

REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN

SUBDIVISION SERVICING BYLAW NO. 2000, 2002 SCHEDULE “A”

Design Criteria, Specifications and Standard Drawings

*This Schedule has been consolidated for Convenience only and includes all Amendments to the text up to: **August 19, 2021***

TABLE OF CONTENTS

1.0	GENERAL INFORMATION.....	1
1.1	INTRODUCTION.....	1
1.2	DEFINITIONS.....	1
1.3	SCOPE AND USE.....	2
1.4	NON-MUNICIPAL CODES AND STANDARDS.....	3
2.0	<i>deleted</i>.....	3
3.0	WATER SUPPLY.....	3
3.1	INTRODUCTION.....	3
3.2	DESIGN PARAMETERS.....	4
3.2.1	Per Capita Flows, Fire Flow Demands.....	4
3.2.2	Pressure and Hydraulic Network Considerations.....	5
3.2.3	Cover, Grades, Clearance.....	6
3.2.4	Valving.....	8
3.2.5	Hydrants.....	8
3.2.6	Air Valves, Blow-Offs.....	9
3.2.7	Thrust Blocking.....	9
3.2.8	Service Connections.....	9
3.2.9	List of Standard Drawings.....	10
3.2.10	Private Water Source.....	10
3.3.	MATERIALS.....	10
3.3.1	Pipe.....	10
3.3.2	Pipe Joints.....	11
3.3.3	Valves, Valve Boxes and Fittings.....	11
3.3.4	Hydrants.....	12
3.3.5	Service Connections.....	13

3.3.6	Pipe Bedding.....	13
3.4	INSTALLATION.....	14
3.4.1	Excavation, Bedding, Backfill, Restoration	14
3.4.2	Pipe Laying.....	14
3.4.3	Valves, Hydrants and Appurtenances	15
3.4.4	Thrust Blocking.....	15
3.4.5	Service Connections	15
3.4.6	Testing.....	16
3.4.7	Flushing and Disinfection	16
4.0	SANITARY SEWERS.....	17
4.1	INTRODUCTION.....	17
4.2	DESIGN PARAMETERS	18
4.2.1	Design Flows.....	18
4.2.2	Pipe Flow Formulas	18
4.2.3	Manholes and Hydraulic Losses	19
4.2.4	Temporary Cleanouts	20
4.2.5	Minimum Pipe Diameter, Velocity, Grades and Cover	20
4.2.6	Service Connections	21
4.2.7	Pumping Stations and Force Mains.....	22
4.2.8	List of Standard Drawings.....	23
4.2.9	<i>deleted</i>	23
4.3	MATERIALS	23
4.3.1	Gravity Main Pipe	23
4.3.2	Force Main Pipe.....	24
4.3.3	Pipe Joints.....	24
4.3.4	Manholes.....	24
4.3.5	Temporary Cleanouts	24
4.3.6	Service Connections	25
4.3.7	Pipe Bedding.....	25
4.4	INSTALLATION.....	25
4.4.1	Excavation, Bedding, Backfill, Restoration	25
4.4.2	Pipe Laying.....	25
4.4.3	Manholes, Cleanouts, and Appurtenances	25
4.4.4	Service Connections	25
4.4.5	Flushing and Testing.....	26
5.0	deleted	26
6.0	STREET LIGHTING.....	27
6.1	INTRODUCTION.....	27
6.2	DESIGN PARAMETERS	27

6.2.1	Minimum Levels of Illumination.....	27
6.2.2	Pole Locations	28
6.2.3	Underground Ducting Locations	29
6.2.4	Lamp Standards and Luminaires	29
6.2.5	List of Standard Drawings.....	29
6.3	MATERIALS	29
6.3.1	Poles	30
6.3.2	Pole Bases.....	30
6.3.3	Conduit	30
6.3.4	Grounding.....	30
6.3.5	Conductors	30
6.3.6	Connectors	30
6.3.7	Luminaires	30
6.3.8	Lamps	31
6.3.9	Conduit Bedding.....	31
6.3.10	Junction Boxes.....	31
6.3.11	Service Panels.....	31
6.3.12	Photo-Cell Units.....	31
6.3.13	Ground Rods.....	31
6.3.14	Paint.....	31
6.4	INSTALLATION.....	32
6.4.1	Layout and Positioning	32
6.4.2	Conduit Installation	32
6.4.3	Poles, Bases and Luminaires.....	32
6.4.4	Wiring and Equipment	32
6.4.5	Inspection and Testing	32
6.4.6	Installation on Power Utility Poles	33
7.0	deleted.....	33
8.0	STANDARD DRAWINGS.....	33
8.1	GENERAL NOTES.....	33
8.2	LIST OF STANDARD DRAWINGS.....	34

REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN

SUBDIVISION SERVICING BYLAW NO. 2000, 2002

SCHEDULE "A"

1.0 GENERAL INFORMATION

1.1 INTRODUCTION

Schedule "A" to the Subdivision Servicing Bylaw identifies the Design Criteria, Specifications, and Standard Drawings acceptable to the Regional District.

This Schedule is to be referred to in the design, construction and acceptance of Engineering Works within the Regional District. Additional information, clarification and suggestions for changes and amendments should be directed to:

Regional District of Okanagan-Similkameen
101 Martin Street
Penticton, B.C.
V2A 5J9

1.2 DEFINITIONS

In this Schedule, unless the context otherwise specify:

"ACCEPTED" means as accepted by the Regional District of Okanagan-Similkameen.ⁱ

"CONSIDERED" means considered for acceptance by the Local Authority.

"CONTRACTOR" means the person or persons or the company undertaking the construction of works in a subdivision development, and/or on municipal property, or their employees, subcontractors or other duly authorized representative.

"DEVELOPER" means the owner of land or the holder of a bona-fide interim agreement or option to purchase land, who has made application to the Regional District for or is engaged in undertaking the development or subdivision of such land and shall include his duly authorized representative.

ⁱ Amendment Bylaw No. 2000.10, 2021 – adopted January 21, 2021.

“DEVELOPER'S ENGINEER” means the Professional Engineer engaged by the Developer to design and/or prepare drawings for the construction of works in a subdivision, development, and/or on municipal property, or his duly authorized representative.

“ENGINEER” means the Engineer of the Local Authority or a duly authorized representative of the Regional District of Okanagan-Similkameen.

“LOCAL AUTHORITY” means a provincial ministry or department, an irrigation district, an improvement district, a local government, a first nation government, a private entity or the Regional District.ⁱⁱ

“LOW DENSITY RESIDENTIAL” means one (1) residential dwelling unit with a maximum of one (1) secondary suite or one (1) accessory dwelling unit, located on a single parcel, or a duplex dwelling unit, being two (2) dwellings located in one (1) residential building located on a single parcel.ⁱⁱⁱ

“MEDIUM DENSITY RESIDENTIAL” means a residential building or development with more than three (3) dwelling units, and includes townhouses and apartments.^{iv}

“PROFESSIONAL ENGINEER” means a person who is registered or duly licensed in British Columbia under the provisions of the *Professional Governance Act*.^v

“REGIONAL DISTRICT” means the Regional District of Okanagan-Similkameen.

“THIS SCHEDULE” means the "Design Criteria, Specifications and Standard Drawings" prepared by the Regional District of Okanagan-Similkameen.

“THE WORK” means and includes anything and everything to be done for the setting out, the execution and fulfilment of the requirements in this Schedule.

1.3 SCOPE AND USE

This schedule shall be taken to mean the Design Criteria, Specifications and Standard Drawings to be referred to, and incorporated in, subdivisions, developments, and on municipal properties or rights-of-way, in the Regional District of Okanagan-Similkameen.

ⁱⁱ Amendment Bylaw No. 2000.10, 2021 – adopted January 21, 2021.

ⁱⁱⁱ Amendment Bylaw No. 2000.10, 2021 – adopted January 21, 2021.

^{iv} Amendment Bylaw No. 2000.10, 2021 – adopted January 21, 2021.

^v Amendment Bylaw No. 2000.14, 2021 – adopted August 19, 2021.

1.4 NON-MUNICIPAL CODES AND STANDARDS

Where non-Municipal codes and standards, such as A.S.T.M., C.S.A., A.W.W.A., etc., are referred to in this Schedule, the latest adopted revision, including amendments, of these codes and standards at the date of commencement of construction shall apply, except that the Approving Officer may vary requirements under certain circumstances in the interest of public health or safety.

When references to the following capitalized abbreviations are made, they refer to Specifications, Standards, or Methods of the respective Association.

AASHTO	American Association of State Highway and Transportation Officials
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
AWS	American Welding Society
BCBC	British Columbia Building Code
CEC	Canadian Electrical Code
CEMA	Canadian Electrical Manufacturers Association
CGSB	Canadian General Standards Board
CSA	Canadian Standards Association
CSPI	Corrugated Steel Pipe Institute
IES	Illumination Engineering Society
LEMA	Lighting Equipment Manufacturers Association
NBC	National Building Code of Canada
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NESC	National Electric Safety Code
NFPA	National Fire Protection Association
TAC	Transportation Association of Canada
WCB	Workers' Compensation Board

2.0 *deleted*^{vi}

3.0 WATER SUPPLY

3.1 GENERAL REQUIREMENTS^{vii}

- .1 All new parcels to be created by subdivision must be provided with sufficient quantities of potable water by:

^{vi} Amendment Bylaw No. 2000.10, 2021 – adopted January 21, 2021.

^{vii} Amendment Bylaw No. 2000.14, 2021 – adopted August 19, 2021.

- a) proving availability of sufficient quantities of potable water from a private water source; or
 - b) connecting to a *community water system*.
- .2 where it is proposed to provide a private water source, the following shall be submitted to the Regional District:
- a) a report certified by a *Professional Engineer* which includes:
 - i) a site plan indicating the location and GPS coordinates of each proposed well;
 - ii) a well log or pump test completed within the previous 12 months; and
 - iii) analysis and assessment of the pumping test data including professional assurance as to whether the subject well meets the requirements of this bylaw.
- .3 where it is proposed to connect to an existing *community water system*, the following shall be submitted to the Regional District:
- a) a letter from the owner of the *community water system* confirming that all of the proposed parcels can be connected to the *community water system* and that all fees have been paid for connection(s) to the *community water system*; and
 - b) a current Certificate of Public Convenience and Necessity (CPCN) where the *community water system* is operated by a private utility.

3.2 DESIGN PARAMETERS

3.2.1 Per Capita Flows, Fire Flow Demands^{viii}

Minimum design flows for domestic demand shall be:

Maximum daily domestic flow	8,000 l/single family unit/day
Peak hour domestic flow	13,600 l/single family unit/day

Additional design flows may be required for industrial, institutional or commercial developments and the Local Authority will review design flows for other developments and larger lot sizes.

Fire flow shall be in accordance with the criteria outlined in "Water Supply for Public Fire Protection - A Guide to Recommended Practice", published by Fire Underwriter's Survey.

Notwithstanding the above, the following minimum fire flows shall be met:^{ix}

^{viii} Amendment Bylaw No. 2000.02, 2006 – adopted June 19, 2008.

^{ix} Amendment Bylaw No. 2000.10, 2021 – adopted January 21, 2021.

<u>Land Use</u>	<u>Fire Flow</u>
Low Density Residential	60 litres/sec
Medium Density Residential	150 litres/sec
Commercial	260 litres/sec
Industrial	230 litres/sec
Administrative and Institutional	85 litres/sec

Design populations used in calculating water demand shall be computed in accordance with the Regional District's population predictions or with the planned development in the area to be served, whichever is larger.

3.2.2 Pressure and Hydraulic Network Considerations

Water Pressure: Unless otherwise accepted by the Local Authority, the following standards shall be used:

Minimum pressure at peak hour demand	265 kPa (40 psi)
Maximum allowable pressure	620 kPa (90 psi) 865 kPa (125 psi) with individual PRV's.
Minimum fire protection residual (at hydrant, maximum day demand)	140 kPa (20 psi)

As a basic guideline, the following criteria may be used:

Design for maximum of (a) fire flows plus maximum day demand or (b) peak hour demand, whichever is greater.

Hazen Williams formula to be used.

Demand requirements shall be based on the Regional District's present water consumption records and the projected trends. Demand may vary for different locations within the Regional District.

Where there is an existing hydraulic network in place, the Local Authority may provide information for design calculations.

Depending on the complexity and extent of the proposed distribution system, the Local Authority may require a hydraulic analysis design showing minimum flows and pressures.

The maximum desirable length of any permanent non-interconnected watermain shall be 150 m. All mains exceeding 150 m, unless it is a temporary situation, shall be looped unless otherwise accepted. Dead-end mains shall not be promoted.

Watermains are to be extended to the last property line at the end of a road which can be further extended and to a least 1 m beyond the curb line or edge of pavement at the extreme end of a designed cul-de-sac.

In residential areas, watermains servicing fire hydrants shall be 150 mm diameter or larger. Watermains 100 mm in diameter may be permitted for domestic service on dead end roads where no further extension is planned, no fire hydrant is required and the dead end main is less than 75 m long. Where a dead-end main is longer than 200 m or services more than one hydrant, watermain shall be 200 mm diameter or larger. In commercial/industrial/ institutional areas, the minimum watermain size shall be 200 mm diameter. However, should the hydraulic analysis indicate a need for larger size watermains, the larger size watermain shall be used.

Watermains shall generally be located in local road right of way's as shown on the Standard Drawings and must be accepted by the Ministry of Transportation. Permits to be issued by the Ministry of Transportation to Utility Company on completion. When watermains must cross private property, a registered utility right-of-way, minimum 6.0 m wide, shall be provided.

Design of pumping stations and control valving such as pressure reducing valves require the acceptance of the Local Authority. Good engineering practice and consideration of operation and maintenance requirements should be considered in the design of these facilities.

3.2.3 Cover, Grades, Clearance

The minimum cover over any watermain shall be 1.6 metres unless otherwise required.

The minimum grade for a main shall be 0.1%. The maximum grade shall be 30.0% unless provisions are made to anchor the pipe to the bottom of the trench with concrete poured in place or with restrained joints. Watermain grades shall generally be consistent with the roadway grade.

The minimum horizontal clearance between a watermain and any sewer shall be 3.0 m unless the watermain is concrete encased or installed in a carrier pipe.

