

# **Engineering, Development & Construction Standards**

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## Foreword

Big Lakes County (BLC) Engineering, Development & Construction Standards are intended to provide information and guidance to Landowner's, Developer's, Engineering Consultants, Utility Companies, and other interested parties to ensure the public infrastructure meets required minimal allowable standards, to address demands for continued long-term growth, operation, and maintenance by the municipality.

These Engineering, Development & Construction Standards are applicable to a variety of land development activities from single approach installations, road construction, subdivision, recreation facilities, road, and utility development activity within BLC. Subdivision and development within BLC generally fall into residential, commercial, recreational, and industrial categories and may involve both urban and rural properties. Sewer and water services may or may not be a component of the development.

Low-impact subdivisions that, at the discretion of BLC, are considered to have a low impact on the existing infrastructure will be handled in a simplified application of the principles and requirements contained herein. Subdivisions that BLC may consider to be low-impact subdivisions can be but are not limited to: First Parcel Out Subdivisions, Single Parcel Subdivisions and Subdivisions with Four (4) Lots or less. The basic requirements for low-impact subdivisions are stated in the Simplified Engineering Design & Construction Standards sheet included in the Subdivision Application Package.

Proponents of development should consult with BLC in respect of the anticipated requirements early in the planning stage of any proposed development.

These standards do not cover the detailed design or construction of shallow utilities, such as power, street lighting, gas, telephone, fibre optics and cablevision services, but do include general requirements and the need for co-ordination with the various franchise or utility companies.

These standards form an appendix to the subdivision approval process, and it is necessary that potential applicants for subdivision or development should consider these standards during the subdivision planning and conceptual design phases to minimize the potential for unforeseen difficulties during detailed design and/or construction of the improvements required. It is suggested that these standards be appended to information supplied to potential applicants for development of subdivisions to facilitate orderly planning and full disclosure by BLC. All proposed developments shall be designed and constructed in accordance with the standards outlined herein, standards that are referenced within and industry accepted practices.

In some instances, designs will need to be modified due to limitations of existing infrastructure systems. This will be evaluated on a project specific case by case. Where approval has been granted with variations from the standards or for improvements not covered by the standards, good planning and engineering practices shall be followed to maintain the integrity of the development. Whenever the standards may be at variance with the provisions of the Developer's Agreement, the higher standard shall take precedence or the Developer's Agreement shall





govern if the higher standard is not readily definable. Variances will only be granted in cases in which adherence to these standards would produce an unsafe or impractical development.

This manual will be reviewed and updated periodically to stay current with BLC's Strategic Policy, the Municipal Development Plan, industry best practises and to remain compliant with regulatory requirements.

Persons using the Engineering, Development & Construction Standards are encouraged to contact the BLC to ensure they have the latest version. This document can be accessed online at BLC's Website [www.biglakescounty.ca](http://www.biglakescounty.ca).





## Table of Contents

<b>1</b>	<b>ENGINEERING PLANS AND DRAWINGS .....</b>	<b>1-1</b>
1.1	GENERAL.....	1-1
1.1.1	Drawing Size.....	1-1
1.1.2	Scales.....	1-1
1.1.3	Elevations .....	1-1
1.1.4	Drawing Techniques.....	1-1
1.1.5	Dimensioning.....	1-1
1.1.6	Title Block .....	1-2
1.2	DESIGN DRAWINGS .....	1-2
1.2.1	Cover Sheet.....	1-2
1.2.2	Index Plan.....	1-2
1.2.3	Topographical and Feature Plan .....	1-2
1.2.4	Drainage and Stormwater Management Plan .....	1-2
1.2.5	Water, Storm Sewer, and Wastewater Sanitary Sewer Overall Plan .....	1-3
1.2.6	Roads and Drainage Plan .....	1-3
1.2.7	Lot Grading Plan.....	1-3
1.2.8	Shallow Utilities Plan.....	1-4
1.2.9	Signage and Pavement Markings Plan.....	1-4
1.2.10	Detail Plan/Profile Drawings .....	1-4
<b>2</b>	<b>GENERAL INFORMATION .....</b>	<b>2-6</b>
2.1	BACKGROUND, DEFINITIONS AND ACRONYMS .....	2-7
2.2	PLANNING AND DEVELOPMENT POLICY.....	2-14
2.2.1	Application of the Engineering Development & Construction Standards.....	2-14
2.2.2	Municipal Planning Documents.....	2-14
2.2.3	Approvals .....	2-15
2.2.4	Developer's Responsibility.....	2-15
2.2.5	Development Procedure.....	2-16
2.2.6	Pre-Application Meeting .....	2-17
2.2.7	Application Process .....	2-17
2.2.8	Engineering Plans and Construction Drawings. ....	2-20
2.2.9	Developer's Agreement.....	2-21
2.3	CONSTRUCTION PHASE .....	2-22
2.3.1	Inspections .....	2-22
2.3.2	Construction Completion Certificate (CCC).....	2-22
2.4	POST CONSTRUCTION PHASE .....	2-22
2.4.1	Record Drawings .....	2-22
2.4.2	Warranty / Guarantee Period .....	2-22
2.4.3	Final Acceptance Certificate (FAC) .....	2-22
2.4.4	Release of Financial Security .....	2-23
2.5	ENGINEERING DESIGN .....	2-1
2.6	GEOTECHNICAL REPORT .....	2-1
2.7	SUBMISSION OF ENGINEERING DESIGN .....	2-2
2.8	ENGINEERING SUPERVISION.....	2-2
2.9	TESTING .....	2-3
2.10	REPORTING REQUIREMENTS .....	2-3
2.11	ACCEPTANCE.....	2-4
<b>3</b>	<b>ROADWAY SYSTEMS.....</b>	<b>3-1</b>





3.1	GENERAL.....	3-1
3.2	ROADWAY CLASSIFICATIONS.....	3-1
3.2.1	General.....	3-1
3.2.2	Farmland Access Road .....	3-1
3.2.3	Local Road (Residential).....	3-1
3.2.4	Collector Road .....	3-1
3.2.5	Arterial Road .....	3-2
3.3	RURAL DESIGN CRITERIA.....	3-2
3.3.1	General.....	3-2
3.3.2	Geometric Design .....	3-3
3.3.3	Road Intersections.....	3-4
3.3.4	No Exit Roads .....	3-4
3.3.5	Cul-De-Sac .....	3-4
3.3.6	Culverts and Drainage .....	3-4
3.3.7	Road Approaches .....	3-5
3.3.8	Roadway Surface Finishes .....	3-6
3.4	URBAN DESIGN STANDARD .....	3-6
3.4.1	General.....	3-6
3.4.2	Geometric Design .....	3-7
3.4.3	Concrete Curb and Gutter .....	3-7
3.4.4	Sidewalks.....	3-8
3.4.5	Walkways.....	3-8
3.4.6	Curb Ramps .....	3-9
3.5	CONSTRUCTION STANDARDS .....	3-9
3.5.1	Preparatory Work.....	3-9
3.5.2	Road Grade Construction .....	3-9
3.5.3	Surfacing Gravel .....	3-10
3.5.4	Base Course Construction.....	3-12
3.5.5	Pavement Structure.....	3-12
3.5.6	Asphaltic Concrete Pavement.....	3-13
3.5.7	Asphalt Stabilized Base Course (ASBC) .....	3-15
3.5.8	Prime Coats, Tack Coats, and Fog Coats .....	3-16
3.6	QUALITY CONTROL AND TESTING .....	3-16
3.7	BRIDGES.....	3-17
<b>4</b>	<b>STORM DRAINAGE SYSTEMS.....</b>	<b>4-18</b>
4.1	GENERAL.....	4-18
4.1.1	STORMWATER MANAGEMENT PLAN.....	4-18
4.1.2	MINOR & MAJOR DRAINAGE SYSTEMS.....	4-18
4.1.3	Run-off Analysis.....	4-19
4.1.4	Run-off Coefficients .....	4-20
4.1.5	Storage Facilities .....	4-20
4.2	RURAL AREAS.....	4-23
4.3	URBAN AREAS.....	4-23
4.4	DESIGN STANDARDS .....	4-24
4.4.1	Design Criteria.....	4-24
4.4.2	Pipe.....	4-24
4.4.3	Manholes.....	4-25
4.4.4	Catch Basins .....	4-25
4.4.5	Storm Sewer Main Installation.....	4-26
4.4.6	Curved Storm Sewers.....	4-26





