the M.D. of the anticipated servicing tie-in so that arrangements can be made for inspection by the Infrastructure Services Department. A minimum of 48 hours advance notice of tie-in is mandatory.
- (3) Infrastructure Services shall supply curb stop operating rod and box and sanitary sewer inspection tee/cleanout (if necessary). The developer will install these components and Infrastructure Services will inspect the tie-in.
- (4) The developer shall arrange for installation of water meter.
- (5) The developer will provide an adequate meter room and protection for the water meter.
- (6) The developer or property owner shall establish a utility account with the M.D.
- (7) The Infrastructure Services Department shall supply water meters. A minimum of 48 hours advance notification is required prior to supply of water meter, fittings and wire.
- (8) The Infrastructure Services Department shall inspect meter installation and wiring and connect wire to water meter. Forty-eight (48) hours advance notification is required prior to inspection.
- (9) The Infrastructure Services Department shall turn on water upon the completion of steps 1 through 8.
- (10) The developer shall provide pressure and flow tests on water service and provide video tape of sanitary service.
- (11) Once steps 1 through 10 have been completed, Infrastructure Services will notify the Planning and Community Services Department of conformance in regard to utility servicing.

All developers of new utility services must comply with *Attachment A: M.D. Water & Sewer Service Engineering Specifications*.

Policy Review

Within five (5) years from date adopted / amended / reviewed.

For administrative use only:

Previous Policy Number: (prior to July 24, 2019)	40.41.01
Related Documentation: (plans, bylaws, policies, procedures, etc.)	Attachment A: Municipal Water and Sewer System Standards and Specifications

Municipal Water and Sewer System Standards and Specifications

Water Distribution Services

Design requirements:

The minimum size of distribution main shall be 200 mm in diameter except for hydrant leads and cul-de-sacs less than 100 metres long, where 150 mm diameter mains may be used.

Poly Vinyl Chloride (PVC) pipe shall be used. The use of High Density Polyethylene (HDPE) pipe will be accepted upon approval by the General Manager of Infrastructure Services.

The design of the proposed water distribution system shall be approved by Alberta Environment prior to any water works installation.

Per capita consumption shall be calculated as follows:

Average Daily Demand – 500 L/capita/day

Maximum Daily Demand – 2 x average demand

Peak Hourly Demand – 4 x average demand

The design population shall be the ultimate population density within the land being subdivided and the ultimate population potential (future projections) for the lands beyond the area under consideration to determine whether oversizing of the water main is required.

The evaluation of the water system shall be undertaken utilizing a calibrated water model acceptable to the General Manager of Infrastructure Services and the results shall be tabulated as part of the pre-design report. Separate analysis shall be undertaken for Average Day, Maximum Day, Peak Hour, Maximum Day plus Fire Flow and Night Filling Demand.

The system shall be capable of providing sufficient Fire Flows at all hydrant locations under Maximum Day Demand conditions to meet the applicable Fire Flow requirements of the latest version of the Insurers' Advisory Organization (IAO) with a minimum residual pressure of 140 kPa (20 psi).

The maximum allowable velocity shall be tested at Maximum Daily Demand plus all applicable IAO Fire Flow demands at the appropriate location. Should velocities be less than 2.50 m/s no further maximum velocity analysis is required. Should the velocity be greater than 2.50 m/s, a second series of runs shall be undertaken at Maximum Daily Demand plus a Fire Flow demand of 100 l/s, or the most current Fire Flow the municipal trucks can draw. This shall be undertaken at all hydrants within the subdivision or development.

Should the 2.50 m/s maximum be exceeded the project consultant will have to reconfigure the water network in order to meet the maximum velocity requirement.

The design operating pressure shall not be greater than 550 kPa (80 psi).

A minimum residual pressure of 350 kPa (50 psi) at finished ground level shall be maintained during peak hour demand at all points in the system. A minimum residual pressure of 140 kPa (20 psi) at finished ground level shall be maintained during Maximum Daily Demand plus Fire Flow at all points in the system.

When assessing commercial or multi-family sites, the required Fire Flow shall be calculated based on IAO guidelines. The calculations will be subject to municipal review and approval.

Adequate frost protection of water mains must be designed for and achieved. The minimum burial depth is to be 3.0 metres.

The actual system required in any particular area will depend on the degree of frost penetration, any systems currently in place in the area and a cost/benefit analysis. The final system design will be approved by the General Manager of Infrastructure Services.

Water Main Materials

Pipe for water mains shall be either Poly Vinyl Chloride (PVC), or high-density polyethylene pressure pipe (HDPE) and shall conform to the following:

- (1) PVC – Class:
 - (a) AWWA C900 for pipes 300 mm and smaller, 1035 kPa DR18, Class 150 CSA B137.3 AWWA C905 for >300 mm diameter.
 - (b) Rubber gasket joints for PVC pressure pipe and fittings shall conform to ASTM D3139, latest revisions thereof.
 - (c) Fittings shall be rubber gasket, in accordance with AWWA C907 for PVC fittings and AWWA C110 for cast iron fittings.
- (2) HDPE – Class:
 - (a) ASTM 3350/F714, ASTM 1258, PE 3408, AWWA C906, CSA B137.1, minimum DR17 Metric.

Wherever possible, the polyethylene pipe should be joined by the method of thermal butt-fusion, as outlined in ASTM-D3261, Butt Heat Fusion of Polyethylene Pipe and Fittings. Butt-fusion joining of a pipe and fittings shall be performed in accordance with the procedures recommended by the manufacturer.

The polyethylene pipe may be adapted to fittings or other systems by means of an assembly consisting of a polyethylene stub-end, butt-fused to the pipe, and a backup flange of epoxy coated ductile iron, made to class 150, ANSI B16.5. Bolts and Nuts are to be stainless steel. Fittings shall be in accordance with AWWA Specification for HDPE pipe, latest revision thereof.

Water Main Installation and Location

Un-insulated mains shall be installed to provide a minimum depth cover of 3.0 metre from the invert of the main to the gutter line or as recommended by the Consultant (and approved by the General Manager of Infrastructure Services).

Mains shall be located as per the standard cross-section drawings located in Schedule 3.0. A minimum of 3.0m horizontal separation shall be maintained between a water main and any sewer main. Crossings as per Standard Drawing. A2.3, in Schedule 3.0. (Comment – aggregate spec.)

The minimum requirements for pipe bedding shall be those recommended by the manufacturer, in accordance with Standard Drawing A1.1 in Schedule 3.0.

Cathodic protection shall be provided on all valves, hydrants, ductile iron and cast-iron fittings.

Hydrant Material

Hydrants shall conform to AWWA Specification C502 and the following:

- (1) compression type shutoff, dry top design;

- (2) depth of bury as indicated on construction drawings (minimum 3.0 metres);
- (3) Two (2) hose nozzles, 63mm nominal diameter, with the threads conforming to the Alberta Mutual Aid Specifications as required by Sec. 6.9.1.1 of the Alberta Fire Code 1997 and Municipal District of Bonnyville (M.D.) Fire Department Standards;
- (4) pumper nozzle, 100mm nominal diameter, with 100mm internal lug quick connect couplings conforming to CAN4-S543 Standards;
- (5) open on counter-clockwise rotation;
- (6) 300mm extension installed below the hydrant breakaway flange;
- (7) drain outlet (plug drain outlet in high water table area, identify hydrant);
- (8) permanent bronze seat casing and O-ring seal;
- (9) operating nut to M.D. Fire Department Standard;
- (10) painted yellow, above ground.

The maximum allowable spacing between fire hydrants shall be 120m in single-family residential areas and 90m in multiple-family residential, school, hospital, industrial-commercial and public areas.

Hydrant locations shall be such that the distance to any building shall not be greater than 75m, residential; 45m for sprinkler applications or to Alberta Building Code/National Building Code standards, whichever is more stringent.

Hydrants on the distribution mains shall be installed at the projection of property lines except:

- (1) at intersections, where they shall be installed at the beginning of the curb returns; and
- (2) in cul-de-sacs, where they shall not be installed within the turning circle but shall be located at the tangent points.

Hydrants located adjacent to curb and sidewalk design shall be shown on both the surface works plan/profile and water main plan/profile.

Valve Materials

Gate valves shall be resilient seating gate valves and shall conform with the latest version of AWWA C509 and to the following:

- (1) iron body, bronze mounted;
- (2) size as shown on the construction drawings;
- (3) cast iron wedge type gate complete with rubber resilient seat, wedge shall be completely encapsulated with rubber;
- (4) non-rising stem with 50mm square operating nut;
- (5) open counter-clockwise;
- (6) in-line vertical position;
- (7) O-ring stem seal;
- (8) bell or combination bell/flange;

- (9) formed joints with a mechanical seal, equivalent to that used in joining the water main;
- (10) interior and exterior of valve body and bonnet shall be coated with epoxy.