The minimum vertical clearance at a crossing between a watermain and any sanitary sewer shall be 450 mm unless the watermain is adequately encased in concrete. The minimum vertical clearance to piping other than sanitary sewer shall be 300 mm unless the watermain is adequately encased in concrete.

3.2.4 Valving

In general, valves shall be located as follows:

- a) In intersections, in a cluster at the pipe intersection or at the projection of property lines, to avoid conflicts with curbs and sidewalks:
 - i) 3 valves at "X" intersection
 - ii) 2 valves at "T" intersectionso that specific sections of mains may be isolated.
- b) Not more than 240 m apart for single family residential. All other zones shall require special designs.
- c) Not more than 1 hydrant isolated.
- d) In gravel surfaced roads, outside the travelled portion of the roadway with valve boxes set 25 mm lower than the roadway surface.

Valves shall be the same diameter as the main up to 300 mm diameter.

3.2.5 Hydrants

Fire hydrants shall generally be located at street intersections. Where hydrants are required at mid-block locations, they shall be installed opposite property pins at an offset to facilitate road maintenance and as shown on the Standard Drawings. In general, all above ground utilities must be located outside the ditch x-section or outside curb. In no case shall fire hydrant spacing exceed a distance of 250 m nor should any residence be more than 300 m from a hydrant.

In high density residential, commercial, and industrial areas, hydrants shall be located at a maximum spacing of 150 m or as accepted. Additional hydrants may be required in high risk areas.

It shall be the Developer's responsibility to ensure the design and proposed locations of the fire hydrants will not conflict with existing or proposed street lights, power poles, etc. All hydrant locations and hydrant type, design and specification are to be confirmed with local Fire Departments.

All hydrants shall be installed with the pumper port facing the street and in no case shall the port be less than 450 mm above ground level.

Gate valves shall be installed with a flanged connection at the main to isolate all hydrants.

3.2.6 Air Valves, Blow-Offs

Air release valves shall be installed at the summit of all mains of 150 mm diameter and larger except where the difference in grade between the summit and valley is less than 300 mm. Chamber insulation and drainage shall conform to Standard Drawings.

A 50 mm diameter standpipe shall be installed on all dead-end mains. Blow-offs shall be installed in a box below grade and shall not be located in the travelled portion of the roadway.

3.2.7 Thrust Blocking

Concrete thrust blocking shall be provided at bends, tees, wyes, reducers, plugs, caps, and blow-offs. The area of thrust block bearing on pipe and ground shall be as shown on the standard drawings or as accepted. For mains 300 mm diameter and larger or in areas of poor soils, special designs may be required.

3.2.8 Service Connections

In addition to the Local Authority requirements, service connections shall be subject to the requirements of the BC and National Plumbing Codes. Service connections larger than 50 mm in diameter may be installed using a gate valve flanged to the tee at the main and, temporary cap and thrust block at property line. Service connections 19 mm to 50 mm diameter shall include a corporation stop at the main, a service saddle as accepted, and a curb stop and valve box at the property line.

The minimum size water service connections shall be as follows:

Residential	19 mm diameter
Other	25 mm diameter.

Whenever possible all water service connections shall be located at 1.5 m from the lowest lot corner or as accepted by the Local Authority.

Connections shall be installed up to the property line at a minimum depth of 1.5 m. All services shall be marked with a 40 mm x 90 mm stake at the property line with the top 150 mm painted blue and marked with the length of the stake in meters. Curb stops shall be located at a 300 mm offset from property line and the curb boxes shall be extended to ground level.

3.2.9 List of Standard Drawings

<u>Title</u>	<u>No.</u>
19 mm Standard Water Service Detail	W1
32 mm/50 mm6/Standard Water Service Detail	W2
Valve Box Detail	W3
Hydrant Detail	W4
Standard Water Main Blow-Off	W5
Thrust Block Details	W6
Air Valve Chamber Detail	W7
Local Urban Road - Typical Location of Utilities	G1
Local Urban Road - Open Shoulders	G2
Trench Detail	S2
Trench Bedding Details	S6

3.2.10 Private Water Source^x

Compliance with the following regulations at the time of subdivision approval does not warrant or guarantee the continuing quality or quantity of water on a parcel over time:

- .1 All wells to be used as a private water source must be designed, located, constructed, tested and disinfected in accordance with the provincial *Ground Water Protection Regulation* under the *Water Act*.
- .2 All wells must be capable of delivering potable water from a source capable of:
 - i) providing at least 2,300 litres per day; and
 - ii) a flow capacity of at least 20.0 litres per minute for one hour.
- .3 All wells must be drilled to a depth of not less than 15 meters, be constructed in a way to prevent surface water from entering the well and meet the minimum construction standards contained in the provincial *Groundwater Protection Regulation 299/2004*.
- .4 A well must be constructed on each parcel of a proposed subdivision that is dependent upon groundwater as a source of water.
- .5 A well is restricted to supplying water to the parcel on which it is to be located.

3.3. MATERIALS

3.3.1 Pipe

The materials outlined in Table 3.3.1 on the following page shall be considered acceptable for installation throughout the Regional District.

^x Amendment Bylaw No. 2189, 2003 – adopted June 19, 2003; and Amendment Bylaw No. 2000.14, 2021 – adopted August 19, 2021.

Table 3.3.1 - Pipe Materials and Specifications

<u>MATERIAL</u>	<u>SIZE RANGE</u> <u>(mm)</u>	<u>SPECIFICATIONS</u>	<u>USE</u>
soft copper	19 - 50	ASTM, B88, Type K	service connection
polyethylene**	19 - 50	CSA, B137-01, 160 Series, Med. density	service connection
polyvinyl chloride	100 - 900	AWWA C900, C905 Class 150 (bell & spigot joints)	distribution mains and service connections
ductile iron*	300 and larger	AWWA C151 cement mortar lined C104 rubber gasket on mechanical joints C111	distribution and trunk mains

*Corrosion protection must be considered

** As approved by Local Authority

Consideration may be given to use of alternate materials for major trunk mains or where main pressures exceed 750 kPA (110 psi).

3.3.2 Pipe Joints

Jointing of pipe shall be in accordance with manufacturer's recommendations.

A flexible joint shall be provided at locations where pipe is held in a fixed position by a rigid structure or support.

Unless otherwise approved, the amount of pipe deflection at joints and couplings shall not exceed 3 degrees, or one half the limit specified by the manufacturer, whichever is less.

3.3.3 Valves, Valve Boxes and Fittings

Solid wedge gate valves, resilient seat, iron body, bronze mounted, clockwise closure, manufactured in Canada, with non-rising stems, conforming to A.W.W.A. C500 specifications and combined with extension spindles and valve boxes shall be installed on all watermains up to and including 300 mm diameter and may be installed on 300 mm diameter water mains. Valve manufacturer must be acceptable to the Local Authority.

Where air release valves are required they shall be double acting, vacuum type, with cast iron bodies and 860 KPa flanges. A ball valve or gate valve with activator shall be installed beneath each air valve assembly. All air release valves shall be protected from frost by insulating the valve chambers.

Valve boxes shall be Terminal City NT Type 1 or equal, or as approved. Valve box risers shall be PVC C-900 pipe or as approved, suitable for the valve and valve box.

Fittings for PVC pipe shall be:

- a) Cast iron fittings manufactured to AWWA C110 designed for a working pressure of 1035 kPa.
- b) Asphalt coated ductile iron compact fittings manufactured to ANSI/AWWA C153/A21.53-84.

Mechanical seal joints on fittings to pipe shall be formed by a bell and preformed rubber gasket suitable for the pipe to which the joint is made.

Flanged joints on fittings shall be flat faced conforming in dimension and drilling to ANSI B16.1.

Ends shall be flanged or belled to suit pipe ends.

3.3.4 Hydrants

Hydrants shall be compression type Canada Valve "Century" Model or Terminal City Model C-71P or approved equal and shall conform with A.W.W.A. Specification C502 and shall be flanged at 50 mm above the ground line. Hydrants shall have two hose nozzles and one pumper nozzle complete with caps. Hose nozzles shall be 63 mm (2.5 inches) in diameter and pumper nozzles 100 mm (4 inches) in diameter. Nozzle threads shall conform with British Columbia Fire Hose Thread Specification, 8 threads per inch on hose port and 4 threads per inch on the pumper port.

Hydrant stems shall be turned counterclockwise to open. Stem seals shall be resilient "O-Ring".

Hydrant extensions shall be supplied complete with nuts, bolts, flange gaskets, operator extension and coupling.

Hydrants shall be supplied complete with nuts, bolts, flange gaskets, operator extension and coupling.

Hydrants shall be installed using hub joints and shall be held in place by tie rods. Thrust blocks shall be installed for thrust restraint in addition to tie rods.

3.3.5 Service Connections

Corporation stops shall be in accordance with AWWA C800, with fittings ends suitable for use with compression fittings. For 19 mm dia. Mueller H-15028 or Ford F-1100 unless otherwise accepted; for 50 mm dia. Ford FB 1100 unless otherwise accepted. Service saddles for connections to PVC shall be wide-band stainless steel complete with cadmium-plated bolts and existing A.C. shall be double strap type.

Corporation couplings shall be in accordance with AWWA C800.

Copper pipe with compression type fittings shall be used for all connections up to 50 mm diameter and polyvinyl chloride with fittings in accordance with Section 3.3.3 for connections 100 mm diameter and larger. 50 mm diameter connections may be silver soldered. Service connections between 50 mm and 100 mm in diameter shall not be permitted.

19 mm curb stops shall be Mueller H15219 or Ford B44-333 or as accepted, with drain; 50 mm curb stops shall be Ford B41-777 with drain, or as accepted. Curb boxes shall be adjustable type, Trojan or Terminal City, and have a sidewalk pattern top casting. Stationary rods shall be provided.

3.3.6 Pipe Bedding

Pipe bedding specifications shall conform to Local Authority standards for Class "A" or, Class "B". Pipe bedding selection may vary for different material installed and for different locations within the Regional District.

3.4 INSTALLATION

3.4.1 Excavation, Bedding, Backfill, Restoration

Any excavation in an existing road Right-of-Way shall be under permit from Ministry of Transportation and all installation and compaction must be to Ministry of Transportation Standards. All utilities in a new subdivision must also be approved and eventually permitted by the Authority having jurisdiction.

The trench shall be excavated so that pipe can be laid to the specified alignment and depth with allowance for the specified trench wall clearances and bedding. Wall clearances shall be minimum 150 mm, maximum 400 mm, from the bottom of the trench to 100 mm above the top of the pipe.

Bracing, sheeting and trench side slopes shall be in accordance with Worker's Compensation Board safety requirements. Dewatering may be required to control trench water.

Bedding material shall be sand, or concrete. Bedding shall be compacted to 95% Standard Proctor Density.

Backfill material shall be approved select native material or pitrun gravel and shall be placed in such a manner to prevent damage to the pipe.

Backfill materials in travelled surfaces shall be compacted to 95% Standard Proctor Density, except for the upper 750 mm which shall be compacted in accordance with the adjacent travelled surface design requirements.

Surface restoration shall conform to the original condition or better, or as accepted by the Ministry of Transportation where applicable.

3.4.2 Pipe Laying

Pipe shall be installed in accordance with the applicable AWWA specifications, the manufacturer's recommendations and requirements of this Schedule.

Pipes shall be handled with the greatest care and with equipment designed so that no damage occurs to pipe or fittings. All pipes shall be laid to horizontal line, with a tolerance of plus or minus 10 mm of the design line; and grade, with a tolerance of plus or minus 25 mm for water mains and services. The pipes shall be jointed in accordance with the manufacturer's recommendations except that joint deflections shall be allowed only up to one-half of the manufacturer's recommended tolerances. Particular care must be taken to see that the ends of the pipes are kept clean. Care shall be taken to properly align the pipe once the joints are forced home. Movement of the pipe once the joints is made shall be kept to an absolute minimum. Jumping on or dropping of pipe to obtain grade shall not be permitted.

Care shall be taken to prevent the entrance of trench water or other material into the pipe during installation.

3.4.3 Valves, Hydrants and Appurtenances

Valves shall be installed at the specified locations, in the vertical position. Valve boxes shall be installed plumb, centred over the valve, and such that traffic loads are not transmitted to the valve.

Hydrants shall be installed at the specified locations, set plumb and such that the pumper port faces, and is at right angles to, the road centreline, unless otherwise accepted. Drain outlets with drain rock shall be provided and kept free of obstructions. The ground flange shall be 50 mm above finished ground or sidewalk grade unless otherwise accepted.

Fittings shall be installed at the specified locations in accordance with the manufacturer's recommendations.

3.4.4 Thrust Blocking

Thrust block bearing areas shall be to Local Authority standards. Concrete shall be 25 MPa minimum at 28 days.

Care shall be taken to ensure that concrete does not interfere with the operation of flange bolts and nuts or prevent proper operation of hydrant drains.

3.4.5 Service Connections

Service connections shall be installed at the specified locations and depths with the same tolerances as specified for pipe laying.

Curb stop boxes shall be set plumb and adjusted to finish grade.

3.4.6 Testing

Prior to testing, all new water mains are to be cleaned of debris by flushing and immediately afterwards the pipe ends shall be capped in preparation for testing and disinfection.

All water mains shall be tested in accordance with the appropriate AWWA specifications and the following criteria:

- a) The test pressure shall be 1035 kPa or 1.5 times the operating pressure, whichever is greater. The pressure test shall be maintained for a minimum of two hours.
- b) The allowable leakage shall be determined by AWWA formula:

$$L = \frac{N}{131,000} D P^{0.5}$$

L = allowable leakage in litres per hour

N = number of joints in test section

D = inside diameter of pipe in millimetres

P = test pressure in kilopascals

Service connections shall be tested with the watermain.

The Local Authority shall be notified 24 hours in advance of the leakage testing and may elect to witness the test. All test data and leakage calculations duly certified by a Professional Engineer are to be submitted to the Local Authority.

3.4.7 Flushing and Disinfection

All water mains shall be disinfected by chlorination, after the system has been flushed of dirt and other debris. Chlorination methods shall conform A.W.W.A. C601 and all disinfection shall be acceptable to the Local Authority and Public Health Inspector.