4.4.7 Trenching and Backfill .....	4-26
4.4.8 Inspection .....	4-27
<b>5 WATER DISTRIBUTION SYSTEMS.....</b>	<b>5-28</b>
5.1 GENERAL.....	5-28
5.1.1 DESIGN CRITERIA.....	5-28
5.1.2 WATERMAIN PIPE MATERIAL.....	5-29
5.1.3 WATERMAIN INSTALLATION CRITERIA.....	5-30
5.1.4 WATER VALVES.....	5-31
5.1.5 HYDRANTS.....	5-32
5.1.6 TRENCHING AND BACKFILLING .....	5-34
5.1.7 THRUST BLOCKING .....	5-34
5.1.8 CATHODIC PROTECTION.....	5-34
5.1.9 TESTING.....	5-34
5.1.10 RESIDENTIAL SPRINKLER SYSTEMS.....	5-36
<b>6 WASTEWATER SEWER SYSTEMS .....</b>	<b>6-37</b>
6.1 GENERAL.....	6-37
6.2 DESIGN CRITERIA .....	6-37
6.2.1 Residential Contribution.....	6-37
6.2.2 Commercial / Industrial Contributions .....	6-37
6.2.3 Infiltration .....	6-38
6.2.4 Design Report.....	6-38
6.2.5 Pipe.....	6-38
6.2.6 MANHOLES.....	6-38
6.2.7 SEWER MAIN INSTALLATION.....	6-39
6.3 CURVED SEWERS .....	6-40
6.4 TRENCHING AND BACKFILL.....	6-40
6.5 TESTING OF SEWERS .....	6-41
6.5.1 Water leakage Test:.....	6-41
6.5.2 Close Circuit Television (CCTV) Inspection:.....	6-41
6.5.3 Mandrel Testing .....	6-42
6.6 LOW PRESSURE SEWER SYSTEM .....	6-42
6.6.1 General.....	6-42
6.6.2 Design Criteria.....	6-42
6.6.3 Fittings.....	6-43
6.6.4 Pipe.....	6-43
6.6.5 Curb Stop.....	6-43
6.6.6 Collector Sewer.....	6-43
6.6.7 Standards .....	6-43
6.7 BURIED PIPE STORM SEWER SYSTEMS.....	6-1
<b>7 COMMON DETAILS &amp; SERVICE CONNECTIONS.....</b>	<b>7-1</b>
7.1 GENERAL.....	7-1
7.2 WATER SERVICE CONNECTIONS .....	7-1
7.3 WASTEWATER SEWER SERVICE CONNECTIONS.....	7-2
7.4 SERVICE CONNECTION REPORTS .....	7-3
7.5 HORIZONTAL DIRECTIONAL DRILLING (HDD).....	7-3
7.5.1 General.....	7-3
7.5.2 Compliance.....	7-3
7.5.3 Temporary Workspace .....	7-3





7.5.4 Regulatory Agencies.....	7-3
<b>8 SIGNAGE .....</b>	<b>8-1</b>
8.1 MUNICIPAL ADDRESSING SIGNAGE .....	8-1
8.2 SUBDIVISION SIGNS .....	8-1
8.3 TRAFFIC CONTROL SIGNAGE .....	8-3
8.4 ENVIROMENTAL RESERVE SIGNAGE .....	8-3
<b>9 MISCELLANEOUS REQUIREMENTS .....</b>	<b>9-1</b>
9.1 GENERAL.....	9-1
9.2 PROPERTY BOUNDARY MONUMENTS.....	9-1
9.2.1 Survey Control Markers.....	9-1
9.3 LANDSCAPING .....	9-1
9.4 PROTECTION AND/OR COORDINATION OF UTILITIES .....	9-2
9.5 ELECTRICAL POWER SERVICE .....	9-3
9.6 NATURAL GAS SERVICE .....	9-3
9.7 STREET LIGHTING.....	9-3
9.8 MAILBOX PULLOUTS .....	9-3
9.9 OFFSITE ROAD CONSTRUCTION.....	9-4
9.9.1 General.....	9-4
9.9.2 Coordination of Existing Utilities.....	9-4
9.9.3 Land Acquisition and Access Agreements .....	9-5
9.9.4 Coordination of Traffic .....	9-7
9.10 GUARD RAILS.....	9-9
9.11 BOLLARDS .....	9-9
9.12 SPEED BUMPS.....	9-9
9.13 EROSION AND SEDIMENT CONTROL MEASURES (ESC) .....	9-9
9.14 NOISE IMPACT ASSESSMENT (NIA) .....	9-9
9.15 MARINAS AND BOAT LAUNCHES.....	9-10
9.16 RECREATIONAL FACILITIES .....	9-10
<b>10 LOW IMPACT DEVELOPMENTS.....</b>	<b>10-1</b>
10.1 INTRODUCTION .....	10-1
10.2 APPLICATION .....	10-1
10.3 DEVELOPER’S AGREEMENT .....	10-2
10.4 APPROACH CONSTRUCTION BY BLC .....	10-3





## 1 ENGINEERING PLANS AND DRAWINGS

### 1.1 GENERAL

All detailed engineering plans and specifications submitted to BLC for review and approval must comply with the following standards and specifications:

#### 1.1.1 Drawing Size

The standard A-1 drawing 594 mm x 841mm (23.4" x 33.1") will be prepared with the profile located at the bottom of the sheet. BLC may request reduced drawings on a 279 mm x 432 mm (11" x 17") page size. These drawings must be printed with double the scale of the A-1 size drawings.

#### 1.1.2 Scales

Drawings shall be prepared using the following scales (where possible):

Overall Plan	1:1000, 1:1500 or 1:2000
Plan/Profiles	1:500 Horizontal, 1:50 Vertical
Cross-Sections and Details	As required.

#### 1.1.3 Elevations

- Elevations shall be relative to Geodetic Datum (NAD 83). Reference benchmarks and elevations are to be identified on the Index Plan.
- The Consulting Engineer shall establish and maintain a minimum of three (3) benchmarks within the Development site boundary throughout the duration of construction and the maintenance period. These shall be clearly noted on the drawings.