The developer shall supply records of tests as required under AWWA Specification CS00, Sections 5.3 and 28.3.

Valve Boxes

Valve boxes shall be 150mm, Norwood Foundry Type A top section with a PVC section and shall be asphaltic coated complete with: operating stem, cast iron lid, and a combination rock guard/operating nut. Rock guard and operating nut are to be set no closer than 300mm below final grade.

Valve boxes shall have sufficient length to provide for adjustments of up to 300mm in either direction.

Valve box extensions shall be cast iron, suitable for use with the valve boxes to be installed.

Valve Location

Valves shall be installed on each hydrant lead, located 1.0m from the hydrant, and on the distribution and trunk mains such that during a shutdown:

- (1) no more than one (1) hydrant is taken out of service;
- (2) no more than three (3) valves are required to affect a shutdown;
- (3) no more than 20 residential units are taken out of service by a shutdown;
- (4) spaced no greater than 450m between valves on trunk mains.

Valves shall be installed in accordance with the Standard Drawings in Schedule 3.0.

Trenching and Backfilling

Maximum trench width shall be as shown in the Standard Drawings in Schedule 3.0.

Backfilling shall be carried out with selected native material in 300mm loose or 200mm compacted layers to a minimum of 95% Standard Proctor Density at optimum moisture content. Backfill 1.0m below the top of the subgrade shall be compacted to 98% Standard Proctor Density. Trenches that do not extend beneath the road surface, compact to 95% Standard Proctor Density.

Sand bedding or other approved granular material in the pipe zone shall be compacted to a minimum of 95% Standard Proctor Density in maximum lifts of 150mm.

Thrust Block

Thrust blocks shall be provided as necessary and in accordance with the Standard Drawings in Schedule 3.0.

Thrust blocks are to be Type 10, Normal, or Type 50, sulphate resistant as specified by a geotechnical engineer.

Appurtenances

Air release manholes, pressure reducing stations, flush-outs and other appurtenances shall be designed and constructed as required.

Disinfection and Testing

All water mains shall be disinfected in accordance with the AWWA Specification C651, latest revision thereof.

All water mains shall be hydrostatically pressure and leak tested in accordance with the applicable AWWA specifications for PVC pipe and PE pipe.

Disposal of disinfectant water is to be in accordance with Alberta Environment requirements.

Test Procedures

All water mains shall be hydrostatically pressure tested at 1.5 times the rated working pressure of the pipe or 1,035 kPa, whichever is greater, for a duration of not less than 2.0 hours. Any damaged or defective pipe, fittings, valves or hydrants that are discovered following the pressure test shall be repaired and/or replaced and the pressure test shall be repeated until it is satisfactory to the General Manager of Infrastructure Services.

The allowable leakage shall be calculated by the Consultant in accordance with the AWWA or the manufacturer's specifications for the pipe type, whichever is the more stringent of the two, and shall be approved by the General Manager of Infrastructure Services.

Prior to disinfecting, the water main shall be flushed to ensure all foreign materials and contaminants are removed from the line. The minimum flow rate for flushing the mains shall be 0.8m/s.

Cathodic Protection

Sacrificial anodes shall be zinc anodes conforming to ASTM B418-73m Type II as approved by the General Manager of Infrastructure Services. Hydrants, valves and fittings shall be protected by 5.5 kg anodes. Leads shall be connected by Cadweld or other approved method.

Sanitary Sewer System

Design Factors

The design of the sanitary sewer system shall be approved by Alberta Environment prior to any sanitary sewer installation.

The sanitary sewer system shall be of sufficient capacity to carry peak flows plus infiltration. The following minimum factors shall be used in the design of sanitary sewage systems.

The design population shall be the ultimate population density within the land being subdivided and the ultimate population potential (future projections) for the lands beyond the area under consideration to determine whether oversizing of the sewer main is required.

- (1) Residential
 - (a) Population Density – 3.5 persons per dwelling unit (Lot) or 40 persons/ha (minimum), whichever is greater.
 - (b) Average Flow – 450L/capital/day
 - (c) Peak Sewage Flow – 4.0 x average flow
 - (d) Infiltration – 33L/mm of nominal pipe diameter/km of main/day
 - (e) Where existing water distribution system records are available, sewage flows shall be a minimum 90% of the water consumption rate.

- (2) Commercial, Industrial, and Institutional
- (a) Peak Flow – 3.0 Average Flow
 - (b) Infiltration – 6,000 L/ha/day
 - (c) Average Flow shall be calculated utilizing the building type(s), consistent with the zoning and building bylaws, which will produce the highest anticipated flow.
 - (d) Minimum velocity to be 0.60 m/s or greater Maximum velocity to be 3.0 m/s or less
 - (e) Pipe sizing shall be determined by utilizing Manning's Formula.
 - (f) The pipe shall be sized such that at peak flow plus infiltration, the pipe is flowing between the spring line (half pipe) and 2/3 full.
 - (g) Sewer mains shall run straight from manhole to manhole, unless otherwise approved by the General Manager of Infrastructure Services.

Sanitary Sewer Main Materials

The minimum size for sanitary sewer mains shall be 200mm in diameter. Pipe for the sewer main shall conform to the following: Poly Vinyl Chloride pipe, DR35 to ASTM D3034, CSA B182.2, ASATM D3034 – rubber gasket joints.

Pipe classes shall be determined to withstand subsequent superimposed loadings.

Various factors affecting the pipe shall be taken into account, and pipe class shall be evaluated as per standard engineering practice.

Manhole sections shall be pre-cast reinforced concrete, conforming to ASTM C478, latest revision thereof.

All manholes shall be 1,200mm inside diameter unless otherwise approved by the General Manager of Infrastructure Services. Either cone or slab tops are acceptable. Slab tops will be constructed such that a minimum of 300mm cover exists between the bottom of the future driving surface and slab top. Slab tops shall be used when the distance from the bottom of the adjustment rings to the MH base is less than 2.2m.

Manhole frames and covers shall be cast iron, as stated on the Standard Drawings A3.0 and A3.1 in Schedule 3.0.

Manhole steps shall be standard safety type, aluminum, with the upper most step installed to a maximum distance of 500mm from the centerline of the rung to the top of the frame and cover (in accordance with the latest revision of OH&S procedures).

Manhole bases shall be pre-cast slabs, concrete poured bases, vaults or pre-cast tees conforming to the standard drawings in Schedule 3.0.

Where the depth of the manhole from the lowest invert to the top of the frame exceeds 6.0m safety platforms shall be provided and installed at mid-depth.

Manholes may be required to have frost covers as per Standard Drawing A4.1.

- (1) Concrete for Manholes and Appurtenances
- (a) Cement - Type 10 or Type 50 as specified by a geotechnical engineer
 - (b) Maximum slump - 75mm
 - (c) Class - 25MPa

Sewer Main Installation and Location

Un-insulated mains shall be installed to provide a minimum depth of cover of 2.8 from the invert of the main to the gutter line, or as recommended by the Consultant (and approved by the General Manager of Infrastructure Services).

Mains shall be installed to provide adequate sewer service connection depth at the property line.

Mains shall be located within the road right-of-way in accordance with the Standard Drawings in Schedule 3.0.

Crossings to be installed as per Standard Drawing A2.3.

Pipe bedding shall be provided for all mains in accordance with the Standard Drawings in Schedule 3.0.

Manhole Installation and Location

Manholes shall be located at the end of each line and at all changes in pipe size, grade and alignment.

The maximum distance between manholes shall not exceed 120m, unless otherwise approved by the General Manager of Infrastructure Services.

Inverts in manholes at changes in direction shall have at least 25mm fall across manhole.

Manholes shall be installed in accordance with the Standard Drawings in Schedule 3.0. A floating manhole frame and cover shall be used in all roadways.

Trenching and Backfilling

Backfilling, including the backfill around manholes, shall be carried out with selected native or imported material in 300mm layers to a minimum of 95% Standard Proctor Density. Backfill 1.0m below the top of the subgrade shall be compacted 98% Standard Proctor Density.

Trenches that do not extend beneath the road surface, compact to 95% Standard Proctor Density.

Sand bedding or other approved granular material in the pipe zone shall be compacted to a minimum of 95% Standard Proctor Density in maximum lifts of 150mm.

Inspection and Testing

Prior to acceptance, a video camera inspection will be required by the municipality to be carried out for all sewer lines up to and including 750mm in diameter. A manual visual inspection shall be carried out for sewer lines with diameters greater than 750mm.

Sewer mains and manholes are subject to an infiltration and exfiltration test for a minimum duration of 2.0 hours. The maximum allowable infiltration and exfiltration rate is .36L/hour per 10mm of pipe diameter /100m length of pipe. All infiltration and exfiltration tests shall be conducted after the service connections to the mains have been installed.