Upon completion of disinfection, the entire piping system shall be thoroughly flushed, filled with water and left in a condition ready for use.

Care shall be taken to ensure chlorinated water from the testing procedure is not discharged into fish bearing streams. Dechlorination may be required prior to discharge.

4.0 SANITARY SEWERS

4.1 GENERAL REQUIREMENTS^{xi}

- .1 All new parcels to be created by subdivision must be provided with sufficient disposal of on-site sewage by:
 - a) an individual on-site sewage disposal system; or
 - b) connecting to a *community sewer system*.
- .2 where a parcel is less than 2.0 ha in area and is to be served by an individual on-site sewage disposal system, the following shall be submitted to the Regional District:
 - a) written confirmation from the authority having jurisdiction stating that their requirements with regard to onsite sewage disposal have been satisfied.
- .3 where it is proposed to connect to an existing *community sewer system*, the following shall be submitted to the Regional District:
 - a) a letter from the owner of the *community sewer system* confirming that:
 - i) all of the proposed parcels can be connected to the *community sewer system*; and
 - ii) all fees have been paid for connection(s) to the *community sewer system*.
- .4 where it is proposed to construct a new *community sewer system*, conditions for approval shall include:
 - a) Each *community sewer system* shall be designed and constructed to the standards prescribed by the *Environmental Management Act* and the *Public Health Act* and regulations pursuant to those Acts; or where standards are not provided, in accordance with standards generally accepted as good engineering practice;
 - b) Where a *community sewer system* is to be acquired by the Regional District, the design of such shall be submitted to the Regional District for approval prior to the commencement of construction as required by this Bylaw;
 - c) Where a *community sewer system* is to be installed, and before confirmation of compliance with the requirements of this section is provided by the Regional District to the provincial Approving Officer, the *community sewer system* shall be:
 - i) installed by the property owner or by the authority having jurisdiction at the property owner's expense and be approved by the authority having jurisdiction; or

^{xi} Amendment Bylaw No. 2000.15, 2021 – adopted August 19, 2021.

- ii) the subject of a Works and Servicing Agreement entered into by the property owner and the Regional District in which the required works and services will be installed by the property owner at their expense.
- d) The Regional District may request of the provincial Approving Officer that part of a sewage collection system have greater capacity than is needed to serve the proposed subdivision. The cost of providing excess capacity shall be paid for pursuant to Section 508 (Latecomer charges and cost recovery for excess or extended services) of the *Local Government Act*.

4.2 DESIGN PARAMETERS

4.2.1 Design Flows

The sanitary sewer system shall be designed using the following minimum average daily flows for the zone noted:

$$\text{Residential/institutional} = 450 \text{ litres/capita/day}$$

An infiltration rate of 30,000 litres/day/km of sewer main shall be added to the above flows.

The design flows shall be calculated using the peak daily flows plus the infiltration rate.

Peak flows shall be 4 times the average daily flow for contributing areas with populations less than 1,000; and 3.5 times the average daily flow for contributing areas with populations between 1,000 and 3,000. For populations of more than 3,000 persons, following the formula:

$$M = 1 + \frac{14}{4 + P^{0.5}} \text{ shall be used.}$$

Where: M = ratio of peak to average flow
P = population in thousands

Design populations used in calculating average daily flows shall be computed in accordance with the Local Authority's population predictions or with the planned development in the area to be served, whichever is larger.

4.2.2 Pipe Flow Formulas

Capacities of gravity sanitary sewer mains shall be determined using Mannings' Formula:

Calculations for capacities of sanitary sewer forcemains shall use the Hazen - Williams Formula:

4.2.3 Manholes and Hydraulic Losses

Manholes on Community Sanitary Sewer mains shall be required at:

- all changes in grade
- all changes in direction
- all changes in pipe sizes
- all intersecting sewers
- all terminal sections
- downstream end of curvilinear sewers

Manholes shall be placed where future extensions are anticipated and shall be spaced no greater than 100 m apart. Manholes should not be located in wheel paths.

Pipe intersections in manholes shall utilize smooth hand formed concrete channels to maintain uniform flows.

The invert of the downstream pipe shall not be higher than that of the upstream pipe.

The springline of the downstream pipe shall not be higher than that of the upstream pipe.

Sanitary sewer mains are to be extended to the last property line of the area it serves, with the exception of sanitary sewer mains in cul-de-sacs where they shall terminate at or near the centre of the cul-de-sac with a manhole.

Minimum drop in invert levels across manholes:

- i) Straight run or deflections up to 45° - 30 mm drop
- ii) Deflections 45° to 90° - 60 mm drop

A drop pipe shall be installed when the drop between inverts exceeds 0.6 m.

Inside ramps will be permitted up to 450 mm from invert to channel bed.

Where a small pipe joins a larger pipe, the energy gradient shall be maintained through the transition.

Deep manholes shall be provided with safety platforms in accordance with the British Columbia Workers' Compensation Board requirements.

Precast concrete manhole sections shall conform to ASTM C478 and shall be minimum 1050 mm diameter for mains less than 450 mm diameter, and minimum 1200 mm diameter for mains greater than 450 mm diameter.

4.2.4 Temporary Cleanouts

Temporary clean-outs on Community Sanitary Sewer mains may be provided at terminal sections of a main provided that:

- a) Future extension of the main is proposed or anticipated.
- b) The length of sewer to the downstream manhole does not exceed 45.0 m.
- c) The depth of the pipe does not exceed 2.0 m at the terminal point, and
- d) No more than two (2) service connections are to be installed between the cleanout and the downstream manhole.

Clean-outs shall not be considered a permanent structure.

4.2.5 Minimum Pipe Diameter, Velocity, Grades and Cover

The minimum diameter for sanitary sewer installations shall be as follows:

- a) Sanitary Sewer Mains = 200 mm
(except last upstream portion which cannot be extended in the future, may be 150 mm diameter if less than 45 m long.)
- b) Sanitary Sewer Connections = 100 mm
(a minimum 150 mm diameter service shall be used for all commercial and industrial services)
- c) Sanitary Sewer Forcemains = 100 mm

The minimum velocity shall be 0.6 m/sec. There is no maximum velocity, however, consideration must be given to scour problems where flow exceed 2.5 m/sec., and anchoring must be incorporated where the grade(s) of the sewer are 30% or greater.

The grade of any sewer shall be governed by the minimum velocity required. However, the last section of a main that will not be extended in the future, shall have a minimum grade of 1.0% where 150 mm diameter pipe is proposed.

The minimum cover over any main shall be 1.5 m and 1.6 m at any road crossing if open ditch exists. The desired cover over any sewer forcemain is 1.5 m. Consideration must be given to both dead and live loads for pipe material being utilized.

The depth of the sewer must be sufficient to provide 'gravity flow' service connections to both sides of the roadway and must allow for future extension(s) to properly service all of the upstream tributary lands for ultimate development.

Where it is not feasible to service by gravity connection to a sewer in the frontage street, a sewer in a rear yard or lane may be required.

Where permitted, horizontal curves will require a constant offset from property line and/or shall be uniform throughout the curve. The radius of the curve shall not be less than 60 m. The design velocity must exceed 0.91 m/sec., the minimum grade shall be 1.0% and each joint is to be located by survey.

Sanitary sewers shall generally be located in the road right-of-way, with offsets from property lines as shown on the standard drawings. When sanitary sewers must cross private property, a registered right-of-way, minimum 6.0 m wide, shall be provided.

4.2.6 Service Connections

In addition to the Local Authority requirements, service connections shall be subject to the requirements of the BC and National Plumbing Code.

Service connections shall be provided to each lot fronting the main. All services shall enter the main at a point just above the springline.

Separate service connections shall be installed for each dwelling unit of a duplex, townhouse or row housing development for individual ownership.

Connections to new mains shall be made using wye fittings; connections to existing mains shall be made using saddles.

The minimum size for sanitary sewer service connections shall be 100 mm.

The minimum grade of 100 mm diameter service connection from the main to the property line shall be 2.0%. Where this grade cannot be met, a 150 mm diameter service connection at a minimum grade of 1.0% may be installed.

Desirable depth shall be 1.5 m at the property line or as accepted.

Single family and duplex residential service connections may be permitted into manholes provided that:

- i) The connection is not in an adverse direction to the flow in the sewer main.
- ii) The provisions noted in 4.2.3 are met.

Service connections, 150 mm and larger, except single family or duplex, shall be connected to manholes and; shall comply with the provisions of Section 4.2.3.

4.2.7 Pumping Stations and Force Mains

If at all possible, the use of sanitary pump stations is to be discouraged. Any proposed use of pump stations must receive prior approval from the Local Authority. Any sanitary pump station must be located within a right-of-way outside of the road dedication.

The size, capacity and type of these stations will be dependent upon the development and catchment area involved.

All pumping station and force main design is to be completed by a Professional Engineer and installation shall be as accepted for the specific installation.

In conjunction with sanitary pumping facilities, the following criteria shall be noted in the design of force main systems.

a) Velocity

At the lowest pump delivery rate anticipated to occur at least once per day, a cleansing velocity of at least 0.9 m/sec should be maintained. Maximum velocity should not exceed 3.5 m/s.

b) Air Relief Valve

An automatic air relief valve suitable for sewerage applications, installed in an insulated manhole, shall be placed at high points in the force main to prevent air locking. If requested by the Local Authority and within reasonable depths, the sewer shall be graded to eliminate air relief valves.

c) Termination

Force mains should enter the gravity sewer system at a point not more than 600 mm above the flow line of the receiving manhole. An inside drop pipe shall be incorporated on all forcemains entering manholes.

d) Size

The minimum size for force mains shall be 100 mm diameter. All force mains shall be designed to prevent damage from superimposed loads, or from water hammer or column separation phenomena.

Consideration must be given to maintenance requirements in the design of all sewage pumping stations. Pump selection, wetwell volumes, control system, etc., shall be reviewed with the Local Authority on a project by project basis.

4.2.8 List of Standard Drawings

The following drawings form part of Section 4:

<u>Title</u>	<u>No.</u>
Pipe Anchoring Detail	S1
Trench Detail	S2
Sanitary Sewer Connections	S3
Standard Manhole Detail	S4
Standard Sewer Manhole Interior Drop	S5
Trench Bedding Details	S6
Service Connection detail for Sanitary Manhole in cul-de-sac	S7
Thrust Block Details	W6
Local Urban Road - Typical Location of Utilities	G1
Local Urban Road - Open Shoulder	G2

4.2.9 On-Site Sewage Disposal^{xii}

- a) where a parcel is not required to be served by a community sewer system under Schedule “B” (Levels of Service), it shall be served by an individual on-site sewage disposal system.
- b) an on-site sewage disposal system must be located on the parcel it will service.
- c) holding tanks are not permitted as a method of on-site sewage disposal.

4.3 MATERIALS

4.3.1 Gravity Main Pipe

The materials outlined in Table 4.3.1 shall be considered acceptable for installation throughout the Regional District.

Table 4.3.1 - Gravity Sewer Pipe Materials and Specifications

Material for Gravity Sewers	Size Range (mm)	Minimum Specifications	Use
Polyvinyl Chloride	100 - 150	CSA B182.2, SDR 28*	service connections

^{xii} Amendment Bylaw No. 2000.03, 2007 – adopted September 6, 2007; and Amendment Bylaw No. 2000.13, 2021 – adopted August 19, 2021.

	100 - 900	CSA B182.2, SDR 35*	collection mains & trunks
Reinforced Concrete	375 & larger	ASTM C76, Class as required	trunks

*SDR shall be suitable for depth of bury

4.3.2 Force Main Pipe

The materials outlined in Table 4.3.2 shall be considered acceptable for installation throughout the Regional District.

Table 4.3.2 - Force Main Sewer Pipe Materials and Specifications

Material for Forcemains	Size Range (mm)	Minimum Specifications	Use
Polyvinyl Chloride	100 & Larger	AWWA C900	minor forcemains
Polyethylene	100 & Larger	ASTM PE 2036 Series 160, CSA 137-1	minor forcemains

4.3.3 Pipe Joints

All gravity sewer pipe shall be jointed using rubber gaskets or gasket fittings and couplings. All sewer force main piping shall be jointed as specified for water main piping.

4.3.4 Manholes

All manholes shall be precast concrete, minimum 1,050 mm inside diameter and shall conform to A.S.T.M. C478. Manhole slabs shall be precast or cast in place on compacted material to Local Authority Standards using 20 MPA concrete and shall be 1,600 mm square.

Precast concrete lids shall be designed to withstand H-20 loading conditions. Cast iron frames and covers and manhole ladder rungs shall conform to Local Authority Standards.

4.3.5 Temporary Cleanouts

Temporary cleanout barrels, covers, base and lids shall conform to standards for manholes, or as accepted.

4.3.6 Service Connections

Polyvinyl chloride pipe and fittings shall be used for all service connections.

4.3.7 Pipe Bedding

Pipe bedding classifications shall conform to Local Authority standards for Class "A" or, Class "B". Pipe bedding selection may vary for different materials installed and for different locations within the Regional District.

4.4 INSTALLATION

4.4.1 Excavation, Bedding, Backfill, Restoration

Excavation, bedding, backfill and restoration shall conform to the requirements of Section 3.4.1 of this Schedule.

4.4.2 Pipe Laying

Grading and aligning the pipe shall be effected with electronic aligning equipment unless otherwise approved by the Local Authority.

Pipe jointing and force main piping installation shall conform to the requirements of Section 3.4.2 of this Schedule. Vertical tolerance shall be 7 mm, plus or minus, for sanitary sewer gravity mains and 25 mm, plus or minus for sewer force mains.

4.4.3 Manholes, Cleanouts, and Appurtenances

Manholes, cleanouts and appurtenances shall be installed at the locations shown on the approved design drawings and in accordance with the Standard Drawings.

Manholes shall be set plumb and shall be constructed concurrently with the laying of the pipe. Manholes shall be constructed so as to be free from both ground water infiltration and exfiltration of sewage. All joints shall have a Butyl Mastic sealant and be mortared inside and out, including base, barrel, cover, bricking and frame.

Inlet and outlet elevations shall be as shown on the approved design drawings with tolerances as specified for pipe laying.