#### 1.1.4 Drawing Techniques

Points of drawing techniques that are significant to the preparation of drawings are as follows:

- Clarity, legibility, and accuracy will be the governing criteria when preparing drawings.
- Care shall be taken to ensure a balanced distribution of detail throughout the drawing.
- Letters and figures will be clearly legible, 2.0 mm size or larger.
- A north arrow will be shown on each drawing. In general, north arrows shall be directed towards the top of the page.

#### 1.1.5 Dimensioning

- All dimensions shall be in the metric system.
- Dimensioning of a drawing is extremely important and should be such that it will not be misinterpreted. Dimensions shall be given from an iron pin, lot line, chainage station, a centerline, or any other reference that can be readily established or identified on the plan and on the ground.





### 1.1.6 Title Block

All drawings must clearly show the following in the title block:

- Developer's/Owner's name.
- Consulting Engineer or Consulting Engineering Firm name.
- Subdivision name including staging and/or phasing identifier(s).
- Drawing name, number, and issue date.
- Drawing scales (horizontal and vertical).
- Space for the dates and signature of the designer, draftsman, reviewer, or checker and approving professional or principal.
- Space for professional stamps and permits.
- Space for revisions including number, date, description, and approval signature.

## 1.2 DESIGN DRAWINGS

The detailed engineering plans and drawings submitted to BLC for review and approval must be stamped by the Consulting Engineer. The plans shall typically include the following:

### 1.2.1 Cover Sheet

This sheet shall show the name of the subdivision, type of development, and the names of the Developer and the Consulting Engineer. In addition, BLC shall be identified. A key plan of BLC or appropriate portion thereof shall be included, illustrating the location of the development or project and enough detail to facilitate navigation to the site.

### 1.2.2 Index Plan

This plan shall be prepared to fit the standard A-1 sheet and will indicate that portion of the development which relates to a particular plan/profile sheet. The plan shall also list each drawing included in the set of drawings. Each drawing is to be listed sequentially along with its corresponding drawing number.

### 1.2.3 Topographical and Feature Plan

This plan will indicate the existing contours at a suitable accuracy and interval, the proposed development concept, if appropriate, and all significant above ground and subsurface features such as buildings, trees, utilities, right of ways, well sites (abandoned and active), etc.

### 1.2.4 Drainage and Stormwater Management Plan

This plan will indicate the pre-and post development drainage systems including any required stormwater management features. The drawing shall indicate catchment areas and contain calculation summaries for pre-and post flow rates at key discharge locations and volume storage requirements for stormwater facilities.





### 1.2.5 Water, Storm Sewer, and Wastewater Sanitary Sewer Overall Plan

This plan shall show the location and alignment of the existing and proposed water and sewer mains, pipe size, pipe type, direction of flow, and the location of all related fixtures and appurtenances.

### 1.2.6 Roads and Drainage Plan

This plan shall show:

- All roads, lanes, trails, and walkways including road surface, right-of-way widths and alignments.
- Surface stormwater drainage systems including the local drainage areas and culvert locations, sizes, inverts, direction of flow, etc. It shall be clearly indicated where the road drainage ties into the overall stormwater management features, if applicable.
- All proposed lot approaches.
- Street furniture

### 1.2.7 Lot Grading Plan

A lot grading plan may not be required in a low-density subdivision or development unless grading of lots is proposed or required to control run-off flows or is a specific integral component of a Stormwater Management Plan.

If grading of lots is proposed or required in any development, a Lot Grading Plan shall be prepared at an appropriate scale which will indicate topography and features as noted in Section 1.2.3, proposed area of grading, finished lot grades and direction of final surface drainage flows. Introduction of flows or maintaining of natural flows across other properties may require utility right-of-way or easements which shall also be clearly indicated as a requirement of the legal survey component.

In a subdivision or development and in instances where sewer and water services are proposed, a Lot Grading Plan shall be prepared at an appropriate scale and will indicate the following:

- Original contours at suitable accuracy and interval.
- Proposed finished lot corner elevations.
- Proposed finished lot grades.
- Direction of lot surface drainage flows.
- Minimum building elevations.
- Alignment of sewer and water lines, c/w manholes, valves, and hydrants.
- Location of lot services at the property.
- Invert elevation of sewer service at property line.
- Proposed piped storm sewer, if applicable.
- Location and invert elevations of approach culverts.

#### 1.2.7.1 Commercial/Industrial Subdivision

A Lot Grading Plan shall be prepared at a suitable scale and will indicate, at a minimum, the following:

- Original contours at suitable accuracy and interval.





- Proposed lot grades.
- Direction of lot surface drainage flows.
- This plan may be combined with the Road and Drainage Plan and Contour Plan provided clarity can be maintained.

### **1.2.8 Shallow Utilities Plan**

An overall plan, drawn to a scale of 1:1,000 or other suitable scale, shall be prepared compiling the location and alignment of the deep utilities (water and sewer lines) with power, gas, telephone, and cablevision lines and including the location of all related street furniture such as power poles, streetlights, transformers, pedestals, hydrants, valves, manholes, signs, mailboxes, etc.

### **1.2.9 Signage and Pavement Markings Plan**

An overall plan shall be prepared compiling the location and alignment of traffic signs, street signs, information signs, details of sign types, rural addressing signage, and complete pavement markings are required to be supplied and installed by the developer in accordance with these standards.

### **1.2.10 Detail Plan/Profile Drawings**

These plans, prepared in accordance with accepted engineering drafting standards and practices, are intended to provide location, alignment and dimensioning detail respecting the proposed municipal improvements required to be constructed. Existing infrastructure and other relevant features shall also be shown in detail.

#### **1.2.10.1 General**

- These plans shall be prepared at a scale of 1:500 horizontal and 1:50 vertical.
- The plan portion shall be positioned at the top of the Standard A-1 sheet and the profile portion at the bottom.
- The location and alignment of all underground utilities including mains, valves, hydrants, manholes, catch basins, etc. and surface improvements including carriageways, drainage channels, ditches, approaches, culverts, etc. shall be shown on the same plan portion.
- Profiles of all underground utilities and surface improvements shall be shown on the same drawing.
- Stationing and chainages shall be so arranged that both the plan and profile portions align wherever possible.
- All dimensioning shall be relative to property lines. Wherever possible, all dimensions shall be provided to a minimum of two (2) property lines.

#### **1.2.10.2 Plan Portion**

Information to be shown on the plan portion shall include, but not be limited to, the following:

- Legal subdivision information including lot and block numbers consistent with the addressing system employed by BLC and lot dimensions, where practical.





- Road and street names and, where applicable, civic addresses.
- Horizontal alignment of all roadways, carriageways, ditches, approaches, culverts, signage, etc. including horizontal curve data, chainages and dimensions of all items related to the property lines.
- Horizontal alignment of all underground mains and fittings, size and type of materials, valves, hydrants, manholes, catch basins, pipe grades, service connection locations, etc., all dimensioned through stationing and chainages and offsets to the property lines.
- Any other information or data deemed necessary and/or appropriate by the BLC.