Sewer mains shall be tested for alignment by means of a light test. The illuminated interior of the pipe shall not show any substantial misalignment or displacement. A minimum of 75% of the full inside diameter must be visible from manhole to manhole.

Water and Sewer Service Connections

Service Connections Minimum Requirements:

The minimum size of service connections to a single-family dwelling shall be as follows:

- (1) Sanitary Service – 100mm diameter.
- (2) Water Service – 20mm diameter.

Commercial services to be as required to a minimum of:

- (1) Sanitary Service – 150mm diameter.
- (2) Water Service – 40mm diameter.
- (3) The minimum grade on a sewer service shall be 2.0%.

Sanitary Service Materials

Service pipe shall be Poly Vinyl SDR 35.

Service fittings shall conform to the pipe material being used and shall be in accordance with the corresponding specifications.

Sanitary services shall be connected to the sanitary main utilizing a prefabricated PVC tee, wye or a tee.

Water Service Materials

Water service pipe shall be copper pipe Type K soft copper to AWWA C800 or Kitec water service tubing to ASTM F1282, CSA-B137.10.

Corporation main stops shall be Mueller, Canada Brass or approved equal and shall be compression fitting.

Couplings for joining copper shall be compression fitting, Mueller, or approved equal. Size of couplings to match diameter of service pipe.

Water pipe saddles shall be double strap saddles, bronze body manufactured to suit the type of main being tapped, straps to be stainless steel, saddles epoxy coated.

Curb stops (CC's) shall be stop and drain valves unless otherwise specified. All fittings shall be of the compression type.

Curb boxes shall be Mueller A-726 for 20 or 25mm services, or Mueller A-728 for 30 to 50mm services, cast iron extension type with A-800 lids, or approved equal. Stationary roads shall be stainless steel c/w bronze clevis.

Service connections subject to freezing (pre-development) shall be greased with non-toxic grease, Grade O, Poly F-M. The grease shall be injected into the service line a minimum of 300mm beyond the curb stops (CC's).

Pressure reducing control valves shall be Clayton CRD, Series 25AUB, all bronze body complete with pressure gauge and stainless-steel seats or approved equal.

Service Connection Installation Requirements

Where possible, water service lines shall be laid in the same trench as the sewer service lines, 300mm to the right of the sanitary service when viewed towards the lot. The water service lines shall be installed in accordance with the Standard Drawings, Schedule 3.0.

Services shall be installed at the mid-point of the lot in relation to one another as shown on Standard Drawing, Schedule 3.0. There may be exceptions where double services in a common trench shall be installed to the property corners of adjacent lots.

The minimum depth of cover over the water and sanitary services at the property line shall be 2.4m, such that services shall not freeze.

The minimum depth of cover over the sewer service at the long radius bend shall be 2.7m from the obvert to the gutter line.

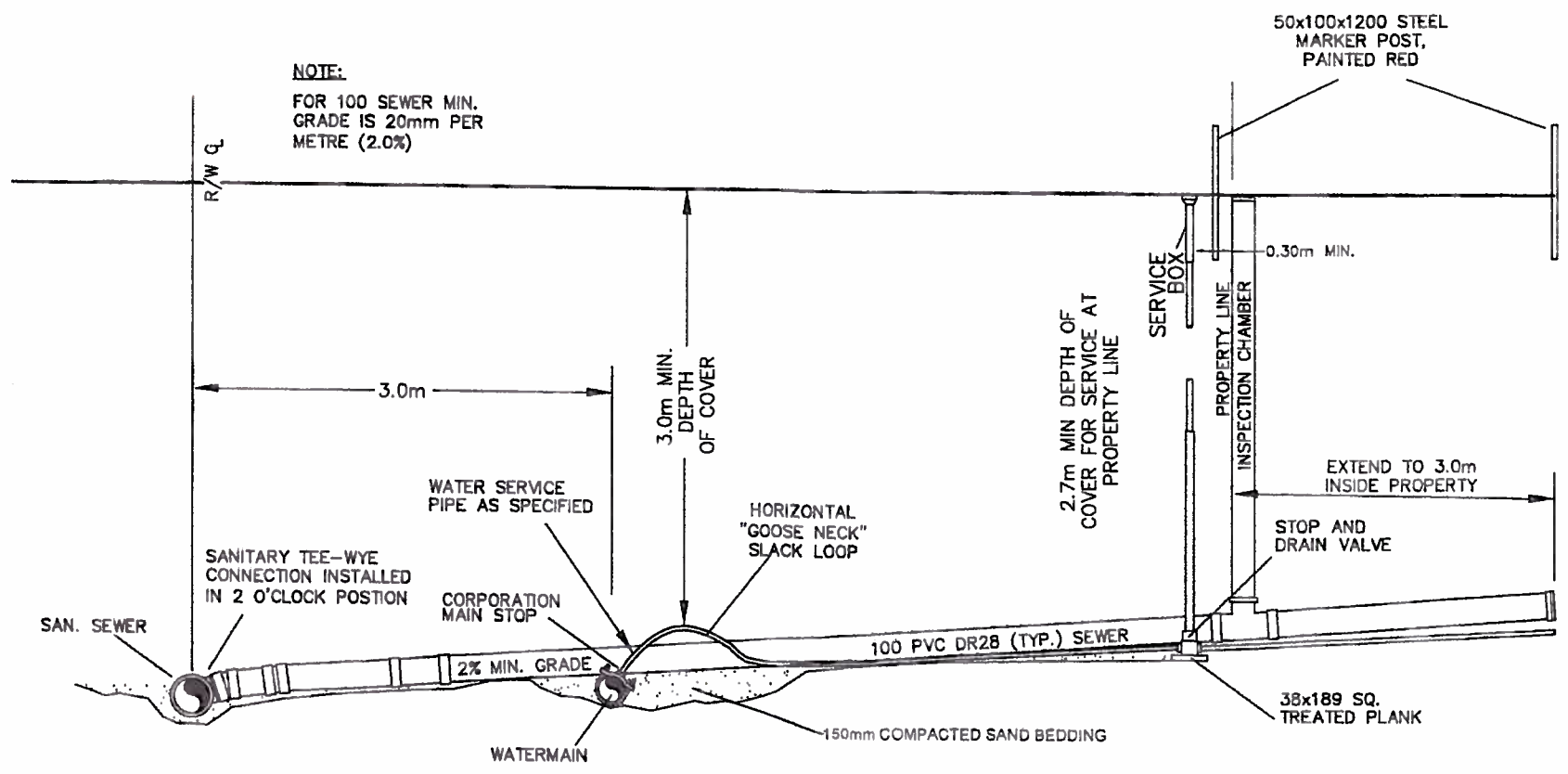
Where the sewer services are required to connect to mains in excess of 4.5m deep, risers shall be installed to within 3.6m of finished surface in accordance with the Standard Drawings in Schedule 3.0.

Corporation main stops and curb stops shall be installed in accordance with the Standard Drawings in Schedule 3.0.


Sewer Service shall be extended to the property line and have an inspection chamber, 8" riser pipe and lid, to surface.