4.4.4 Service Connections

Service connections shall be installed at the locations and depths shown on the approved drawings with the same tolerances as specified for pipelaying and as shown on the standard drawings.

4.4.5 Flushing and Testing

Prior to testing, all new mains are to be cleaned of debris by flushing by approved method and T.V. inspection and immediately afterwards capping the pipe ends in preparation for testing. This procedure will help to identify any misalignments on curved mains. All sanitary sewers shall be visually inspected to determine that they are straight.

Exfiltration tests shall be carried out on gravity sewers with either air or water as outlined below.

Testing for sanitary sewer forcemains shall conform to the testing criteria for watermains, but need not include disinfection.

Exfiltration Test for Gravity Sewers:

The allowable exfiltration (water method) shall be 10 litres per millimetre of pipe diameter per kilometre per day.

The allowable exfiltration (air method) shall be determined by filling the test section with air to a constant pressure of 25 Kpa and maintaining a pressure above 20 kPa for a minimum of 5 minutes. After the stabilization period, the air supply shall be cut off and the pressure allowed to drop to 20 kPa. Timing shall commence at 20 kPa and shall continue until the pressure reaches 15 kPa. The minimum acceptable time period shall be determined by the formula:

Minimum Time in min. = $0.040 \times \text{pipe dia. in millimetres}$

Where prevailing groundwater is above the sewer line being tested, the test pressure shall be increased 10 kPa for each metre of groundwater above the pipe.

An infiltration test may be required in areas of high groundwater, at the discretion of the Local Authority.

The Local Authority shall be notified 24 hours in advance of the leakage testing and may elect to witness the test. All test data and leakage calculations duly certified by a Professional Engineer are to be submitted to the Local Authority.

5.0 ~~deleted~~^{xiii}

^{xiii} Amendment Bylaw No. 2000.10, 2021 – adopted January 21, 2021.

6.0 STREET LIGHTING

6.1 INTRODUCTION

All street lighting systems shall be designed by a Professional Engineer competent in lighting design, and in accordance with the International Illuminating Engineering Society and Local Authority standards where required by the Local Authority.

All materials, equipment and specifications shall be subject to approval of the Provincial Electrical Inspector prior to submission to the Local Authority for consideration.

The developer shall be responsible for obtaining all permits and payment of any fees required by the Provincial Electrical Inspector or the power utility company prior to start of construction.

Upon completion, the consulting engineer or contractor shall make provision to energize the system for inspection purposes and notify the Local Authority the system is ready to inspect. After completion of such inspection by the Local Authority and correction of remaining deficiencies, the Local Authority will then make application to energize the system when service is required.

Street lighting voltages shall be compatible with the local power authority service voltages.

Provision for future lighting of parks shall be made by installing ducts from the nearest street-light or junction to the park property line.

6.2 DESIGN PARAMETERS

6.2.1 Minimum Levels of Illumination

The levels of average horizontal illumination, in lux, for roadways and pedestrian walkways shall not be less than those outlined in Table 6.2.1.1.

Table 6.2.1.1 - Average Horizontal Illumination (LUX)

Road Classification	Main Commercial Areas	Industrial & Intermediate	Residential Areas
Arterial	22	15	*11
Collector	13	10	* 6

Local	10	6	4
Pedestrian Walkways	6	6	4

* Average horizontal illumination shall apply only to arterial or collector roads abutting residential properties. Arterial or collector roads traversing a residential area but not abutting residential properties shall be designed to meet industrial and intermediate commercial area standards.

Differentiation between areas shall be at the discretion of the Approving Officer.

The maximum uniformity ratio of horizontal illumination for roadways and pedestrian walkways using a maintenance factor of 0.90 shall be as outlined in Table 6.2.1.2.

Table 6.2.1.2 - Uniformity Ratios

Road Classification	Uniformity Average: Minimum
Arterial	3:1
Collector	4:1
Local	5:1
Pedestrian Walkways	5:1

6.2.2 Pole Locations

All pole locations are subject to Ministry of Transportation approval for which a permit is required.

For arterial and collector roadways, pole installations shall utilize a staggered arrangement on both sides of the roadways and where possible be located on lot lines, away from driveways and underground services. On local roadways, pole installations shall utilize a one-side arrangement along the sidewalk side, however a staggered arrangement may be considered provided private utility companies are satisfied that no conflicts exist.

Illumination levels differ for different classifications of roadways and where these roads meet, a transition area shall be incorporated. These shall have a gradual increase in illumination level until the higher level is reached.

On curves the luminaire spacing shall be reduced to ensure uniformity of illumination. Where poles are situated on the inside of bends the spacing must be reduced to $\pm 55\%$ of the spacing on straight sections. On the outside of bends the spacing must be reduced to $\pm 70\%$ of the normal spacing. Reduction figures are general guidelines and uniformity levels should dictate the required spacing.

Consideration shall be given to the relative positions of luminaires and trees to ensure that a uniform light distribution is maintained.

6.2.3 Underground Ducting Locations

In general, conduit shall be placed on the light side of the roadway. However, where a staggered type lighting pattern is utilized, conduit shall be placed on both sides of the roadway.

6.2.4 Lamp Standards and Luminaires

The types of standards and luminaires for different road classifications shall be as per Table 6.2.4.

Table 6.2.4 - Standards and Luminaires

Road Classification	Standard Type	Height	Luminaire Description
Arterial	Davit Arm NAPCO #29180-110-000	9.14 m	150 watt high pressure sodium,
Collector	Davit Arm NAPCO #29180-110-000	7.62 m	150 watt high pressure sodium
Local	Davit Arm NAPCO #29180-110-000 as per Std. Dwg.	7.62 m	100 Watt high pressure sodium,
	E-1 or accepted post top as per Std. Dwg. E-2	6.0 m	

6.2.5 List of Standard Drawings

The following drawings form part of Section 6:

Title	No.
Davit Street Lights	E1
Post Top Street Lights	E2
Local Urban Road - Typical Location of Utilities	G1
Local Urban Road - Open Shoulders	G2

6.3 MATERIALS

All materials shall be C.S.A. approved and conform to the following specifications:

6.3.1 Poles

Poles shall be one piece octagonal tapered, factory primed steel to A.S.T.M. Standard A153 (610 gms/m² inside and outside) designed to withstand 160 km/h wind loading. All poles shall be painted prior to installation and touched up to cover damaged areas after erection. Street light poles and accessories shall be as detailed on the standard drawings. Breakaway bases may be required at the discretion of the Local Authority.

6.3.2 Pole Bases

Precast concrete trapezoidal bases shall be installed on all pole installations. Under certain situations cast in place bases may be considered.

6.3.3 Conduit

All conduit, couplings, adapters and bends for street lighting shall be rigid unplasticized polyvinyl chloride, 50mm diameter minimum, Canadian Electrical Code, with maximum 30% conduit fill, unless otherwise accepted. Installation shall be in strict accordance with the manufacturer's recommendations using C.S.A. certified cement. Steel conduit for power service shall be hot-dipped galvanized malleable iron.

6.3.4 Grounding

Grounding of neutral wire to grounding rod at each pole and service kiosk and installation of a continuous ground conductor in the conduit system shall be provided in accordance with the Provincial Electrical Code, #8 size, colour coded green.

6.3.5 Conductors

All conductors shall be type RW 90 X-link or RWU 90 X-link stranded copper. Minimum conductor size shall be #12. Conductor minimum size for advance warning flashers shall be #12. High traffic heads shall be wired with cabtire.

6.3.6 Connectors

Connectors shall be solderless insulated connectors of the Marrette type, taped with black P.V.C. tape. Full compression lugs shall be used for connecting ground conductors to ground studs in hand-holes.

6.3.7 Luminaires

All luminaires shall be acrylic type II, III or IV with cut-off or semi-cut-off distributions, in accordance with Section 6.2.4.

Polycarbonate vandal resistant refractors are required.

6.3.8 Lamps

All lamps shall be 150 watts or 100 watt high pressure sodium as applicable, colour corrected, deluxe coated.

6.3.9 Conduit Bedding

Bedding for buried conduit shall be sand or crushed granular aggregate as specified for PVC water piping. Utility warning tape shall be installed above all buried conduit.

6.3.10 Junction Boxes

Junction boxes shall be cast aluminum, P.V.C. or concrete. Cast aluminum boxes shall be used in sidewalks in commercial areas; concrete boxes may be used in all other areas.

6.3.11 Service Panels

Service panels shall be C.S.A. approved of the pole mounting or kiosk type.

6.3.12 Photo-Cell Units

Photo-cell units shall be cadmium sulphide type having externally adjustable sensitivity, thermal on and off delay type for 120 volt operation and an integrally contained control relay capable of switching at least 1000 volt-amperes. The unit shall be provided with a twist-lock base to match the receptacle provided in the luminaire and the action shall be such that in daylight the relay is energized, holding open its normally closed contacts. The unit shall have a built-in surge protector and a lightning arrester.

One photo-cell unit shall be installed for each 10 or less streetlights on a circuit.

Where pole mounting is required an outdoor receptacle with wall mounting bracket shall be provided.

6.3.13 Ground Rods

Ground rods shall be 19 mm diameter steel with hot forged point. Top ends shall be galvanized for a minimum distance of 250 mm for 1500 mm rods and 450 mm for 3 metre rods. Ground rods shall be full length copper clad.

6.3.14 Paint

Primer shall be factory applied and any marks touched up with an accepted primer prior to painting. Paint shall be "Tremclad Dark Blue", or accepted equal.

6.4 INSTALLATION

6.4.1 Layout and Positioning

Poles, pole bases, conduit and appurtenances shall be accurately located in accordance with the accepted drawings. Conduit shall be installed parallel or perpendicular to the road centreline and routed so as to run in a direct line between adjacent poles or junction boxes.

6.4.2 Conduit Installation

Conduit shall be installed in accordance with the manufacturer's recommendations.

Empty conduits shall be provided with an insulated #12 AWG copper wire and capped immediately after installation of the pull wire.

6.4.3 Poles, Bases and Luminaires

Bases shall be set plumb and oriented such that one side of the bolt square layout is parallel to the road centreline.

Poles shall receive one coat of paint prior to erection. Poles shall be set plumb with no more than 6 shims per pole.

Luminaires shall be securely fastened to the poles, levelled and cleaned after pole erection. Paint on poles shall be touched up after erection. If paint is badly scarred during installation, a second coat of paint shall be applied.

6.4.4 Wiring and Equipment

Wiring and equipment installation shall conform to the B.C. Electrical Code and manufacturer's recommendations.

6.4.5 Inspection and Testing

Inspection and testing shall conform to the provisions of the B.C. Electrical Code and the provisions of Section 6.1 hereof.

6.4.6 Installation on Power Utility Poles

Where street lighting is to be installed on power utility poles, the installations shall conform to the lighting level requirements of this Schedule and to the materials and installation requirements of the utility owner.

7.0 deleted^{xiv}

8.0 STANDARD DRAWINGS

8.1 GENERAL NOTES

1. Where CSA, ASTM, AWWA or other non-Municipal Standard Specifications are referred to, the most recent edition at the date of commencement of construction will apply.
2. All castings shall be true to pattern and free from cracks, gas holes, flaws, and excessive shrinkage. Surfaces of the castings shall be free from burnt on sand and shall be reasonably smooth. Runners, risers, fins, and other cast on pieces shall be removed. In other respects, the castings shall conform to whatever points may be specially agreed upon between the manufacturer and the Local Authority.

Frame material specification -
Cast Iron ASTM A48 - Class 20

Grate and cover material specification -
Ductile Iron ASTM A445 or cast steel grade 60 - 90 (Table 11 ASTM A 148)

3. "as approved" means as accepted for the specific application by the Local Authority.
4. All valve boxes, manholes and catch basin covers or grates to be set 5 - 10 mm below finished paved asphalt road grade, and 25 mm below finished gravel surface grade.

^{xiv} Amendment Bylaw No. 2000.10, 2021 – adopted January 21, 2021.

5. Standard drawings are to represent the preferred methodology under standard conditions and are to be used wherever practical. This does not rule out the development or use of other methods after appropriate approvals have been obtained from the Local Authority. Any special conditions or deviations from standard drawings must be submitted as design details and will, after approval, take precedence over the standard drawing. Therefore, any standard drawing developed for non-standard situation must specify on the drawing the specific use intended.
6. It is not the purpose of the standard drawings to detail a manufacturer's product but only the conditions of the Local Authority's use of such product.

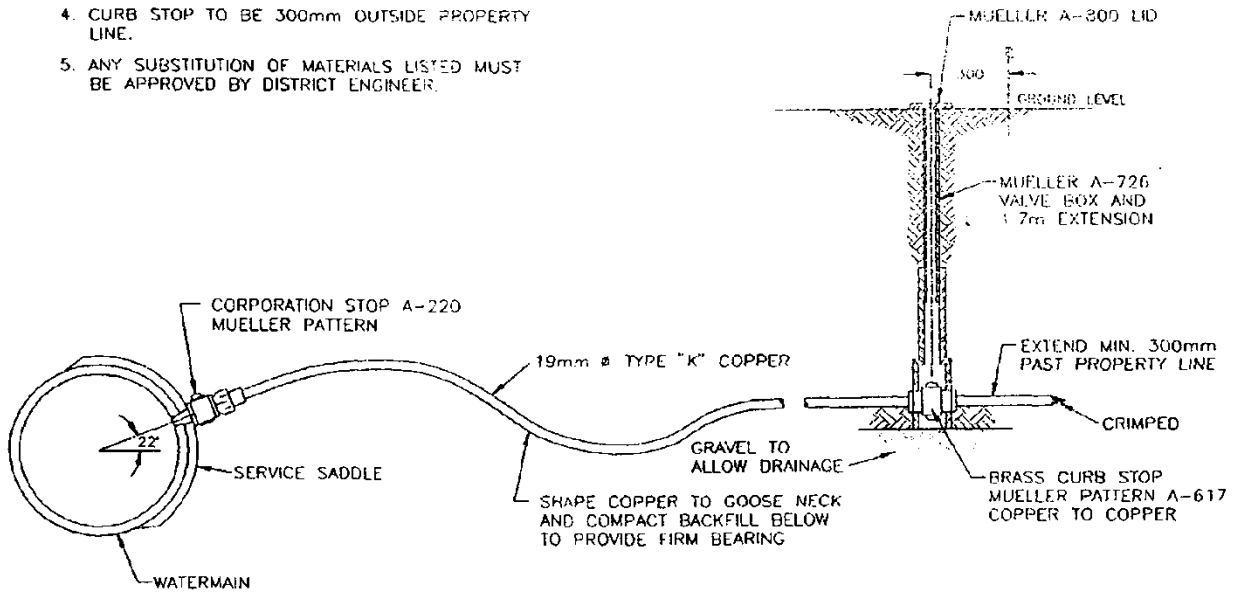
8.2 LIST OF STANDARD DRAWINGS^{xv}

<u>Title</u>	<u>No.</u>
19 mm Water Service Detail	W1
50 mm Water Service Detail	W2
Valve Box Detail	W3
Hydrant Detail	W4
Water Main Blow-Off	W5
Thrust Block Details	W6
50 mm Air Valve Chamber Detail	W7
Pipe Anchoring Detail	S1
Trench Detail	S2
Sanitary Sewer Connections	S3
Manhole Detail	S4
Exterior Drop Manhole Detail	S5
Trench Bedding Details	S6
Service Connection Detail for Sanitary Manhole in Cul-de-sac	S7
Davit Street Lights	E1
Post Top Street Lights	E2

xv Amendment Bylaw No. 2000.10, 2021 – adopted January 21, 2021.