#### **1.2.10.3 Profile Portion**

Information to be shown on the profile portion shall include, but not be limited to, the following:

- Existing ground profiles.
- Proposed design profiles for centerline of road carriageway including chainages, vertical alignments and grades, vertical curve data.
- Proposed design profile for ditch bottoms including chainages, grades, elevations, culvert inverts, erosion, and flow control devices, etc.
- Proposed design profile for the underground utilities including stationing, percent grades, size, type and class of pipe, class of bedding, type of trench backfill, invert elevations at all inlets and outlets as well as at all grade changes, manhole rim elevations, existing underground utilities data, etc.
- Any other information or data deemed necessary and/or appropriate by the BLC.

#### **1.2.10.4 Landscape Plans**

- The landscaping plans are to include all tree planting, sodded or seeded areas, entrance signage, fence locations, trails, trail signage, playground sites, furniture, bollards, lighting details, retaining walls and all other details that relate to the final landscape designs.
- The Landscape Contractor is responsible for damages and liabilities incurred by damages to site utilities.





## **2 GENERAL INFORMATION**

The following design standards sections apply to any or all activities for the Construction of Municipal Services including:

<b>Section 1:</b>	<b>Engineering Plans and Drawings</b>
<b>Section 2:</b>	<b>General Information</b>
<b>Section 3:</b>	<b>Roadway Systems</b>
<b>Section 4:</b>	<b>Storm Drainage Systems</b>
<b>Section 5:</b>	<b>Water Distribution Systems</b>
<b>Section 6:</b>	<b>Wastewater Sewer Systems</b>
<b>Section 7:</b>	<b>Common Details and Service Connections</b>
<b>Section 8:</b>	<b>Signage</b>
<b>Section 9:</b>	<b>Miscellaneous Requirements</b>
<b>Section 10:</b>	<b>Low Impact Developments</b>





## 2.1 BACKGROUND, DEFINITIONS AND ACRONYMS

**BIG LAKES COUNTY**, Incorporated on JANUARY 1, 1995.

Website: [www.biglakescounty.ca](http://www.biglakescounty.ca)

<b>Urban centers within BLC:</b> (Independent Municipalities)	Town of High Prairie Town of Swan Hills
<b>Hamlets within BLC:</b>	Hamlet of Enilda Hamlet of Faust Hamlet of Grouard Hamlet of Jousard Hamlet of Kinuso
<b>Metis Settlements</b>	East Prairie Metis Settlement Gift Lake Metis Settlement Peavine Metis Settlement
<b>First Nations</b>	Driftpile Cree Nation Kapawe'no First Nation Sucker Creek First Nation Swan River First Nation Whitefish Lake First Nation
<b>Localities</b>	Aggie Banana Belt Big Prairie Gilwood Heart River Heart River Settlement Improvement District No. 17 Kenzie Leicester Lesser Slave Lake Settlement Nine Mile Point Prairie Echo Salt Prairie Salt Prairie Settlement Triangle
<b>Remaining portion of BLC:</b>	Largely agricultural, rangeland or forest.
<b>Energy sector:</b>	Largely oil, gas, and logging throughout BLC.





In these standards, the following definitions shall apply:

### Definitions:

**“Adjacent”**- Shall refer to lands next to the proposed development area.

**“Alberta Land Surveyor”**- shall mean the professional land surveyor who is registered and authorized to practice land Surveying under the Land Surveyors Act through the Alberta Land Surveyors Association.

**“Applicant”** – shall mean a person or entity who has applied for approval of a proposed subdivision, or to develop or service an existing parcel of land, whether as the owner or an agent for the owner of the land included therein.

**“Construction Completion Certificate” (CCC)** – this document is required at the completion of Construction Completion Inspection and, when approved, initiates the warranty period under the Developer’s Agreement, issued by the BLC.

**“Construction Drawings”** – shall mean those Engineering plans, profiles, reports, and specifications prepared by the Consulting Engineer, showing the details of the installation of the various municipal improvements within the Development, conforming to BLC’s Engineering, Development & Construction Standards. Contract drawings must be stamped by the Consulting Engineer and be “Issued for construction”.

**“Construction Specifications”** – shall refer to the documents prepared by the Consulting Engineer specifying the legal, administrative, and technical aspects of the infrastructure improvements, all of which shall conform to the minimum requirements as outlined in BLC’s Engineering, Development & Construction Standards.

**“County Engineer”**- shall mean the professional engineer(s) and/or firm retained by BLC to review, inspect, and recommend approval or rejection of the work proposed or performed by the Developer under the terms of the Developer’s Agreement.

**“Contractor”** – shall mean any person, persons or corporation who undertake the construction of local improvements or municipal improvements on behalf of the Developer, owner, or municipality.

**“Council”**- Shall mean persons duly elected to the Council of BLC.

**“Descriptive Plan”** – Shall mean a plan prepared by an Alberta Land Surveyor and where only a minimal amount of field work is conducted, to describe a parcel of land to be subdivided and as permitted by the Alberta Land Surveyor’s Act. Subdivision by Descriptive Plan may be considered where the parcel is the first from a quarter section and is square or rectangular in shape, but not where there are multiple lots proposed or where land is to be dedicated for roads and/or reserves.

**“Developer”** – Shall mean any person or entity that has obtained a subdivision approval or development permit and who has entered into a Developer’s Agreement with BLC with respect to specific identified lands.

**“Developer’s Engineer”** – shall mean a qualified Professional Engineer, registered, and licensed to practice in the Province of Alberta, who is appointed or engaged by the Developer to be responsible for the design of municipal improvements, preparation of drawings and specifications, and provision of construction supervision during the installation of the local or municipal improvements.





**“Development Agreement”** – a document between BLC and the Developer or Owner specifying general requirements, terms, and conditions of the municipal improvements, for the developing of specified lands. This will generally refer to infrastructure which will ultimately fall under the ownership and control of BLC but may also include related appurtenances and franchise utilities.

**“Development Authority”** – means the Development Officer, Municipal Planning Commission, or Council, to exercise the duties and powers and perform the functions prescribed in the land use Bylaw pursuant to BLC’s Bylaw.

**“Development or Development Area”** – the area to be serviced or developed, as delineated in the Developer’s Agreement or Servicing Agreement, and may include both onsite and offsite areas of development.

**“Development Permit”** – a permit issued by BLC in response to an application specifying legal, administrative, and technical requirements of the Developer for developing lands which shall not generally result in infrastructure which will ultimately fall under the ownership and control of BLC.

**“Development Officer”**- shall mean a person or persons appointed and acting on behalf of the municipality to regulate orderly development.

**“Easement”**- An easement, interest or right held by BLC for purpose of providing utilities, access, or drainage.

**“Endorsement”**- shall mean the final approval from BLC of a subdivision upon completion of all the “Conditions of a Notice Approval”.

**“Final Acceptance Certificate” (FAC)** – final inspection and formal approval by BLC signals expiry of the maintenance period of each infrastructure improvement outlined in the servicing agreement when approved. The purpose of the FAC is to transfer full ownership and responsibility for an infrastructure improvement from the Developer to BLC. FAC is issued by the BLC.

**“Final Acceptance Inspection” (FAI)**- shall mean an inspection carried out by the Developer and BLC at the end of the warranty phase of the project to assess any remaining deficiencies prior to the issuance of the “Final Acceptance Certificate.”

**“General Design Standards”**- shall mean the Engineering, Development & Construction Standards as amended by BLC and approved by the Consulting Engineer for installation of the local improvements.