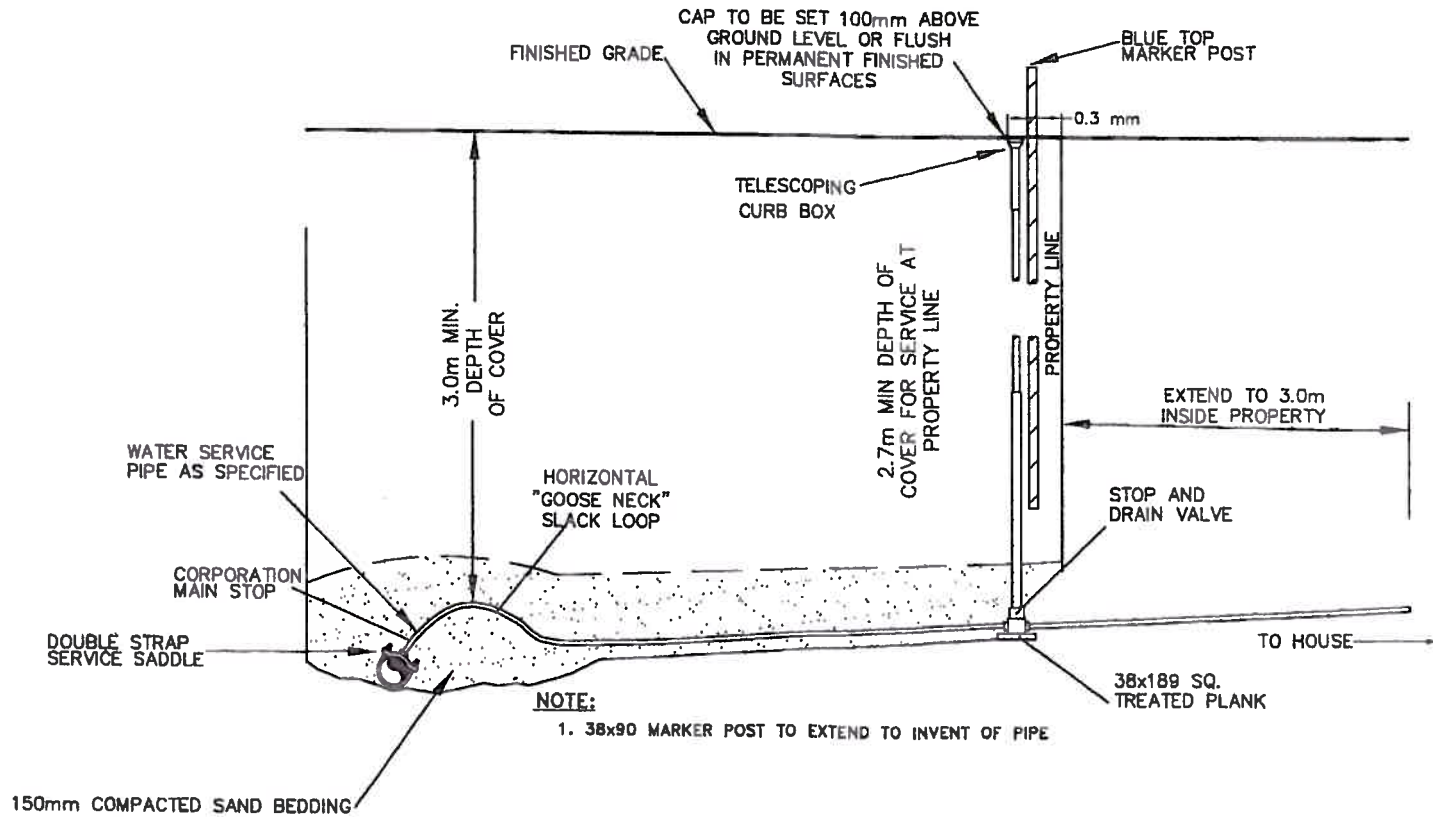
All services shall be laid on 100mm granular bedding. The bedding material shall be placed up to a level of 300mm above the crown of the highest service in the trench.


When required, a red painted pressure treated wood stake for sewer and blue for water of size 50mm x 100mm shall be extended from the end of the service connections to a minimum of 500mm above the ground level.

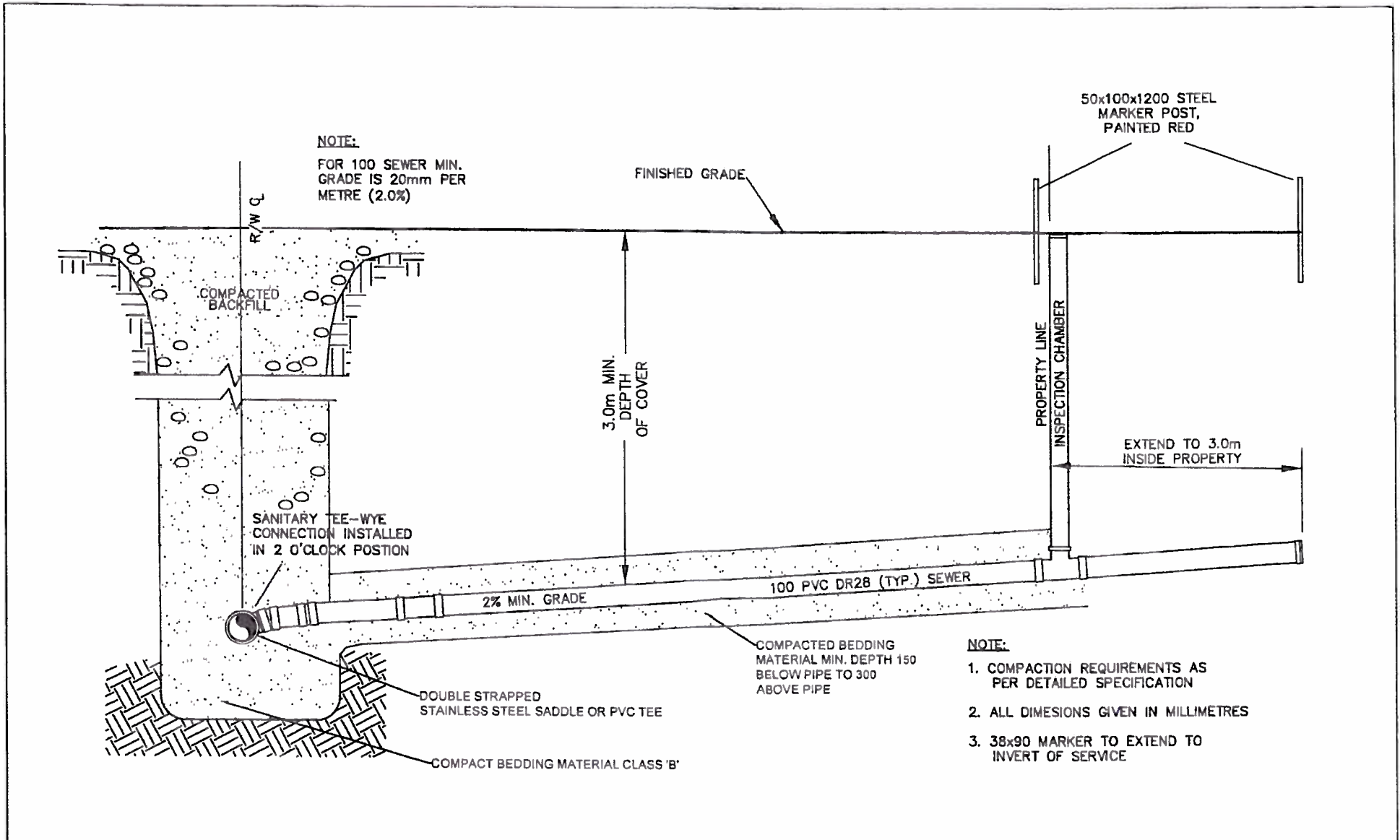



NOTE:
 FOR 100 SEWER MIN.
 GRADE IS 20mm PER
 METRE (2.0%)

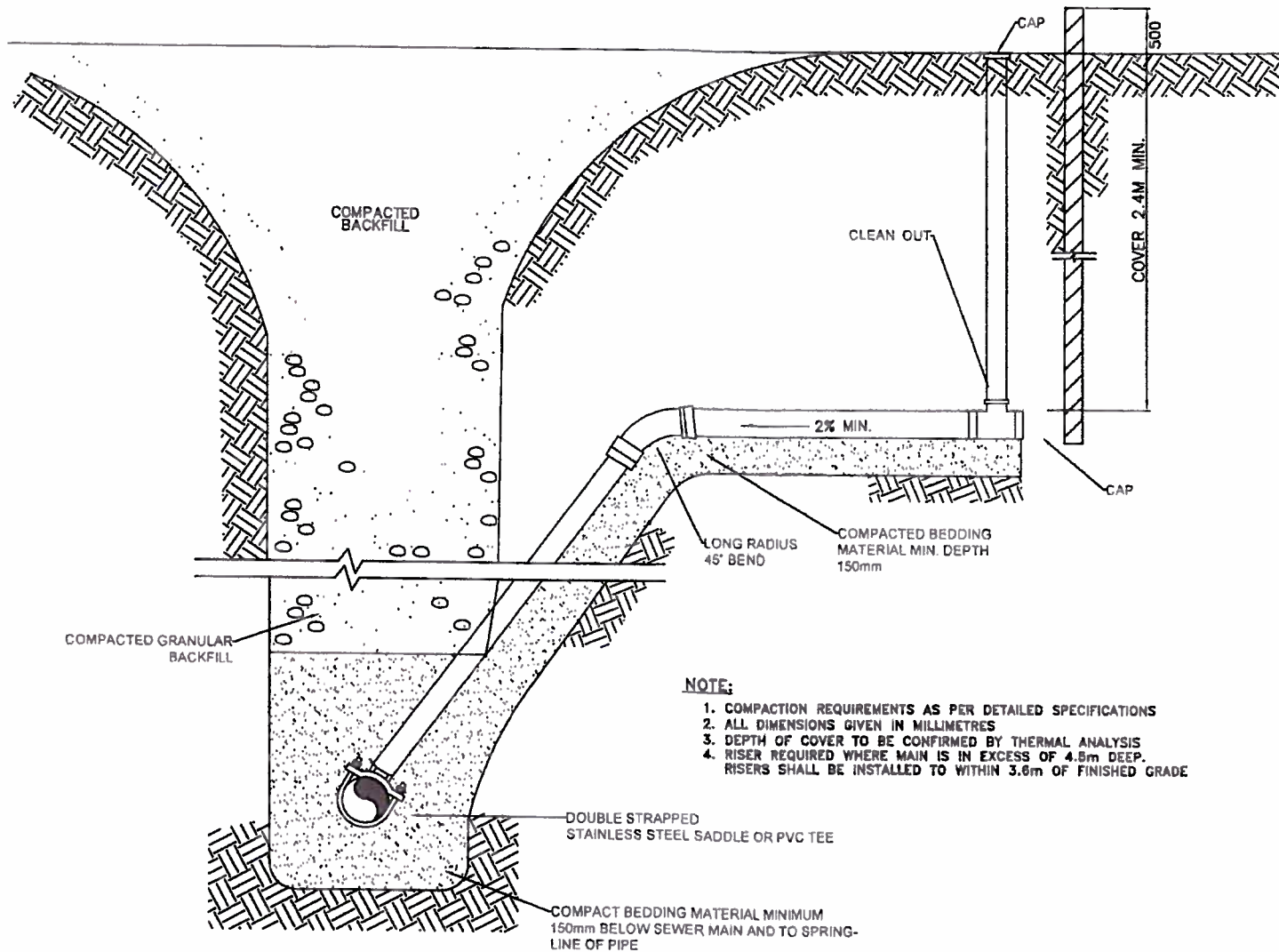
SCHEDULE 3.0	<u>TYPICAL SERVICE CONNECTION</u> <u>(WATER AND SANITARY)</u> N.T.S	STD DWG	MD OF BONNYVILLE
	DATE: APRIL 2016	A -1.0	 MUNICIPAL DISTRICT BONNYVILLE NO. 87