NOTES:

1. SERVICE SADDLES REQUIRED ON ALL PVC PIPE
SADDLES TO BE WIDEBAND STAINLESS STEEL.
2. CONNECTIONS TO BE AT LEAST 450mm APART
AT MAIN.
3. SERVICES SHOULD RUN PERPENDICULAR FROM
MAIN AND BE 1.5m OFF CORNER OF
PROPERTY (MINIMUM)
4. CURB STOP TO BE 300mm OUTSIDE PROPERTY
LINE.
5. ANY SUBSTITUTION OF MATERIALS LISTED MUST
BE APPROVED BY DISTRICT ENGINEER.



REGIONAL DISTRICT of OKANAGAN SIMILKAMEEN

19mm WATER SERVICE DETAIL

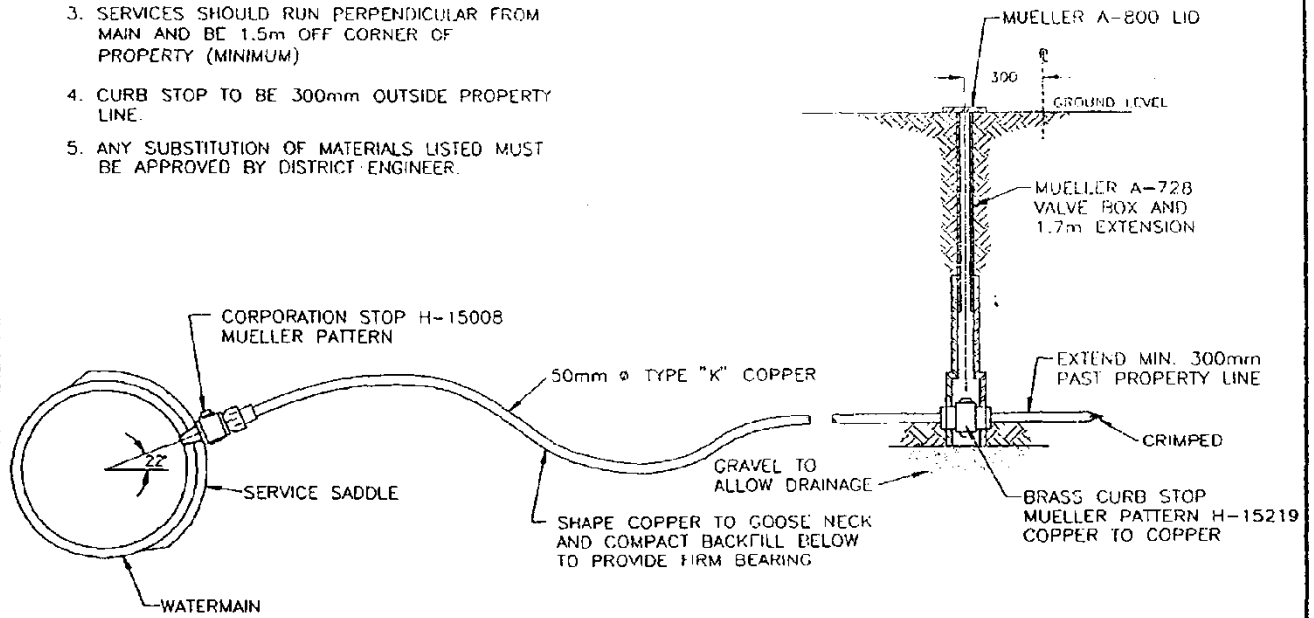
SCALE: N.T.S.

DWG. NO:

W1

NOTES:

1. SERVICE SADDLES REQUIRED ON ALL PVC PIPE. SADDLES TO BE WIDEBAND STAINLESS STEEL.
2. CONNECTIONS TO BF AT LEAST 450mm APART AT MAIN.
3. SERVICES SHOULD RUN PERPENDICULAR FROM MAIN AND BE 1.5m OFF CORNER OF PROPERTY (MINIMUM)
4. CURB STOP TO BE 300mm OUTSIDE PROPERTY LINE.
5. ANY SUBSTITUTION OF MATERIALS LISTED MUST BE APPROVED BY DISTRICT ENGINEER.



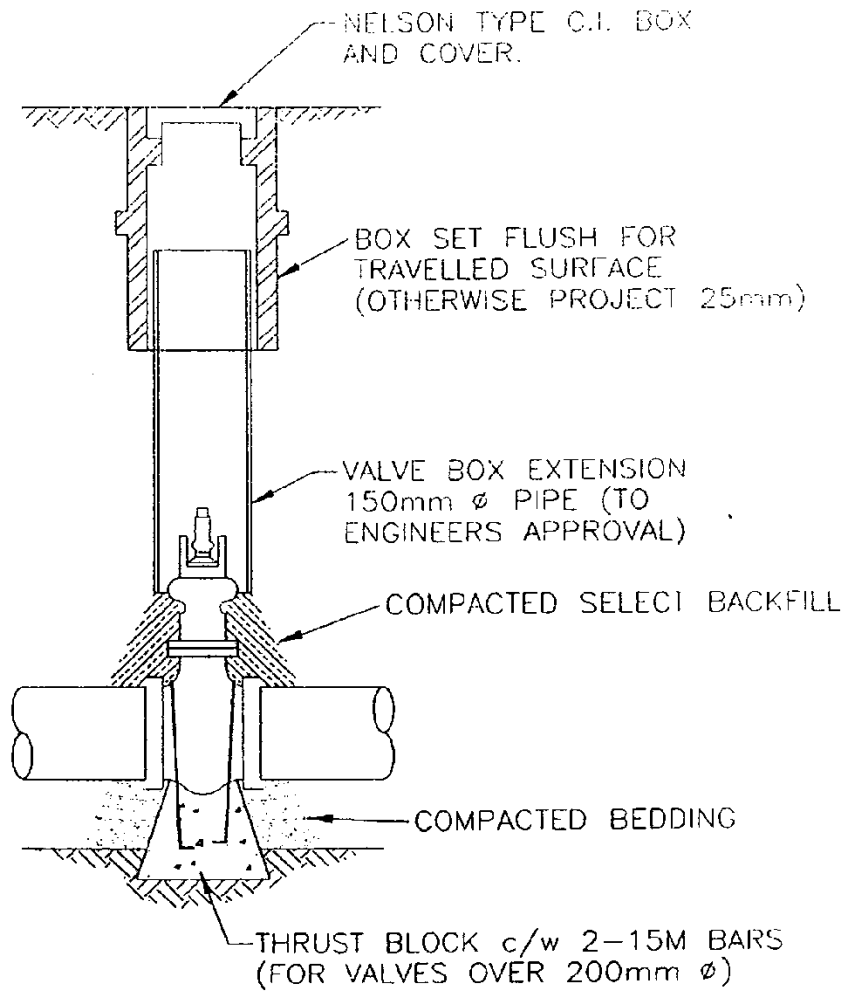
REGIONAL DISTRICT of OKANAGAN SIMILKAMEEN

50mm WATER SERVICE DETAIL

SCALE: N.T.S.

DWG. NO:

W2



REGIONAL DISTRICT of OKANAGAN SIMILKAMEEN

VALVE BOX DETAIL

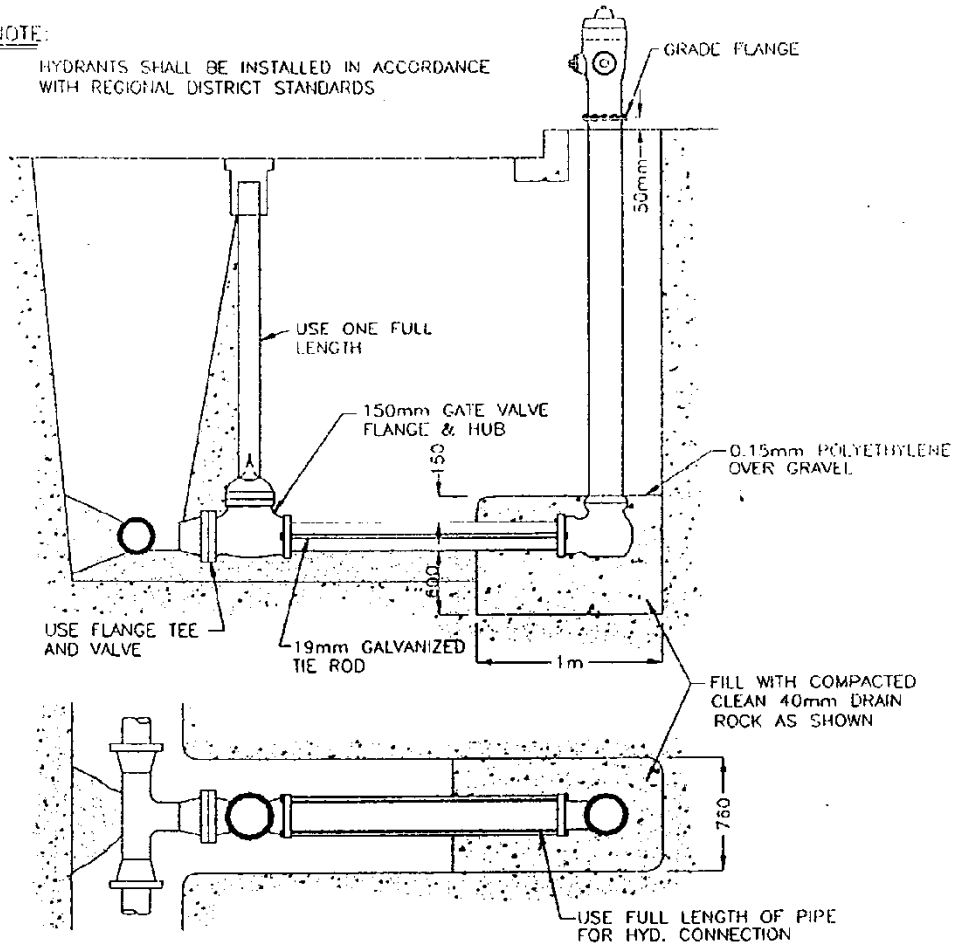
SCALE: N.T.S.

DWG. NO:

W3

NOTE:

HYDRANTS SHALL BE INSTALLED IN ACCORDANCE WITH REGIONAL DISTRICT STANDARDS



REGIONAL DISTRICT of OKANAGAN SIMILKAMEEN

HYDRANT DETAIL

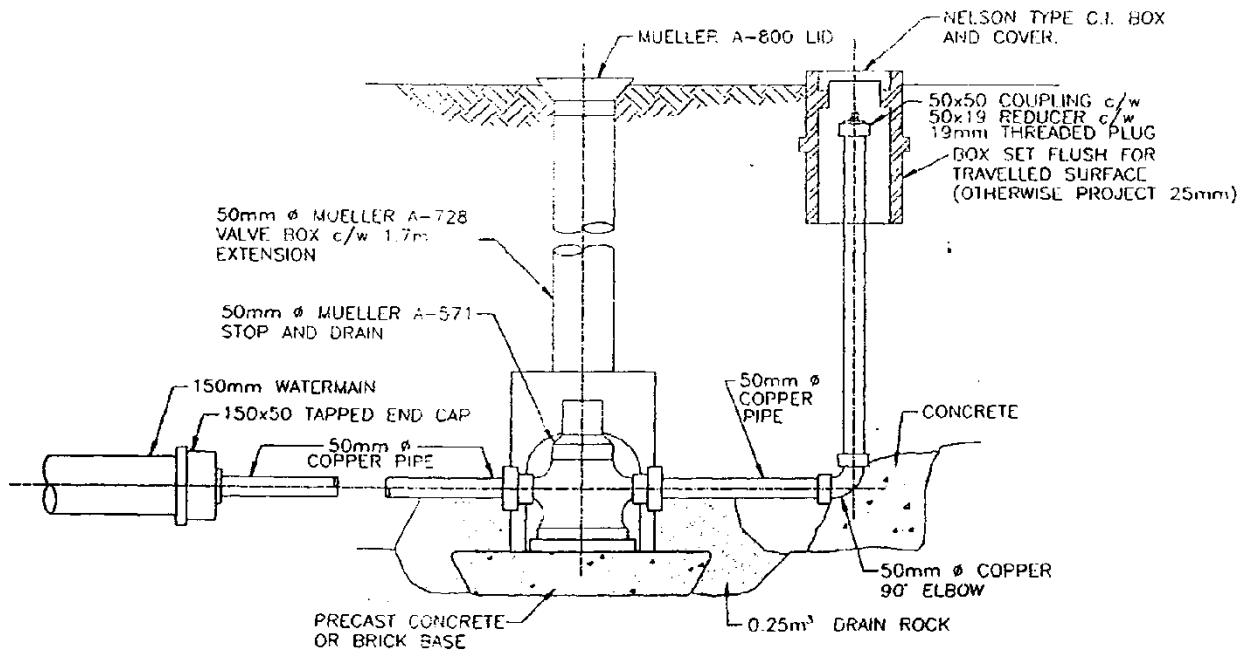
SCALE: N.T.S.