**“Geotechnical Report”**- shall mean a document prepared by a Geological or Geophysical Professional Engineer licensed to practice in the Province of Alberta and that bears the seals or stamps signed and dated by the professional in accordance with the enactments that govern their profession.

**“Grading”**- shall mean an operation or process intended to level or to grade the development area to a desired horizontal gradient.

**“Internal Road”**- shall mean a public roadway, the primary function of which is to provide access to individual sites within a multi-lot subdivision, except for mobile home communities or bare land condominium developments in which the case of internal roads is privately owned.

**“Local Improvements, External/Offsite”**- shall mean all the local improvements or the portions thereof to be constructed by the Developer outside of the proposed development as described in the Developer’s Agreement.





**“Local Improvements, Internal”**- shall mean all the local improvements or the portions thereof to be constructed by the Developer within the proposed development as described in the Developer’s Agreement

**“Local or Municipal Improvements”** – all improvements within or related to the Development, including but not restricted to:

- Paved roads, including pavement markings.
- Gravel roads including culverts, guardrails.
- Sidewalk, curb, and gutter
- Storm water management systems and drainage
- Water supply and treatment facilities or upgrades
- Lift Stations
- Sewage treatment and disposal facilities
- Solid Waste disposal or transfer stations
- Paved or gravel lanes.
- Water, wastewater, and storm sewer mains
- Water, wastewater and storm sewer service connections
- Franchise utilities, including electrical, street lighting, natural gas, telephone, fibre optics and cable television.
- Landscaped boulevards, medians, municipal reserves, trails, parks, and public utility lots
- Lot grading
- Paved, concrete or gravel walkways/bikeways.
- Park and recreation amenities (E.g., playground equipment, benches etc.)
- Traffic control, street names, subdivision information signs

**“Maintenance Period”** – see Warranty period.

**“Municipal Development Plan”**- The Council approved planning document that outlines a strategic path to manage regional, urban, and rural growth.

**“BLC”** – shall mean Big Lakes County in the Province of Alberta.

**“Municipality”**- shall mean BLC.

**“Municipality Property”**- shall mean:

- Any property owned or leased by BLC developed for use as public park, sports field, playground, or other recreation area, or
- Undeveloped reserve land as either: reserve, municipal reserve, school reserve, environmental reserve, or combination of reserves, or
- Municipal rights-of-way including all forms of public roadways (roads, lanes, streets, highways), sidewalks, boulevards, road allowances, utility rights-of-way, public utility lots, public spaces, undeveloped rights-of-way and storm water management facilities, bridges, culverts, and water bodies, or
- Any property developed as a pathway or park trail system, or
- Any property owned or titled to BLC including buildings, structures, and parking facilities.

**“Municipality Manager”**- shall mean the Chief Administrative Officer, or designate, of BLC.





**“Off-site Levies”**- shall mean the monies collected by BLC from the Developer or industry to assist with the payment of the portion of the off-site services that the development may utilize.

**“Plan of Survey”**- shall mean a plan prepared by an Alberta Land Surveyor where the boundaries of a new parcel of land are identified by legal survey posts placed at the corners of the lots as dictated by the Alberta Land Surveyor’s Act. A Plan of Survey is required when a “Descriptive Plan” is not permitted by BLC County or as per the requirements of the Land Surveyor’s Act.

**Property”**- shall mean any land, building, structures, or premises including any personal property located on, over or in the property that is located within the municipal boundaries of Municipality.

**“Private Property”**- shall mean land owned by a person, group, corporation, or entity that is not a government body.

**“Record Drawings”**- shall mean design drawings up-dated to accurately show utility and municipal improvements as constructed in the field. Such drawings shall be stamped and signed by the Developers Engineer.

**“Substantial Completion Certificate” (SCC)** – this document is issued upon near completion of a project (project can be used for its intended use with minor outstanding work remaining). When approved, it initiates the warranty period under the Development Agreement, issued by BLC.

**“Tentative Plan of Survey”**- shall mean a drawing prepared by an Alberta Land Surveyor that illustrates the approximate location of all relevant existing and proposed improvements on a lot relative to existing and proposed lot boundaries and natural features.

**“Units of Measurement”**- shall mean that the standard units of measurement approved by BLC are System International (metric) only, and any reference to imperial measurement units may be allowed for convenience purposes only.

**“Utilities”**- shall mean those utilities together with all necessary appurtenances, which are described in the Developer’s Agreement.

**“Warranty / Guarantee Period”**- a minimum of two (2) year period commencing with the issuance of a Construction Completion Certificate (CCC) and ending with the issuance of a Final Acceptance Certificate (FAC), during which time the developer shall be responsible for maintenance in accordance with the Development Agreement and/or Contract documents and reparation of any deficiencies.





## Acronyms:

AADT	–	Average Annual Daily Traffic
ASBC	–	Asphalt Stabilized Base Course
ASTM	–	American Society for Testing and Materials
ASTM 03212	–	Standard Specification for PVC Pipe
ASTM A048	–	Standard Specification for Gray Iron Castings
ASTM B148	–	Standard Specification for Aluminum-Bronze Sand Castings
ASTM B952	–	Standard Specification for Zinc Alloys in Ingot Form for Spin Casting
ASTM C076	–	Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe
ASTM C117	–	Standard Test Method for materials finer than 75.0 µm (No.200) sieve in Mineral Aggregates by washing.
ASTM C136	–	Test method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C443	–	Standard specifications for Joints for Concrete Pipe and Manholes, using Rubber Gaskets
ASTM C478	–	Standard Specification for Precast Reinforced Concrete Manhole sections
ASTM C655	–	Standard Specification for Reinforced Concrete D-Load Culvert, Storm Drain and Sewer Pipe
ASTM D3034	–	Standard Specification for Type PSM Polyvinyl Chloride (PVC) Sewer pipe and Fittings
ASTM F794	–	Standard Specification for PVC Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter
AWWA	–	American Water Works Association
AWWA C110	–	American National standard for Ductile-Iron and Gray-Iron Fittings, 75.0 mm through 1200.0 mm, for Water and Other Liquids
AWWA C502	–	AWWA standard for Dry-Barrel Fire Hydrants
AWWA C504	–	AWWA standard for Rubber-Seated Butterfly Valve
AWWA C509	–	AWWA standard for Resilient-Seated Gate Valves for water supply service
AWWA C651	–	Disinfecting Water Mains
AWWA C800	–	Underground Service Line Valves and Fittings
AWWA C900	–	AWWA standard for Polyvinyl Chloride (PVC) Pressure Pipe, 100.0 mm through 300.0 mm, for Water Distribution
AWWA C903	-	Polyethylene-aluminum, polyethylene, and cross-linked polyethylene aluminum. Cross linked polyethylene composite pipe 12 mm through 50 mm for water servicing
AWWA M17	-	Installation, Field testing and maintenance fire hydrant
CBR	–	California Bearing Ratio
CCC	–	Construction Completion Certificate
CCTV	–	Closed Circuit Television Camera
CSA	–	Canadian Standards Association
CSA A23.1	–	Concrete Materials and Methods of Concrete Construction / Methods of Test and Standard practices for Concrete