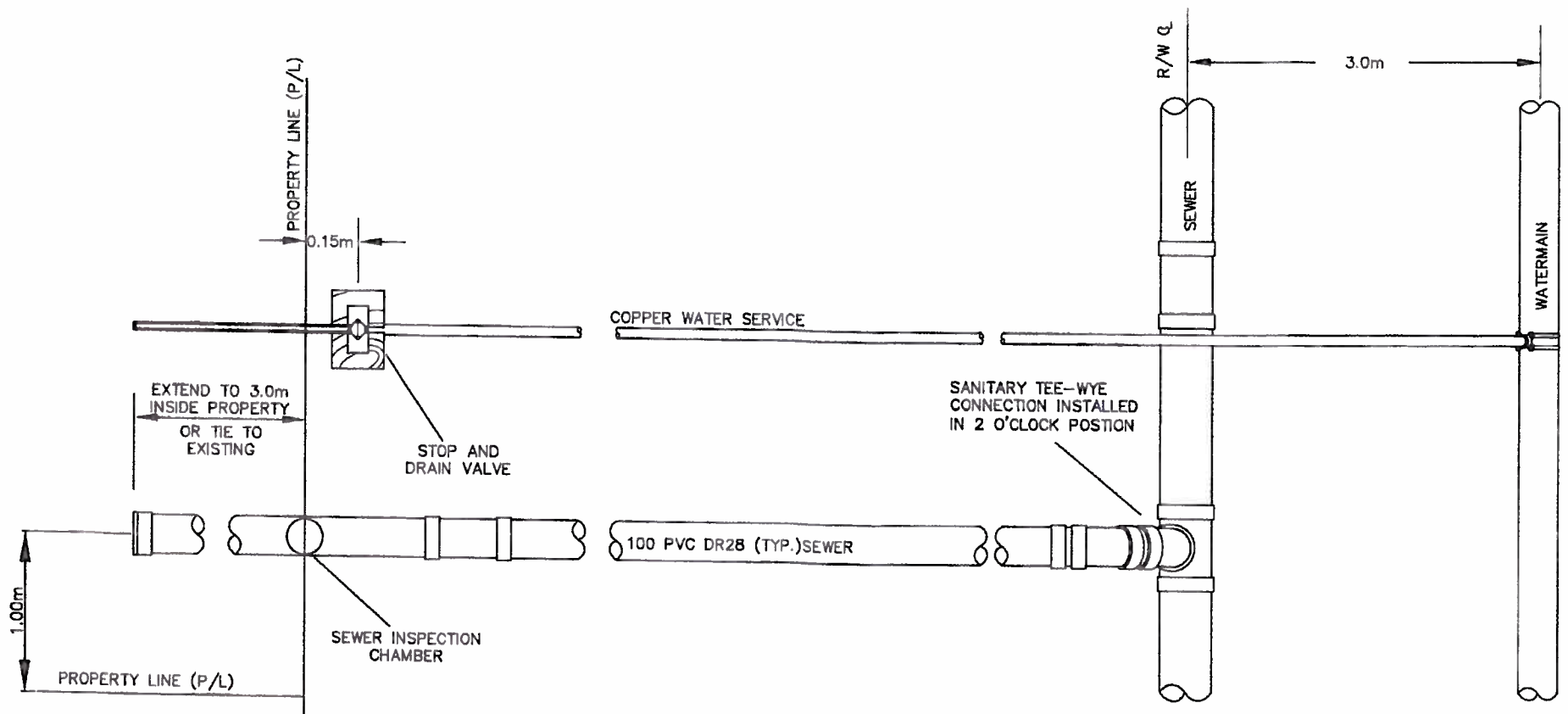
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		A -2.0	
DATE: APRIL 2016			



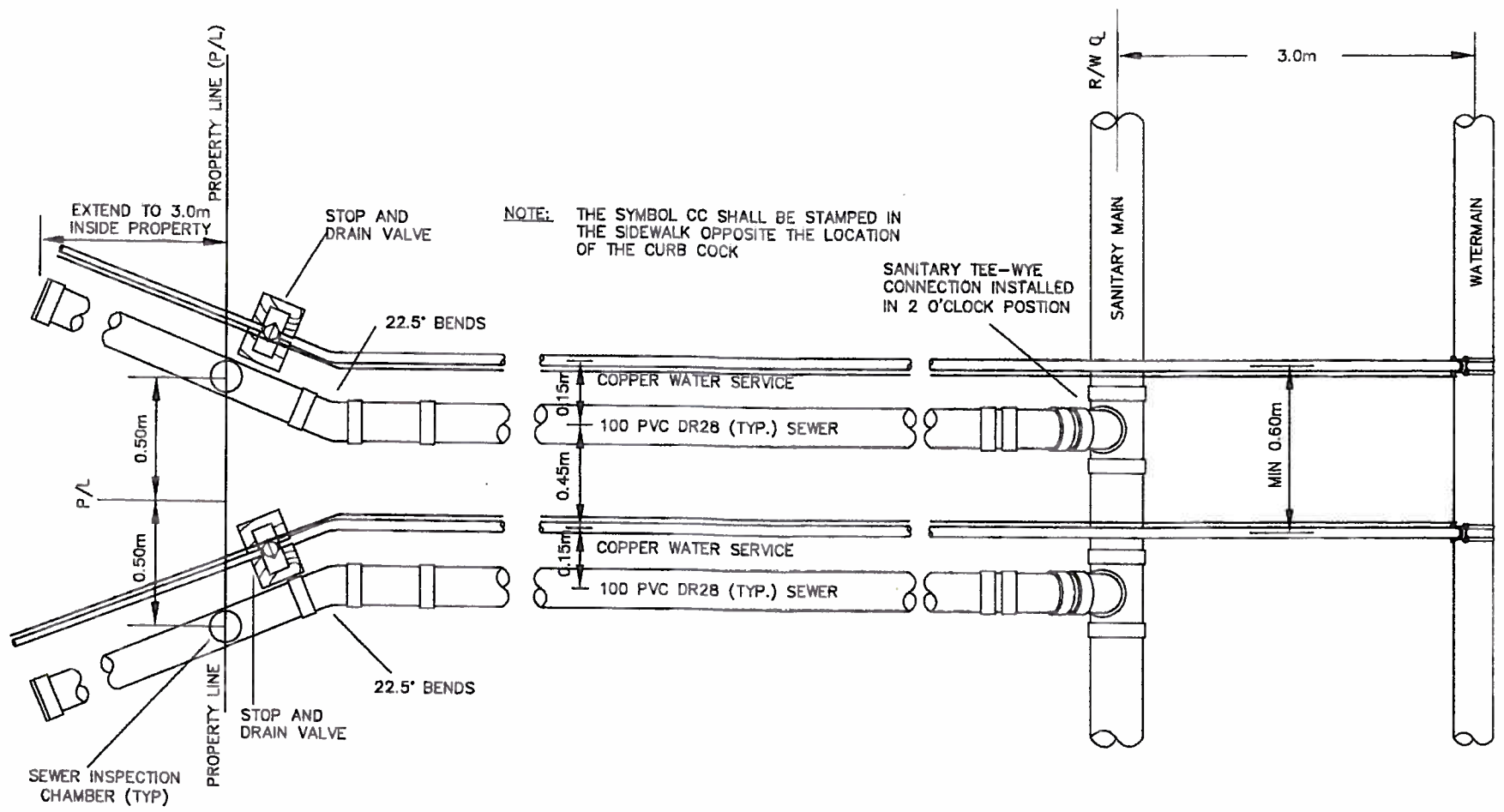
SCHEDULE 3.0	<p align="center">SANITARY SEWER SERVICE CONNECTION N.T.S</p>	STD DWG	<p align="center">MD OF BONNYVILLE</p>  <p align="center">MUNICIPAL DISTRICT BONNYVILLE NO. 87</p>
		A - 3.0	
DATE: APRIL 2016			



SCHEDULE 3.0	SANITARY SEWER SERVICE CONNECTION RISER	STD DWG	MD OF BONNYVILLE
	N.T.S	A - 4.0	 MUNICIPAL DISTRICT BONNYVILLE NO. 87
	DATE: APRIL 2016		



SCHEDULE 3.0	<p align="center"><u>SINGLE SERVICE LAYOUT</u> N.T.S.</p>	STD DWG	<p align="center">MD OF BONNYVILLE</p> <p align="center">MUNICIPAL DISTRICT BONNYVILLE NO. 87</p>
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DATE: APRIL 2016			



SCHEDULE 3.0

DOUBLE SERVICE LAYOUT
N.T.S.