DWG NO:

W4

NOTES:

1. ALL COPPER PIPE UNDERGROUND OR APPROVED EQUAL.
2. ANY SUBSTITUTIONS OF MATERIALS LISTED MUST BE APPROVED BY DISTRICT ENGINEER.



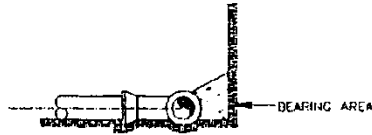
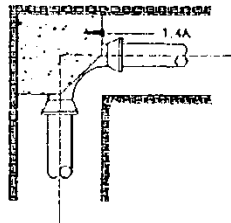
REGIONAL DISTRICT of OKANAGAN SIMILKAMEEN

WATER MAIN BLOW OFF DETAIL

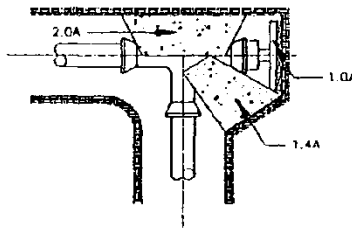
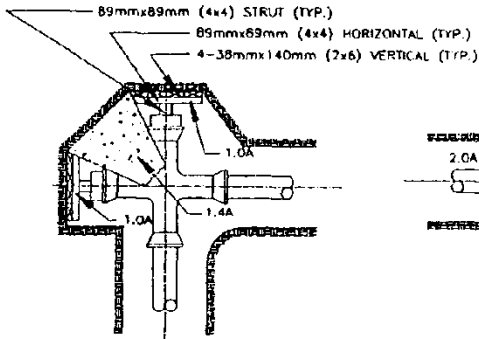
SCALE: N.T.S.

DWG. NO:

W5



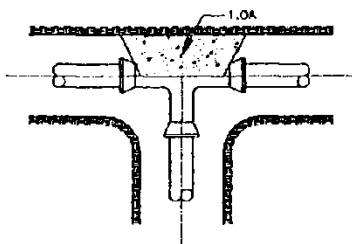
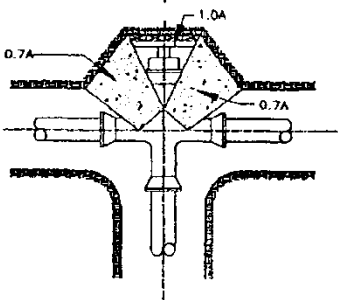
SIDE VIEW
(TYPICAL SCHEMATIC)



NOTES:

THRUST BLOCK BEARING AREAS FOR
 - WATER PRESSURE 103.2kPa (150 psi)
 - MINIMUM COVER OVER WATERMAINS 1.5m (5'-0")
 BASIC THRUST BLOCK BEARING AREA
 (SOIL CONSIDERED TO BE SAND - 1882 kg/m²)

PIPE SIZEmm	150	200	250	300
AREA (m ²)	0.45	0.75	1.20	1.70



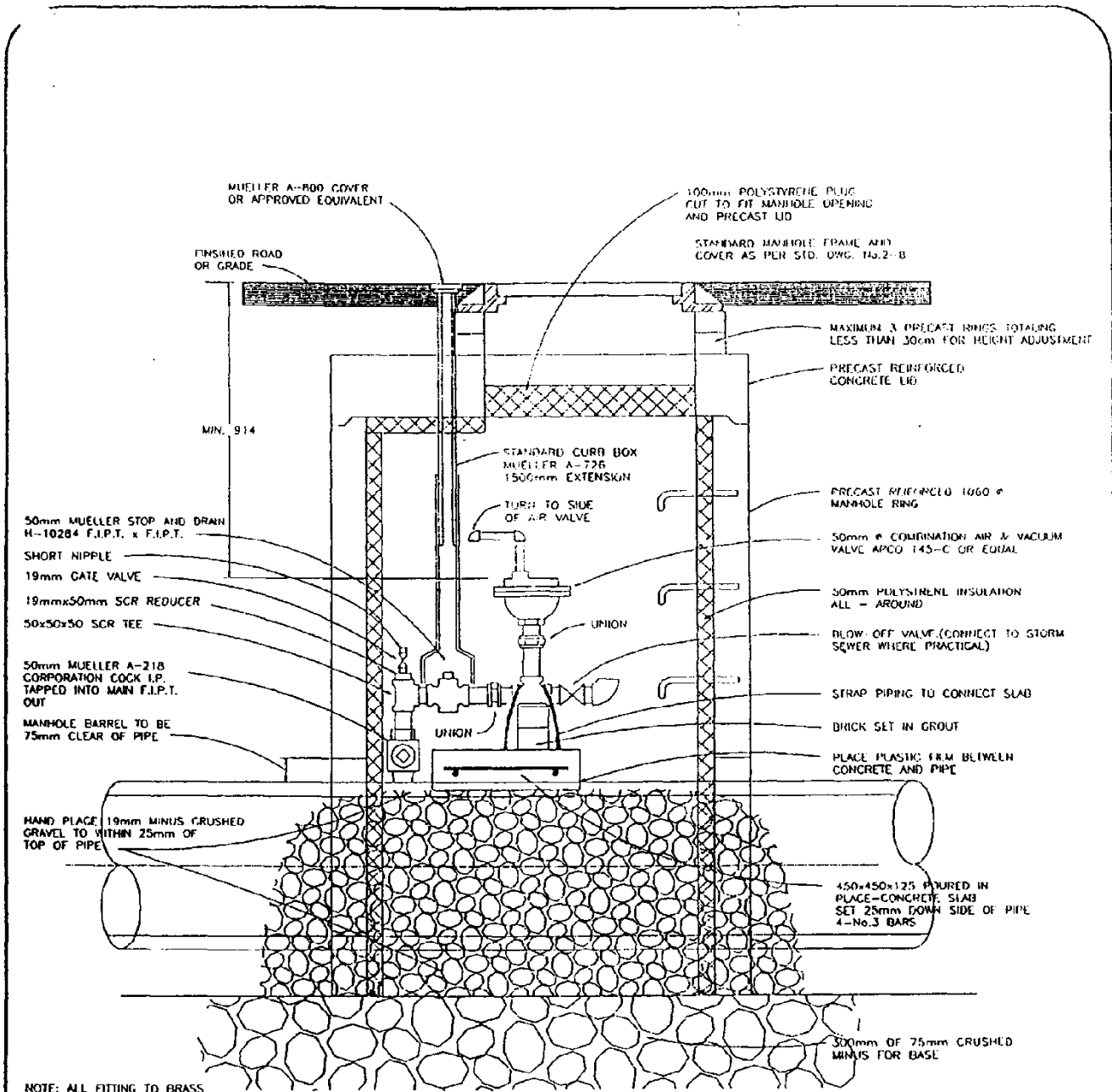
REGIONAL DISTRICT of OKANAGAN SIMILKAMEEN

THRUST BLOCK DETAILS

SCALE: N.T.S.

DWG. NO:

W6



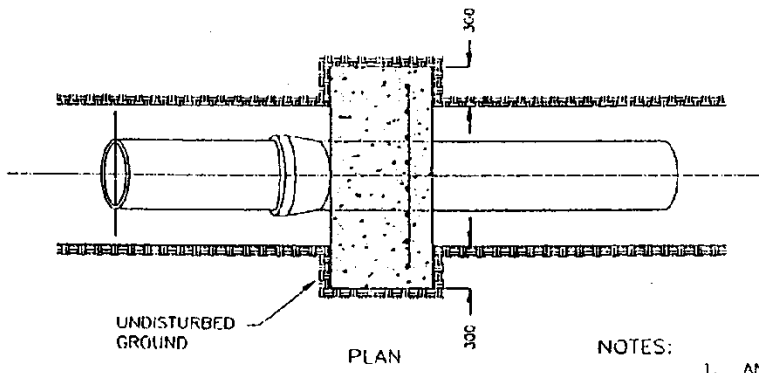
REGIONAL DISTRICT of OKANAGAN SIMILKAMEEN

50mm AIR VALVE CHAMBER DETAIL

SCALE: N.T.S.

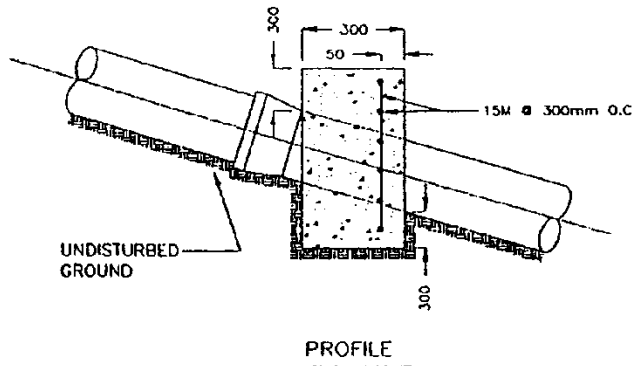
DWG. NO:

W7



NOTES:

1. ANCHORAGE REQUIRED AS PER PROFILE.
2. ANCHOR PIPE EVERY JOINT
3. CONCRETE SHALL BE 20 MPa AT 28 DAY STRENGTH
4. CONCRETE SHALL BE TYPE 10 NORMAL
5. PLACE 2 PLY OF 0.015mm POLYETHYLENE BETWEEN PIPE AND CONCRETE



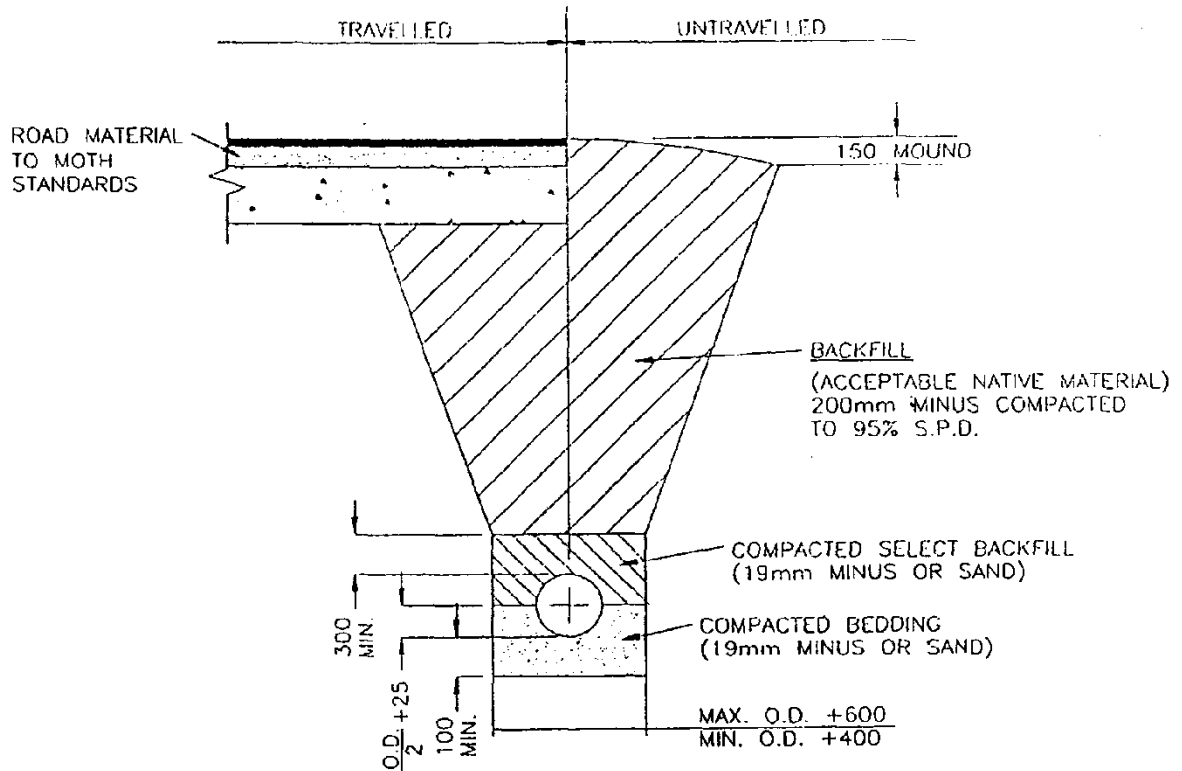
REGIONAL DISTRICT of OKANAGAN SIMILKAMEEN

PIPE ANCHORING DETAIL

SCALE: N.T.S.