CSA A3000	–	Cementitious Materials Compendium
CSA B137.1	–	Polyethylene Pipe, Tubing and Fittings for Cold Water Pressure Services
CSA B137.2	–	PVC Injection-Molded Gasketed Fittings for Pressure Applications-General Instruction No. 1
CSA B182.4	–	Profile PVC Sewer Pipe and Fitting
C.S.P.	–	Corrugated Steel Pipe
DFO	–	Department of Fisheries and Oceans
EPDM	–	Ethylene Propylene Diene Monomer (rubber)
FAC	–	Final Acceptance Certificate
Ha	–	Hectares
HDPE	–	High-Density Polyethylene
Kg	–	Kilograms
Km	–	Kilometres
kPa	–	Kilopascals
L	–	Litres
M.C.	–	Medium Curing (Asphalt)
MD	–	Municipal District
M	–	Metres
mm	–	Millimetres
Mpa	–	Mega Pascal
NAAPI	–	North American Association of Pipeline Inspectors
NFPA	–	National Fire Protection Association
NFPA 13D	–	Standard for the Installation of Sprinkler Systems in One (1) and Two (2) Family Dwellings and Manufactured Homes
NSF	-	National Sanitation Foundation
O.D.	–	Outside Diameter
OHS	–	Occupational Health and Safety
psi	–	Pounds per Square Inch
PVC	–	Polyvinyl Chloride
R.C.	–	Rapid Curing (Asphalt)
R.O.W.	–	Right-of-way
RTAC	–	Roads and Transportation Association of Canada
S.E.P.	–	Special Emulsified Primer
SS	–	Slow Setting (Asphalt)
T	–	Tonnes
TEC	–	Transportation and Economic Corridors
TAC	–	Transportation Association of Canada
TIA	–	Traffic Impact Assessment
ULC	–	Underwriters Laboratories of Canada





## 2.2 PLANNING AND DEVELOPMENT POLICY

This document is intended to provide information and guidance to developers, Engineering Consultants and Utility companies regarding the standards governing the design, preparation of plans, specifications, construction standards and supervision for municipal improvements within BLC. These standards are a minimum and good planning and engineering judgement and/or requirements of BLC.

### 2.2.1 Application of the Engineering Development & Construction Standards

These Engineering, Development & Construction Standards are applicable to subdivision, road, and utility development activity within the Municipal District. Subdivision and development within BLC generally fall into the following categories for both urban and rural properties:

- Residential
- Recreational
- Commercial
- Industrial

Developments considered as “low impact” by BLC will be accommodated through a simplified application process as outlined in Section 10: Low Impact Developments. These types of developments, typically, include:

- First parcel out.
- Residential subdivision with four lots or less that would not include municipal water and sewer infrastructure servicing but must meet approach and internal subdivision road requirements as per the Engineering, Development & Construction Standards.

All other residential, industrial, commercial or recreation development, regardless of number of lots, would not be considered “low impact” and would need to adhere to these Engineering, Development & Construction Standards.

### 2.2.2 Municipal Planning Documents

The following documents provide guidance to the planning of municipal growth. These documents shall be reviewed by the Developer to ensure conformity with the proposed development.

1. Federal Acts or Regulations
2. Regional Plan/(s)
3. Inter-municipal Development Plan/(s)
4. Municipal Development Plan
5. Area Structure Plans (Big Lakes County)
6. Land Use Bylaw
7. Development Agreement
8. Municipal Government Act (MGA)





### 2.2.3 Approvals

There are several potential approvals and/or permits required for developments through Municipal, Provincial and Federal legislation and agencies. These may include, but are not limited to:

#### Federal

- Canadian Environmental Assessment Act (CEAA)
- Migratory Birds Convention Act (MBCA)
- Fisheries Act

#### Provincial

- Water Act
- Environmental Protection and Enhancement Act (EPEA)
- Forestry Act
- Wildlife Act
- Wetlands Policy
- Public Lands Act
- Historical Resources Act
- Municipal Government Act (MGA)

#### Other

- Transportation and Economic Corridors (TEC) Guidelines
- Alberta Environment Guidelines

### 2.2.4 Developer's Responsibility

The developer shall be responsible for the following, at their own expense:

- Commissioning of:
  - Alberta Land Surveyor
    - Preparation of tentative plan of Subdivision
    - Preparation of easements and/or right-of-way
    - Preparation of a legal plan
  - Consulting Engineer and/or other Professionals
    - Preparation of Concept Plan or Area Structure Plan
    - Preparation of a design brief
    - Design of required municipal infrastructure.
    - Geotechnical investigation
    - Material testing
    - Biophysical and Environmental assessments
    - Other specialty services (E.g., structural, process, hydrological, mechanical, electrical, etc.)
- Design and construction of the required municipal improvements associated with the development, including road widening, internal roads, approach construction to all lots and remainder of the quarter.
- Design and construction of water and sewer services when tying into municipal services.





- Design and construction of drainage and stormwater management features.
- Quality control and material testing by an independent third-party qualified professional engineering firm.
- Registration with Alberta Land Titles, all easements including plans and documents for the construction of municipal improvements outside of the municipal rights-of way.
- The developer shall be responsible for satisfying all statutory requirements governing such works and obtaining approvals and permits for compliance with those requirements from authorities having jurisdiction (see Section 1.2.3 above).
- The developer is responsible for satisfying all design and construction requirements established in the Municipal District of BLC's Engineering, Development & Construction Standards Manual.

### 2.2.5 Development Procedure

An outline of the major steps and development procedure from subdivision approval to final acceptance are listed, but not limited to, the following:

1. Preparation and submission of a proposed development concept plan and design brief
2. Pre-Application Meeting (see 2.2.6)
3. Subdivision or Development Application submitted and reviewed.
4. Submission of a preliminary conceptual plan and supporting documents.
5. Amendments to the Land Use Bylaw and Area Structure Plan, if necessary.
6. Decision made on development or subdivision application.
7. Development and finalization of easement and Reserve Agreements.
8. Development and finalization of Road Dedication, Widening and Approach.
9. Preparation of detailed Engineering Drawings and Specifications.
10. Approval of Engineering drawings and specifications.
11. Preparation and endorsement of a Developer's Agreement.
12. Execution of a Developer's Agreement.
13. Security deposit for improvements.
14. Preparation and registration of the Legal Plan of Subdivision for endorsement by municipality.
15. Complete construction activities in accordance with the Engineering, Development & Construction Standards and the approved plans and specifications.
16. Submission of Record Drawings and related data.
17. Inspection by municipality and issuance of Construction Completion Certificate(s) (CCC).
18. Warranty period(s) as stated within the Development Agreement.
19. Final overlays, correction of deficiencies.
20. Inspection, Final Acceptance Certificate (FAC) and takeover by Municipality.
21. Release of Financial Security.





### 2.2.6 Pre-Application Meeting

The primary purpose of the pre-application meeting is to provide the developer with specific information on application process requirements. The pre-application meeting is intended to provide an opportunity for the Developer to receive preliminary feedback from BLC including review of the preliminary concept plan and design brief.

Pre-application meeting is required for any of the following types of developments:

- Multi-lot subdivisions
- Multi-family residential
- Commercial / industrial
- Recreation

The Developer shall contact the Planning and Development department for the scheduling and coordination of the pre-application meeting.

### 2.2.7 Application Process

#### 2.2.7.1 Application Form

The subdivision application must be filled out in its entirety and accompanied by the appropriate fees, and all required supporting documents. Incomplete applications will be returned and must be completed before they will be officially considered.