DATE: APRIL 2016

STD DWG

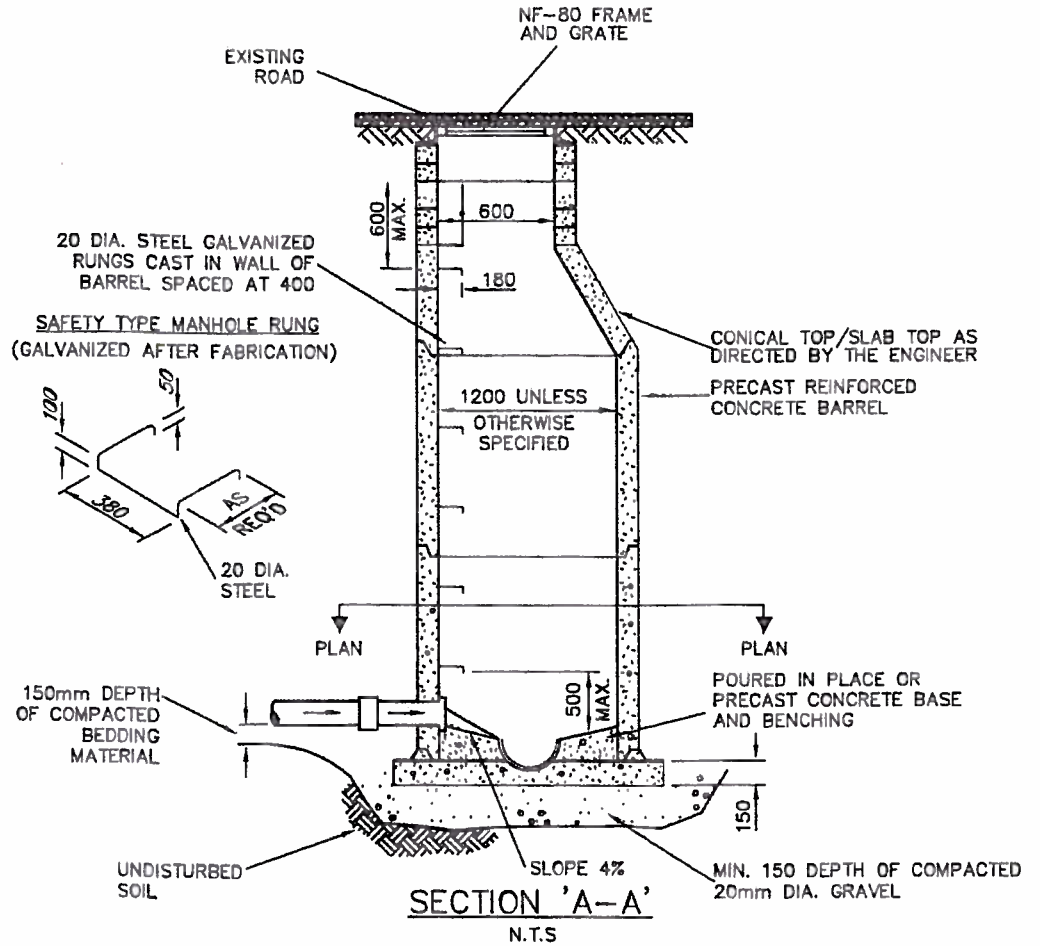
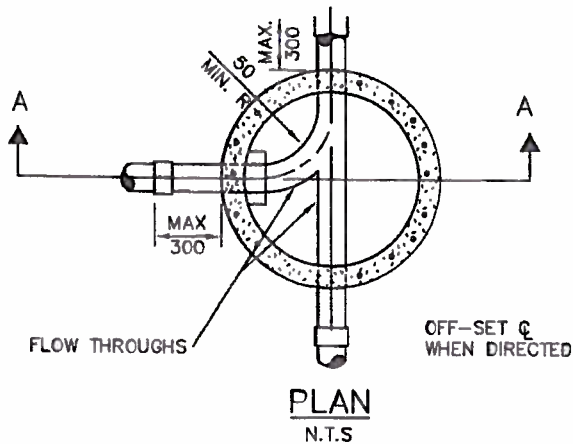
A -6.0

MD OF BONNYVILLE



NOTES:

1. ALL PRECAST MANHOLES MUST CONFORM TO A.S.T.M. SPECIFICATIONS C478
2. POURED IN PLACE CONCRETE SHALL HAVE 28 DAYS COMPRESSIVE STRENGTH 25 MPa.
3. ALL JOINTS MORTARED INSIDE & OUT
4. FORM FLOW THROUGH IN PARTIALLY SET CONCRETE AND TROWEL SMOOTH
5. ALL DIMENSIONS GIVEN IN MILLIMETRES.
6. MAX. DIST FROM RIM TO TOP RUNG IS 600mm.
7. BACKFILL MH. WITH SELECT NATIVE MATERIAL.
8. INSTALL SAFETY PLATFORMS FOR ALL MH OVER 5m DEEP. LOCATED 2m ABOVE PIPE.



SCHEDULE 3.0

STANDARD 1200mm dia.
PRECAST MANHOLE DETAIL
N.T.S.