DWG. NO:

S1



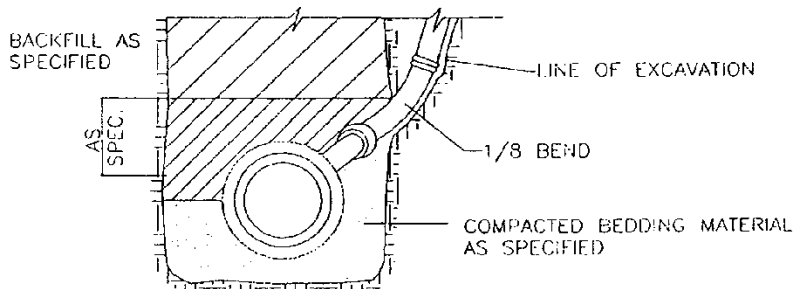
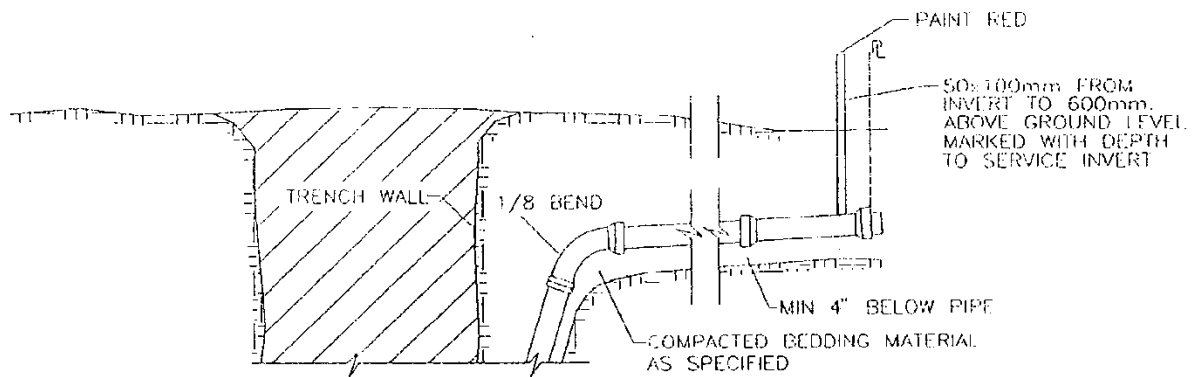
REGIONAL DISTRICT of OKANAGAN SIMILKAMEEN

TRENCH DETAIL

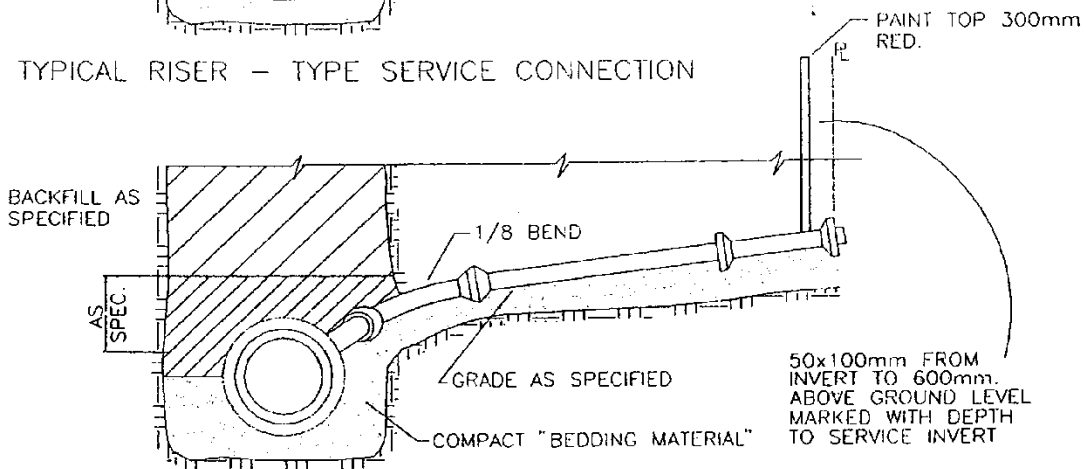
SCALE: N.T.S.

DWG. NO:

S2



TYPICAL RISER - TYPE SERVICE CONNECTION



TYPICAL NON - RISER SERVICE CONNECTION

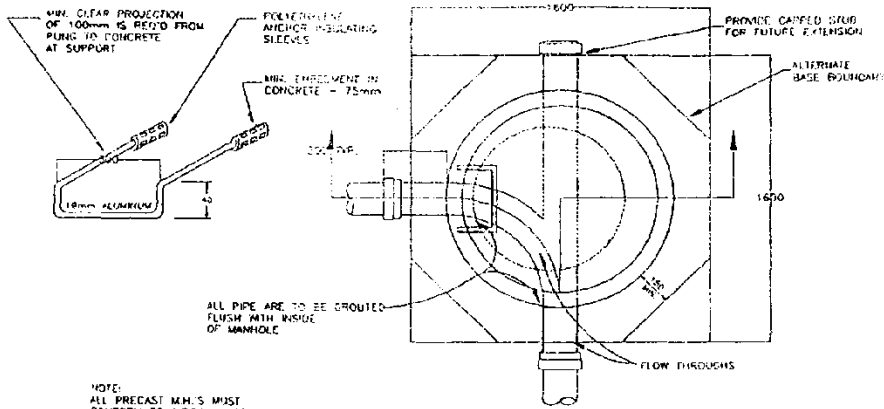
REGIONAL DISTRICT of OKANAGAN SIMILKAMEEN

SANITARY AND STORM SEWER
CONNECTIONS

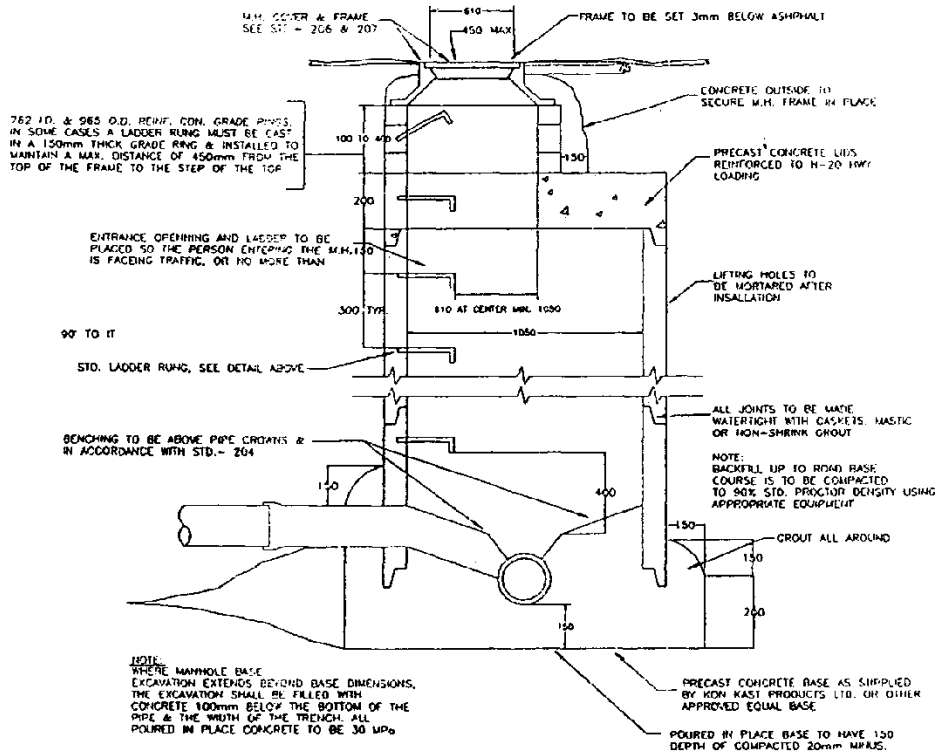
SCALE: N.T.S.

DWG. NO.

S3



NOTE:
ALL PRECAST M.H.'S MUST
CONFORM TO A.S.T.M. & CSA SPECIFICATIONS
AND HAVE A MIN. 114mm WALL THICKNESS.



REGIONAL DISTRICT of OKANAGAN SIMILKAMEEN

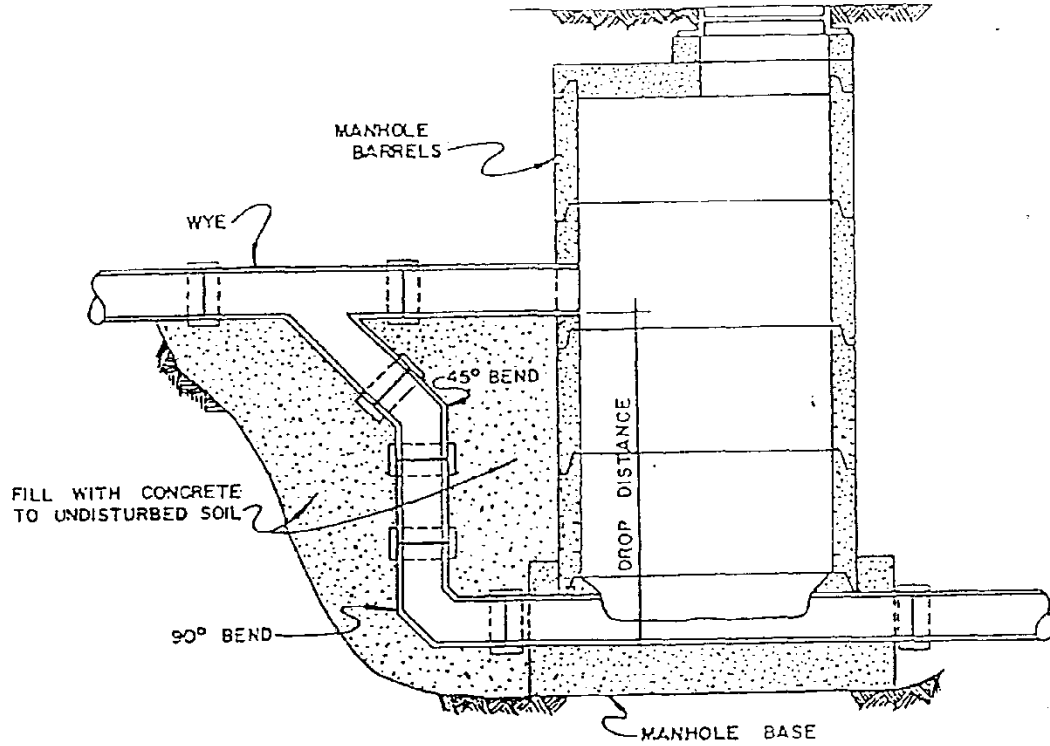
MANHOLE DETAIL

SCALE: N.T.S.

DWG. NO:

S4

PIPE	
INFLOW	EXT. DROP
200 TO 450	200
525 TO 750	250
900 TO 1200	450



NOTES:

1. THIS DRAWING ONLY APPLIES TO THE DROP SECTION (SEE STANDARD MANHOLE DETAILS).
2. AN EXTERIOR DROP IS REQUIRED WHERE THE DROP DISTANCE IS MORE THAN 0.6 FOR SANITARY AND 2.5 FOR STORM.

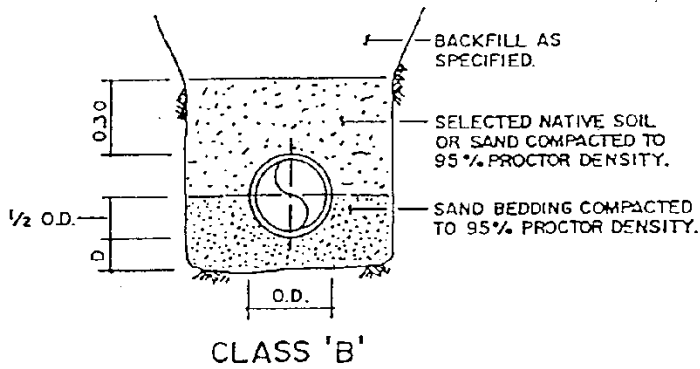
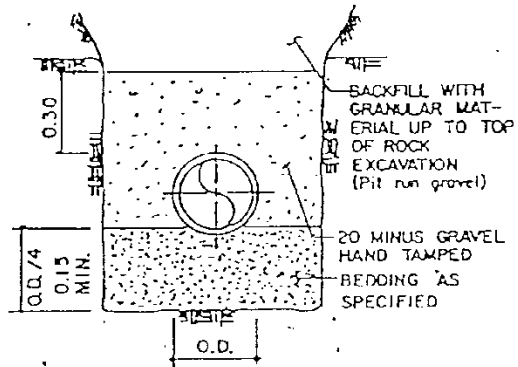
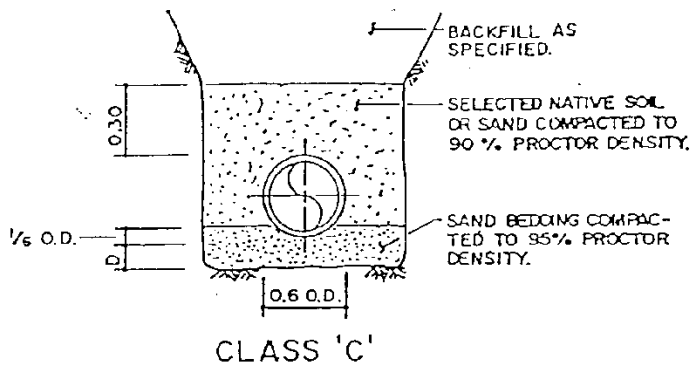
REGIONAL DISTRICT of OKANAGAN SIMILKAMEEN

EXTERIOR DROP MANHOLE DETAIL

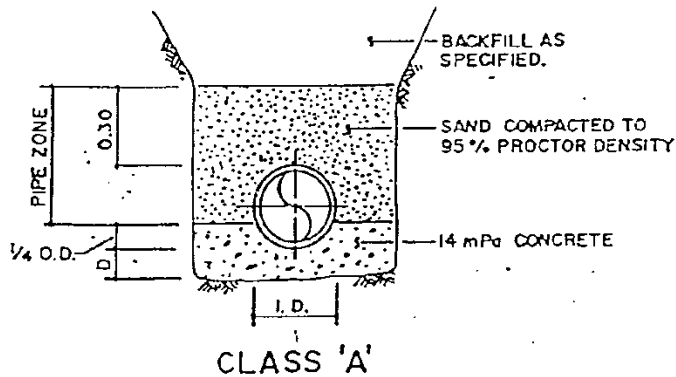
SCALE: N.T.S.

DWG. NO:

S5



PIPE SIZE	D (MIN)
675 or smaller	75
750 to 1500	100
1650 and larger	150
PIPE SIZE	TRENCH WIDTH
750 or smaller	O.D. + 600 MAX.
825 to 1200	O.D. + 750 MAX.
1350 and over	O.D. X 1.5 MAX.