The application shall include a Tentative Plan of Subdivision and/or a Concept Plan as described below.

When Planning and Development determines that there is sufficient information to render a decision on the application and all comments and concerns from internal and external departments have been, or can be resolved, the application will be forwarded to the Municipal Planning Commission for consideration.

#### 2.2.7.2 Preliminary Conceptual Plan and Design Brief

##### Preliminary Conceptual Plan

The intent of the preliminary concept plan is to illustrate the key features of the proposed development. This includes proposed lots, roads, drainage and stormwater features, water and wastewater sewer servicing, shallow utilities, and recreational amenities (E.g., walkways, parks, etc.).

The developer shall, at their own expense, retain the services of a qualified Consulting Engineer, registered, and licensed to practice in the Province of Alberta, who shall be responsible for the design and preparation of preliminary conceptual plan.





The preliminary conceptual plan must show the following:

- The location of all existing improvements, buildings, fencing, and water and sewer servicing with all distances from all property lines.
- The location, dimensions, boundaries of each new lot proposed to be created, and of any proposed municipal/school and/or environmental reserve parcels.
- The location, dimensions, and boundaries of any right-of-way of existing roads and proposed roads.
- The location of existing and proposed access to each new parcel that is to be created as well as the remainder of the titled area.
- Existing treed areas and treed areas proposed to be removed because of the subdivision and subsequent development.
- The location and boundaries of the bed and shore of any river, stream, watercourse, lake or other body of water, including seasonal wetlands.
- If the proposed lots are to be serviced by individual wells and private sewage disposal systems, the location of any existing or proposed wells, the location and type of any private sewage disposal systems and the distance from these to existing or proposed buildings and property lines.
- Additional information may be required based upon the nature and complexity of the proposed subdivision.

Additional supporting documentation may be required by BLC, based upon the nature and complexity of the proposed project.

#### Design Brief

A design brief shall accompany the Preliminary Conceptual Plan of the Proposed Subdivision. The design brief is the basis upon the creation of the conceptual plan and shall include calculations to support the proposed servicing of the subdivision (E.g., water distribution system and/or wastewater sewer hydraulic analysis). Supporting assessments, documentation or reports are to be included with the design brief. This may include:

- Area Structure Plan (ASP)
- Heritage Site Assessment
- Wastewater Sewer Analysis
- Supporting Design Calculations
- Surveyed Grading Plan
- Traffic Impact Assessment (TIA)
- Wetland Assessment
- Hydrological Report
- Geotechnical Report
- Stormwater Management Plan (SWMP)
- Environmental and/or Biophysical Assessments

Any report, drawing, or study required in support of an application is to be provided at the developer's expense.





Following the approval of the preliminary concept plan, the developer may proceed with a subdivision application and will then be required to provide a more detailed engineered plan for the proposed subdivision pursuant to the BLC's Engineering, Development & Construction Standards Manual.

#### **2.2.7.3 Content of a Tentative Plan of Subdivision**

A tentative plan of subdivision shall include:

- Location of all existing improvements, buildings, fencing and servicing utilities.
- Location, dimensions, boundary, and area of each new lot proposed to be created, and of any proposed municipal, school and/or environmental reserve parcels.
- Location, dimensions, and boundaries of any right-of-way of existing and proposed roadways.
- Location of existing and proposed access to each new parcel that is to be created as well as to the remainder of the of the titled area.
- Existing treed areas and indication of areas where vegetation / trees will be removed as result of the proposed development.
- Location and boundaries of the bed and shore of any river, stream, watercourse, lake, or other body of water including seasonal wetlands or drainage courses.
- Location of existing wells, cisterns, and private sewage disposal systems. Dimensions shall indicate measurements from existing and proposed lot boundaries and buildings.

#### **2.2.7.4 Decision on Application**

The Municipal Planning Commission, as the Subdivision Authority for the of BLC, will decide on the application during one of its regular meetings. In some instances, the development officer may serve as the subdivision authority. The Subdivision Authority will decide on an application within a limited time from the date of receipt of a complete application.

The Subdivision Authority may:

- Approve the subdivision application, with conditions.
- Refuse the application, and provide reasons for the refusal; or
- Refer the subdivision application back to Planning and Development for further review to consider comments and/or concerns that the Subdivision Authority has raised in considering the application.

The decision of the Subdivision Authority may be appealed in accordance with the Municipal Government Act (MGA).

#### **2.2.7.5 Easement and Reserve Agreements**

As part of subdivision process, the developer may be required to dedicate municipal and school reserves and/or environmental reserves to the Municipality.





BLC can require a minimum of 10% of land from the subdivision to be provided for municipal or school reserve or as cash in lieu of land or as a combination thereof.

Environmental reserves may be taken on lands with environmental conditions that may make it unsuitable for development or when sensitive areas need to be protected. The Municipal Government Act stipulates which landforms qualify for environmental reserve dedication.

Reserves are not required when:

- Single lot is to be created from a quarter section of land.
- Land is to be subdivided into lots 16.0 hectares or more and is to be used only for agricultural purposes.
- The land that will be subdivided is 0.8 hectares (2 acres) or less.
- Reserve land, or money in place of it was provided previously for the same piece of land.

#### **2.2.7.6 Road Dedication, Widening and Approaches**

As per 661 of the MGA (Municipal Government Act), the owner of a parcel of land that is the subject of a proposed subdivision must provide, without compensation, (a) to the Crown in right of Alberta or a municipality, land for roads and public utilities.

For a subdivision application, BLC requires that the developer dedicate road widening to BLC in accordance with policy along all road right-of-way of the quarter section. Road dedication shall be by way of a road plan and the cost of preparing and registering the road plan shall be BLC's responsibility.

The developer is responsible to provide access into new parcels and to the remaining balance of the quarter section by upgrading existing approaches or installing new approaches, as well as any internal access roads.

#### **2.2.8 Engineering Plans and Construction Drawings.**

The Developer shall retain the services of a qualified Engineer, registered, and licensed to practice in the Province of Alberta, who shall be responsible for the design and preparation of drawings and specifications for all municipal improvements to be constructed within and/or related to the proposed development area, at the developer's expense.

The Engineer will design all infrastructure necessary to allow the proposed usage to take place within the new development. The detailed design will include a water distribution system, a wastewater collection system, a storm water management system as well as any required surface features such as grading, roads, lanes, and landscaping.

Please refer to Section 1.0 for drawing requirements and subsequent sections respecting criteria for design of infrastructure systems.





### 2.2.9 Developer's Agreement

When a development permit or subdivision has been approved with the condition of a Developer's Agreement, the developer shall contact BLC to commence the process.

The Developer's Agreement is between BLC and the Developer and outlines details about the intended process for development that may include plans, servicing, financial implications, and various Municipal requirements that need to be met.

The Developer must enter into the Developer's Agreement prior to constructing any improvements or infrastructure.

#### 2.2.9.1 Security Deposit for Improvements

Upon entering into a Developer's Agreement with BLC, the developer must provide a security deposit for all improvements in the form of cash or an Irrevocable Letter of Credit acceptable to BLC.

The security deposit shall be a guarantee for the performance of the requirements and obligations of the developer as set forth in the Developer's Agreement and shall be retained by BLC until the issuance of the Final Acceptance Certificate.