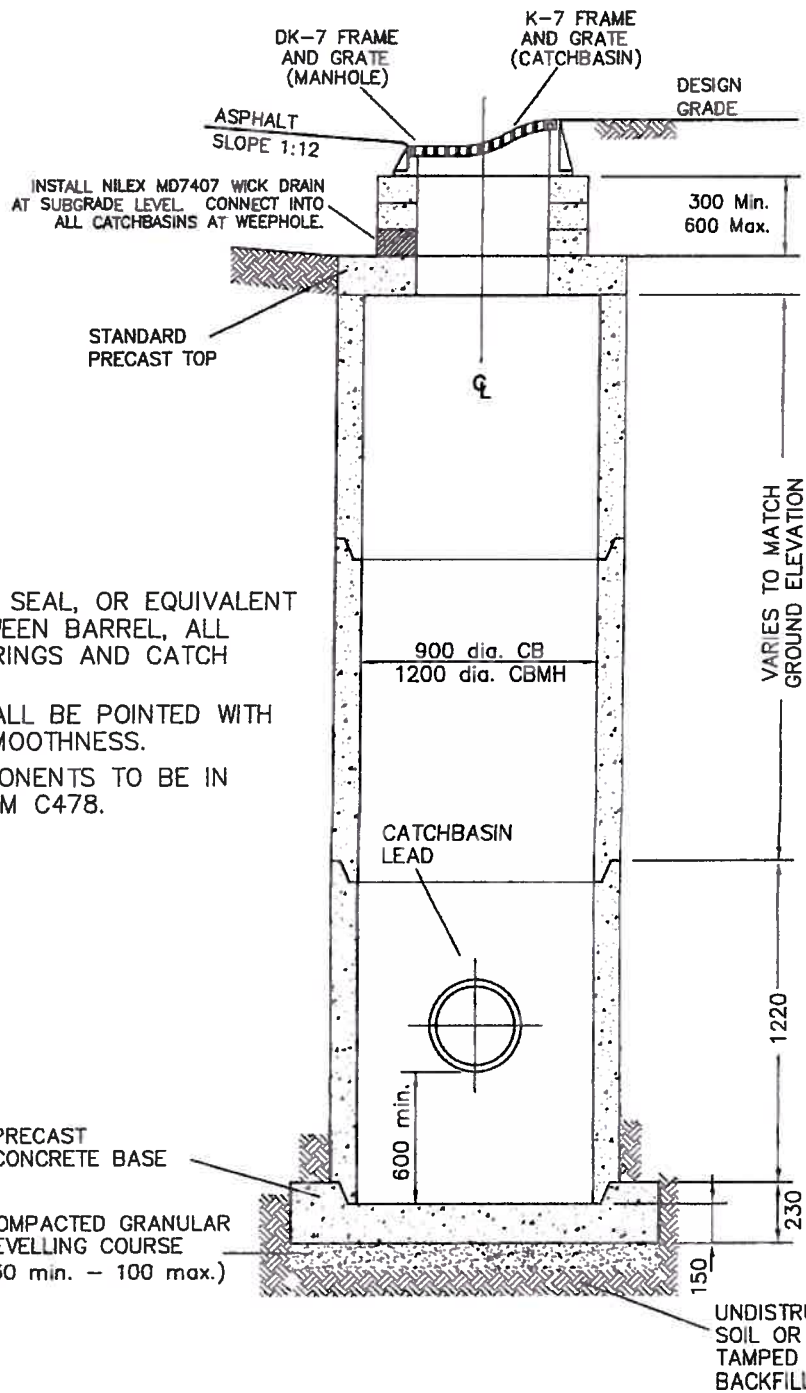
STD DWG

MD OF BONNYVILLE

A - 7.0

DATE: APRIL 2016





NOTES

1. RUBBER GASKET, KENT SEAL, OR EQUIVALENT TO BE INSTALLED BETWEEN BARREL, ALL SHOULDER AND NECK RINGS AND CATCH BASIN FRAME.
2. ALL ROUGH JOINTS SHALL BE POINTED WITH MORTAR TO ENSURE SMOOTHNESS.
3. ALL CATCHBASIN COMPONENTS TO BE IN ACCORDANCE WITH ASTM C478.

SCHEDULE 3.0

STORM MANHOLE
/CATCHBASIN DETAIL
FRAME AND GRATE
N.T.S.

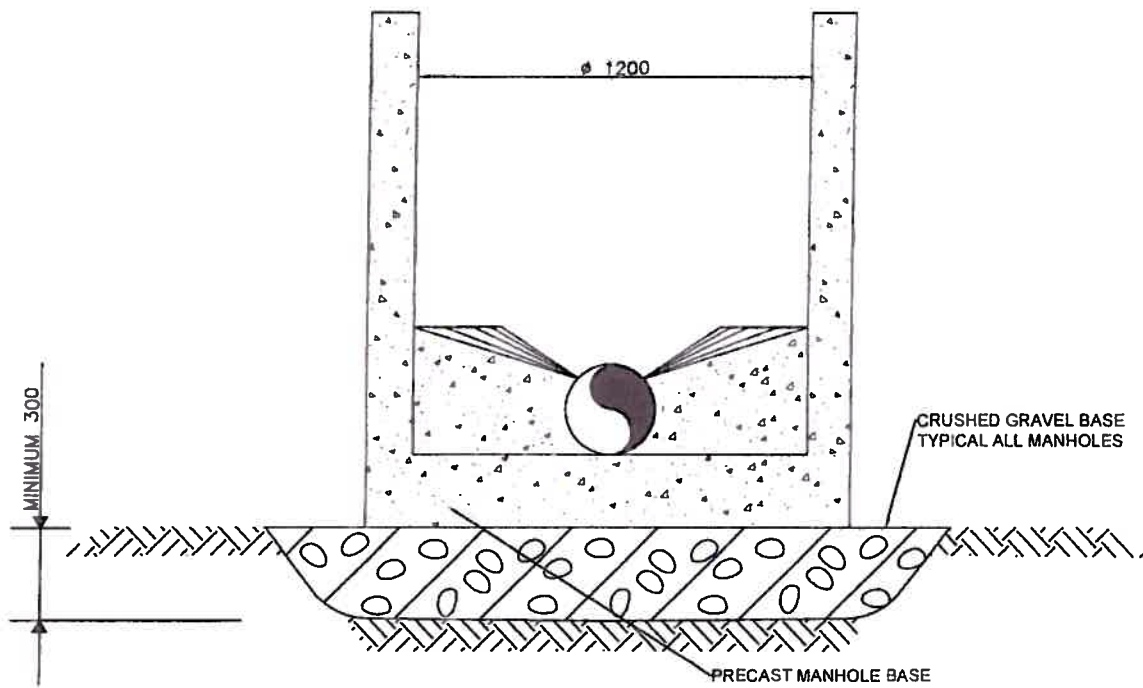
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STD DWG

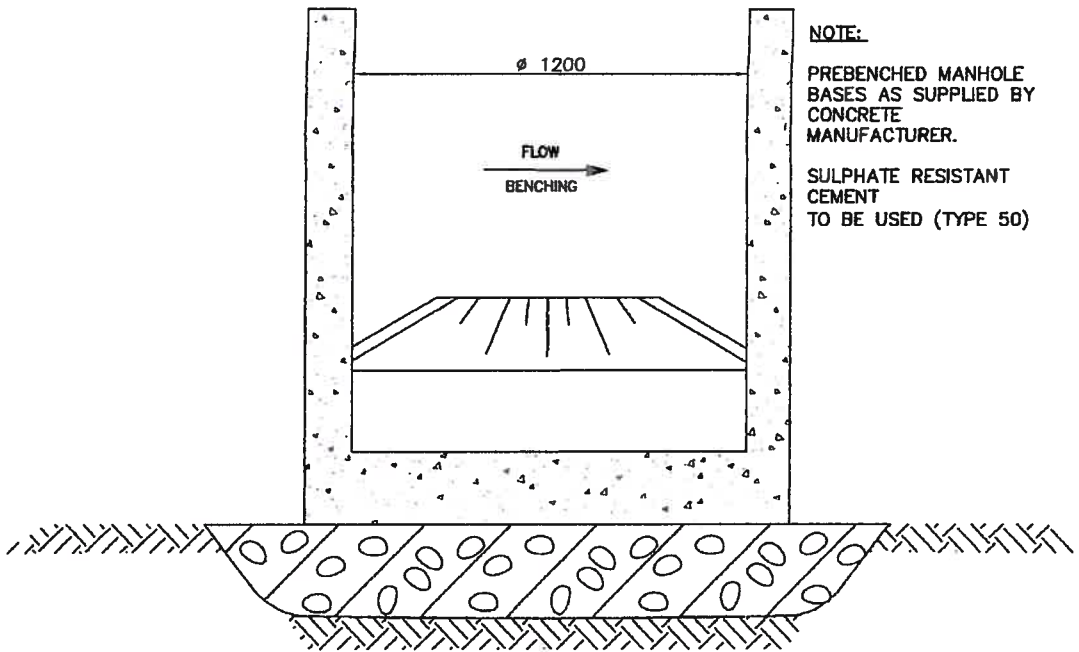
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MD OF BONNYVILLE





STANDARD MANHOLE
SECTIONS ABOVE

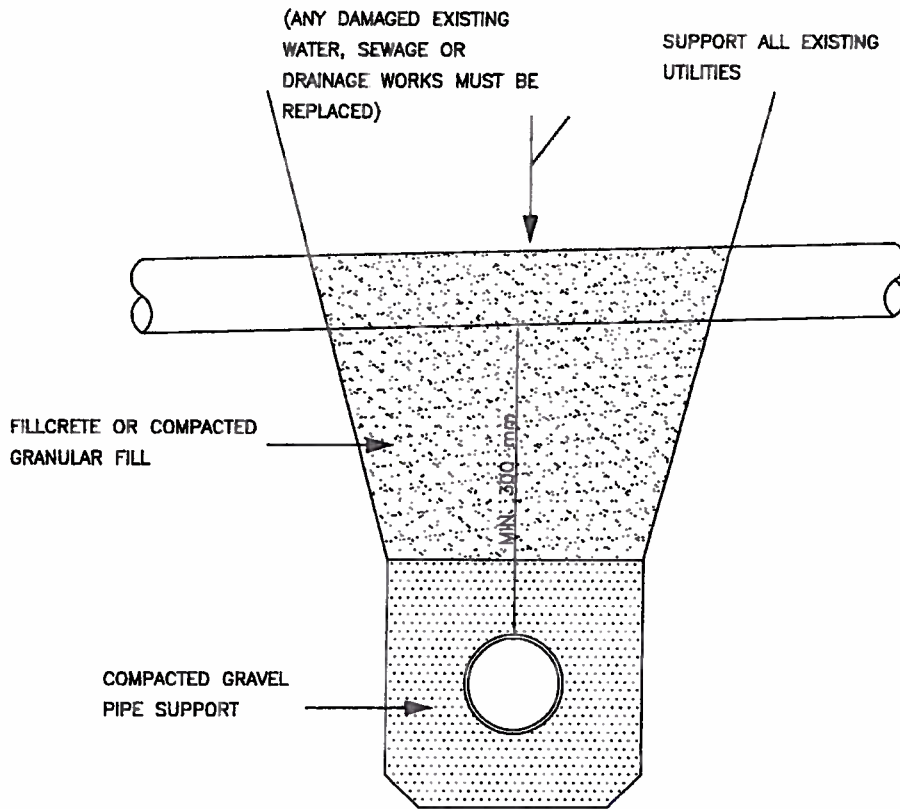


NOTE:
PREBENCHED MANHOLE
BASES AS SUPPLIED BY
CONCRETE
MANUFACTURER.
SULPHATE RESISTANT
CEMENT
TO BE USED (TYPE 50)