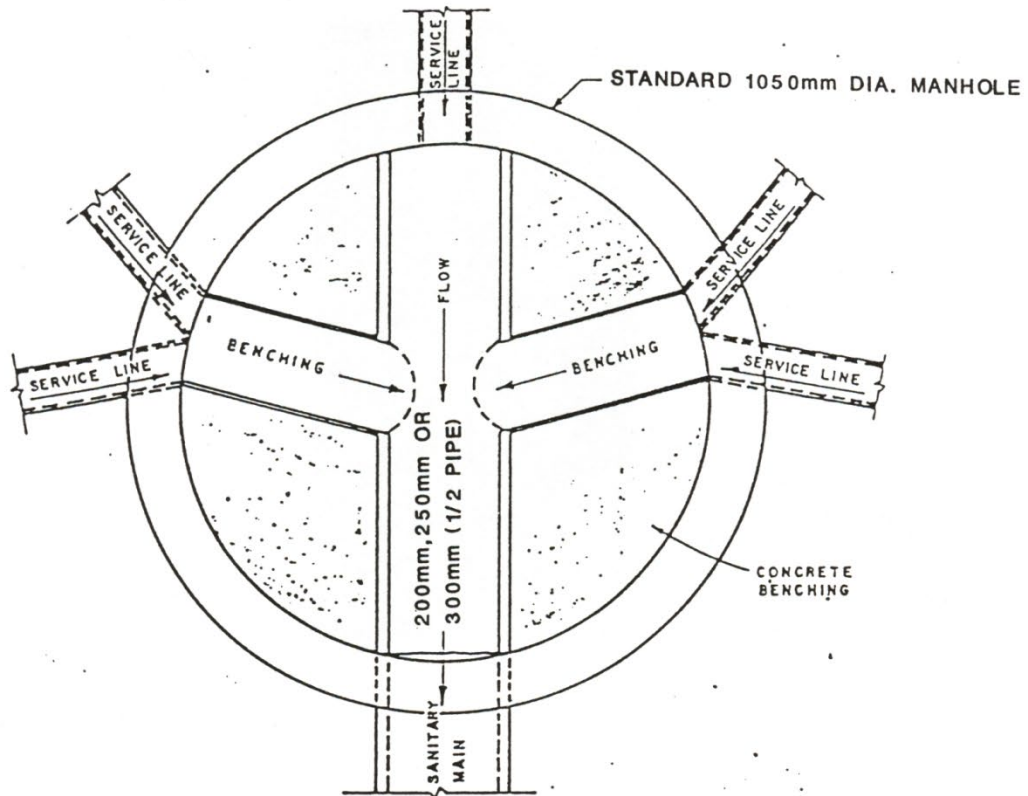
REGIONAL DISTRICT of OKANAGAN SIMILKAMEEN

TRENCH BEDDING DETAILS

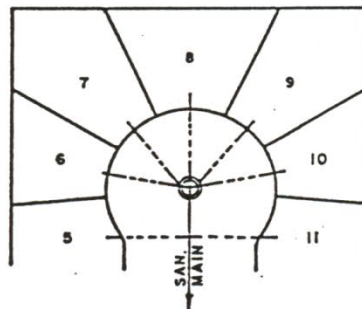
SCALE: N.T.S.

DWG. NO:

S6



NOTE: SANITARY MAIN TO GO STRAIGHT THROUGH MANHOLE WITH 1/2 PIPE TO OPPOSITE WALL.
 -MAXIMUM HEIGHT OF INLET 300mm ABOVE INVERT OF OUTLET.



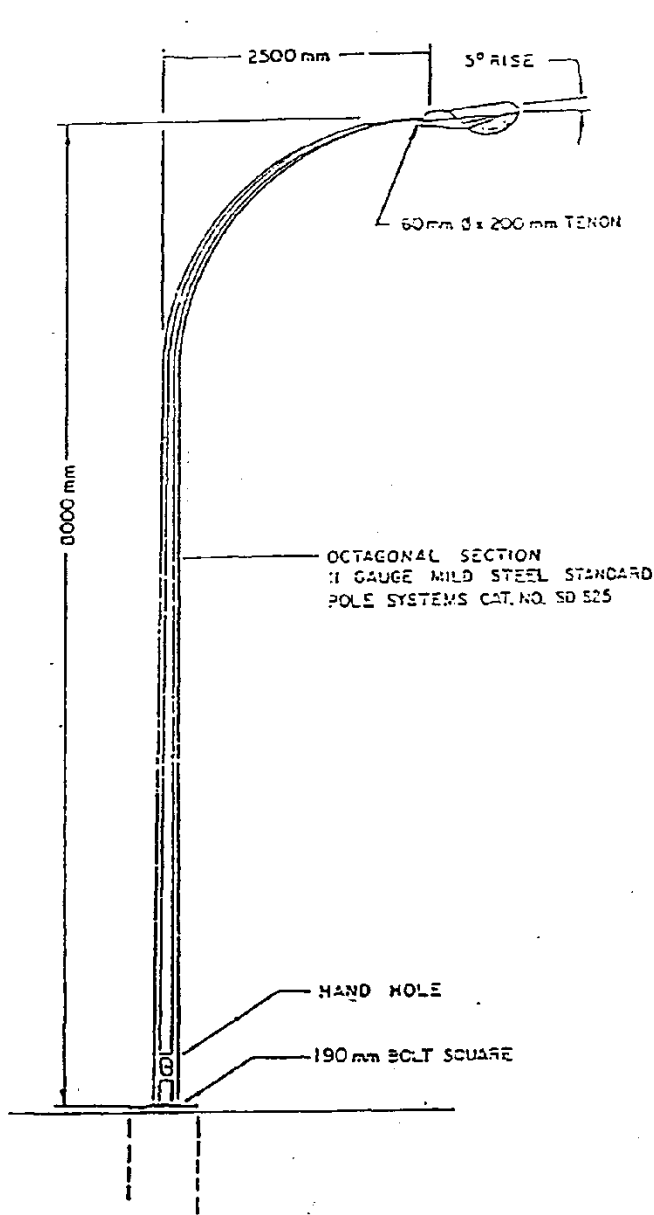
TYPICAL SITE PLAN

REGIONAL DISTRICT of OKANAGAN SIMILKAMEEN

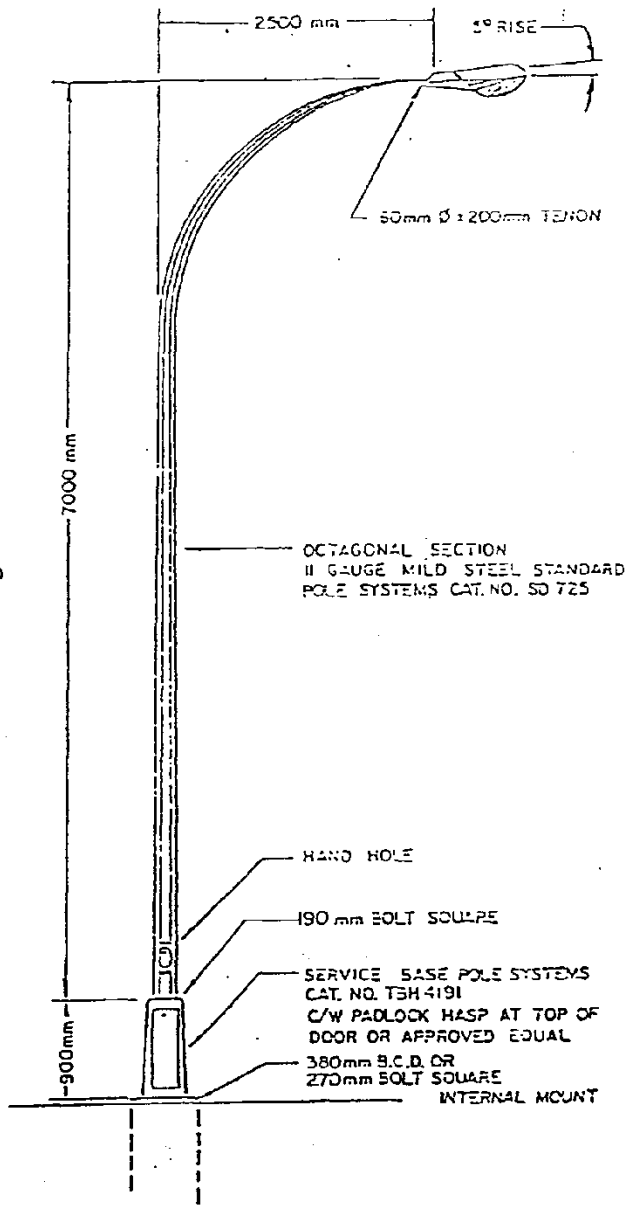
SERVICE CONNECTION DETAIL FOR
 SANITARY MANHOLE IN CUL-DE-SAC

SCALE: N.T.S.
 DWG. NO:

S7



TYPE A



TYPE B

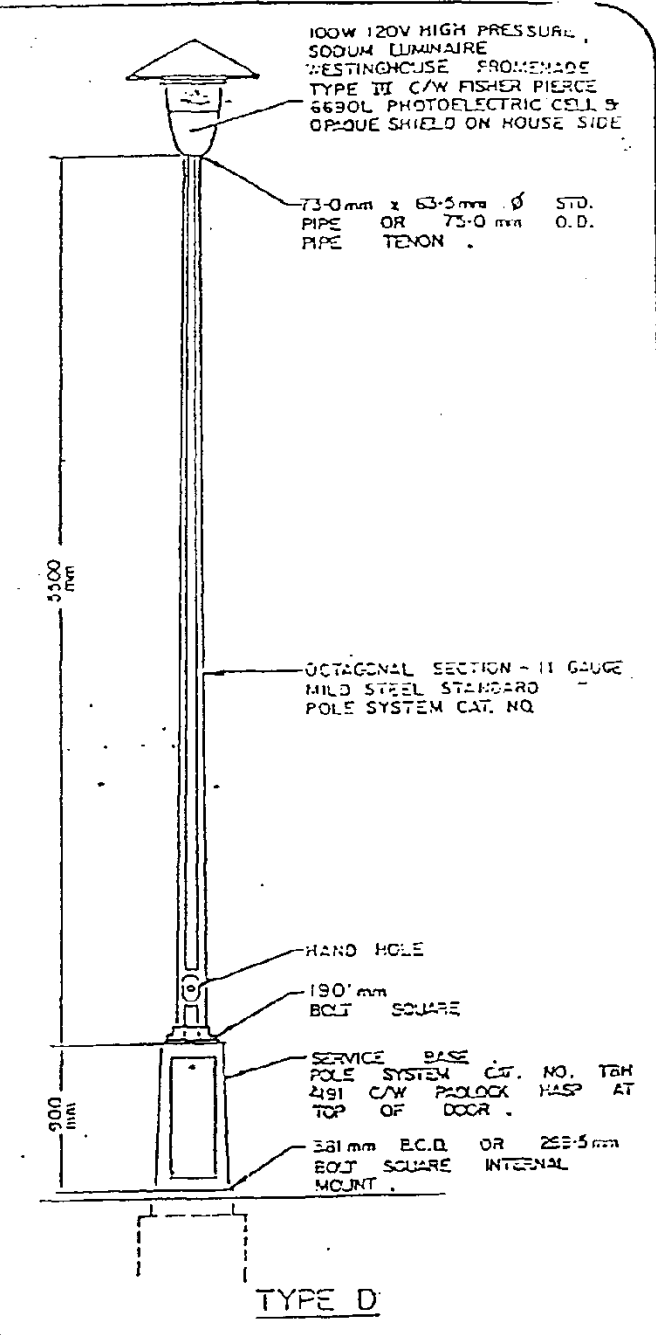
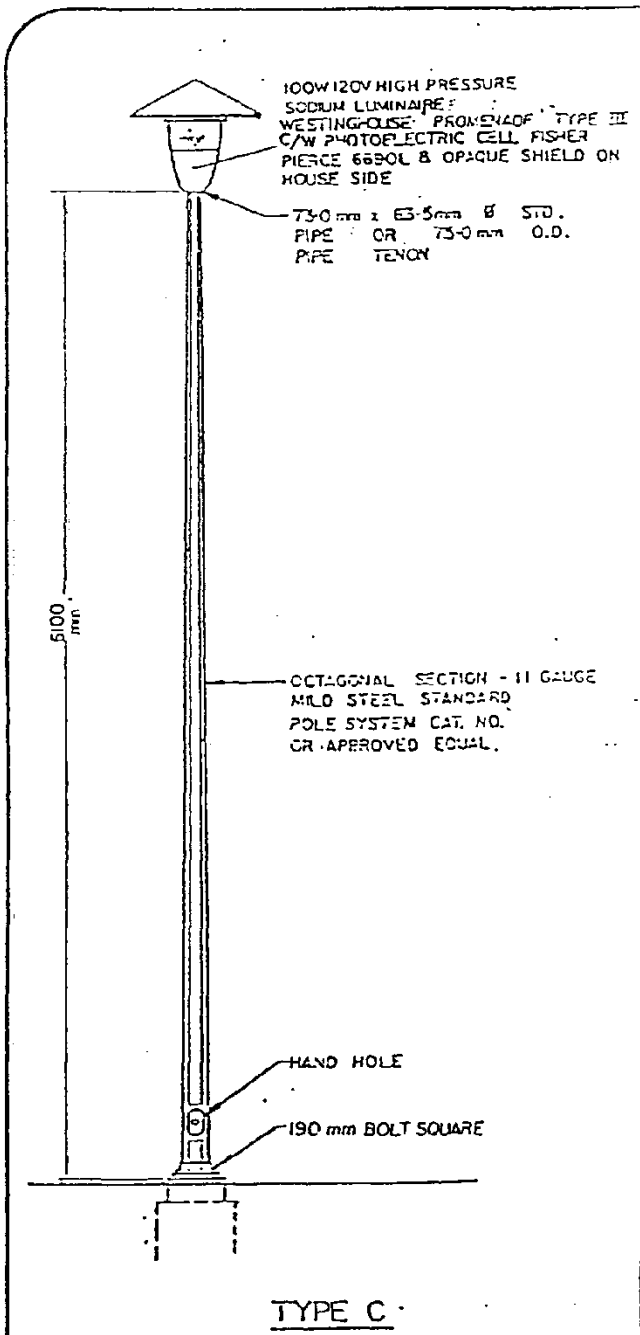
1. POLES AND SERVICE BASES TO BE PRIMED AT FACTORY AND PAINTED AFTER ERECTION WITH ONE COAT OF DARK BLUE TREM CLAD.
2. BASE BOLT COVERS TO BE USED ON TYPE 'B' POLES ONLY.

REGIONAL DISTRICT of OKANAGAN SIMILKAMEEN

DAVIT STREET LIGHTS

SCALE: N.T.S.
DWG. NO:

E1



NOTE:

1. POLES AND SERVICE BASES TO BE PRIMED AT FACTORY AND PAINTED AFTER ERECTION WITH ONE COAT OF DARK BLUE TREM CLAD.
2. INSTALLATION OF POST-TOP STREET LIGHTING REQUIRES APPROVAL IN ADVANCE FROM THE APPROVING OFFICER.

REGIONAL DISTRICT of OKANAGAN SIMILKAMEEN

POST TOP STREET LIGHTS

SCALE: N.T.S.

DWG. NO:

E2