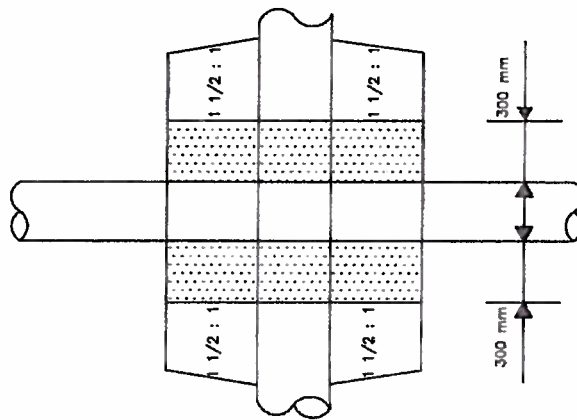
FOR P.V.C. PIPE

SCHEDULE 3.0	PREBENCHED MANHOLE BASES	STD DWG	MD OF BONNYVILLE
	N.T.S.	A - 9.0	
	DATE: APRIL 2016		





CROSS SECTION



SCHEDULE 3.0

METHOD OF PIPE SUPPORT
N.T.S.

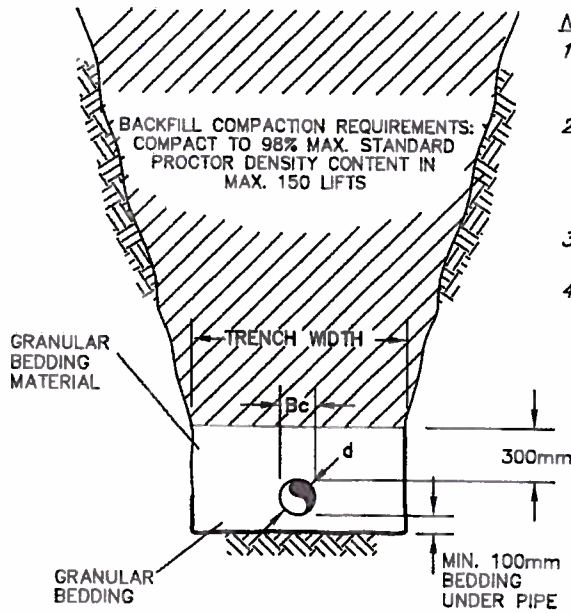
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STD DWG

A - 10.0

MD OF BONNYVILLE

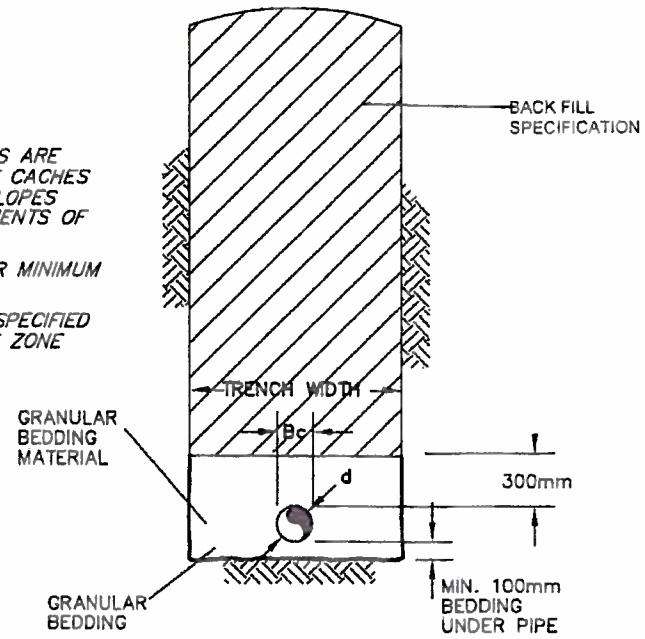




SLOPE TRENCH

NOTE:

1. PROVIDE SHORING TO COMPLY WITH O.H. & S. REQUIREMENTS.
2. WHEN CUT BACK SLOPES ARE TO BE USED IN LIEU OF CACHES AND SHORING, THESE SLOPES ARE TO MEET REQUIREMENTS OF LOCAL CODES.
3. SEE SPECIFICATIONS FOR MINIMUM COVER ABOVE PIPE.
4. MIN. TRENCH WIDTH IS SPECIFIED TO ALLOW PROPER PIPE ZONE COMPACTION.



SHORE TRENCH

B_c = OUTSIDE PIPE dia.
 C_c = INSIDE PIPE dia.

PIPE SIZE	TRENCH WIDTH	
	MAXIMUM	MINIMUM
UP TO 525mm dia.	1050mm	B _c +200mm
600mm dia. AND UP	1400mm	B _c +200mm

SCHEDULE 3.0

TRENCH DETAIL
 N.T.S.

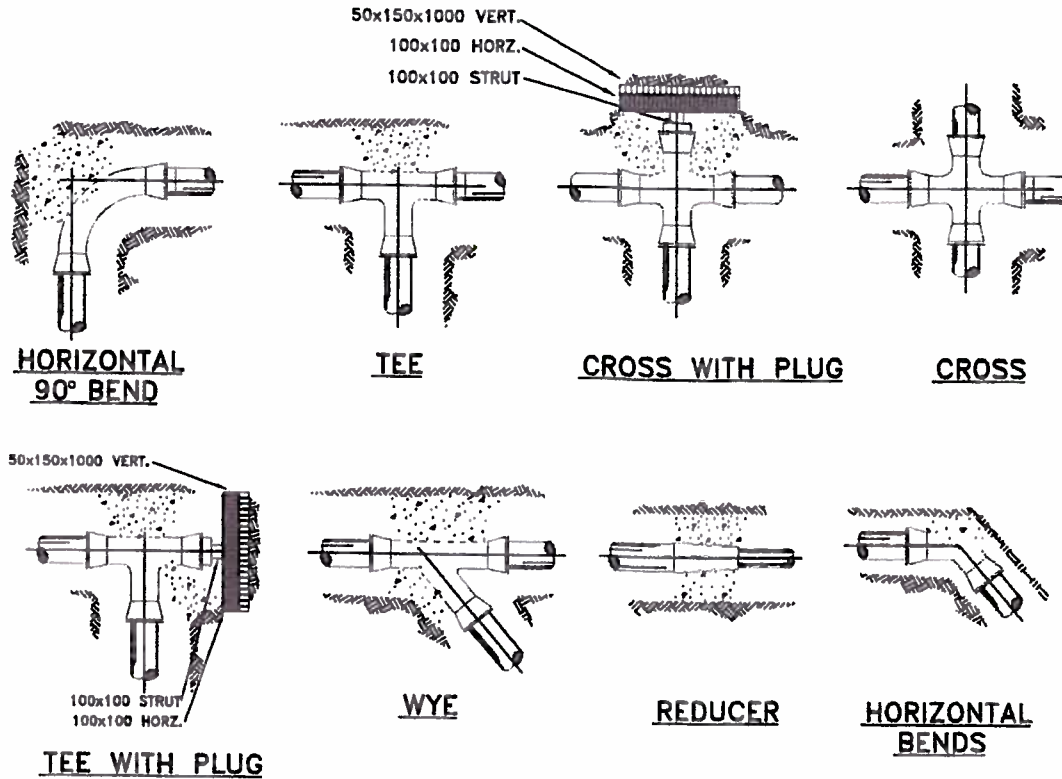
DATE: APRIL 2016

STD DWG

A - 11.0

MD OF BONNYVILLE





NOTE: THE REQUIRED BEARING AREA SHALL BE DETERMINED BY THE CONTRACTOR TO SUIT THE SOIL CONDITIONS.

TABLE FOR CALCULATION OF BASIC TRUST
BLOCK BEARING AREA 'A' (IN SQUARE METRES)

PIPE SIZE	150	200	250	300	350	400	450
'A'	0.40	0.68	1.08	1.54	2.08	3.72	3.44

NOTE:

1. ALL DIMENSIONS ARE GIVEN IN MILLIMETRES
2. ALL WOOD PRODUCTS TO BE TREATED
3. ALL FITTINGS TO BE WRAPPED IN POLY PRIOR TO POURING CONCRETE
4. ALL CONCRETE TO BE MIN. 25MPa @ 28 DAYS.

SCHEDULE 3.0

HORIZONTAL THRUST BLOCKING DETAIL
N.T.S.

DATE: APRIL 2016

STD DWG

A - 12.0

MD OF BONNYVILLE