#### 2.2.9.2 Endorsement of Subdivision Plan for Registration

Endorsement is the final review by BLC to ensure that the subdivision complies with the subdivision approval and meets the conditions that were attached to that approval.

After a subdivision has been approved, the developer is responsible, at their own expense, for having an acceptable final document (plan of survey or descriptive plan) prepared by a certified Alberta Land Surveyor.

The final document is submitted to BLC for endorsement. The municipality will endorse the document only if the conditions of approval have been met to their satisfaction. Once the plan is endorsed, it is returned to the Surveyor who will take the plan to Alberta Land Titles for registration. Final documents must be submitted for endorsement within one (1) year of the date of approval.





## 2.3 CONSTRUCTION PHASE

### 2.3.1 Inspections

Weekly, throughout the construction process, the developer will submit detailed engineered progress reports completed by the Consulting Engineer.

The detailed engineered reports will be reviewed by the infrastructure department with any deficiencies noted and pre- and post-inspections conducted to ensure that construction meets municipal requirements in accordance with the Engineering, Development & Construction Standards Manual.

### 2.3.2 Construction Completion Certificate (CCC)

The Construction Completion Certificate will be issued after construction of the works outlined in the Developer's Agreement has been completed to the satisfaction of BLC and all required submissions and reporting have been provided. The date of issuance of a CCC will commence the warranty period. In some instances, a Substantial Completion Certificate (SCC) will be issued, provided that the work is completed as per the requirements of the Alberta Lien Act.

## 2.4 POST CONSTRUCTION PHASE

### 2.4.1 Record Drawings

Within 60 days of issuance of the Construction Completion Certificate (CCC), record drawings of the constructed works must be provided to BLC for review and approval.

### 2.4.2 Warranty / Guarantee Period

A minimum of two (2) year period commencing with the issuance of a Construction Completion Certificate (CCC) and ending with the issuance of a Final Acceptance Certificate (FAC), during which time the developer shall be responsible for maintenance in accordance with the Development Agreement and/or Contract documents and reparation of any deficiencies.

**Prior to the expiry of the warranty period, the developer shall notify BLC and arrange for an inspection.**

### 2.4.3 Final Acceptance Certificate (FAC)

The final acceptance certificate will not be issued until the developer provides BLC with such evidence and assurance that the construction and installation of all improvements and infrastructure meets the Engineering, Development & Construction Standards Manual.





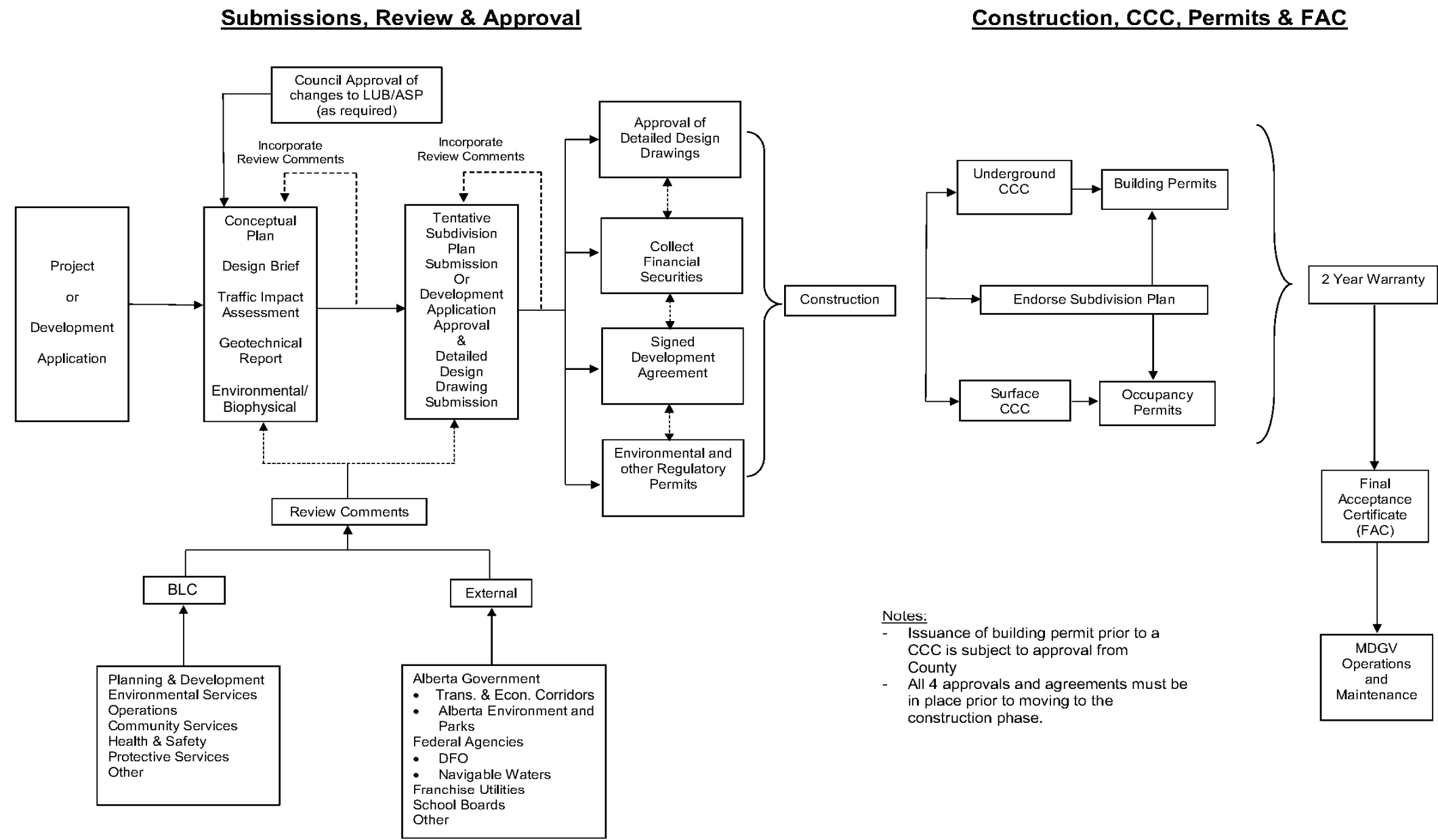
#### **2.4.4 Release of Financial Security**

Once the final acceptance certificate has been issued and after the warranty period has ended, the securities will be released as outlined in Section 2.2.9.1





APPROVAL PROCESSS FLOWCHART





## 2.5 ENGINEERING DESIGN

- The Developer shall retain the services of a qualified Consulting Engineer, registered, and licensed to practice in the Province of Alberta, who shall be responsible for the design and preparation of drawings and specifications for all municipal improvements to be constructed within and/or related to the proposed development area. All required improvements shall be designed in accordance with accepted engineering practices and shall meet or exceed BLC's Engineering, Development & Construction Standards as set out herein.
- It shall be the responsibility of the Consulting Engineer to delineate the location and alignment of all existing and proposed municipal improvements including coordination with the shallow utilities, overhead power, and street lighting. Unless approved otherwise by the BLC, the location of all underground utilities shall be subject to the inspection and approval of BLC and its representatives and all Statutory or Regulatory Approval agencies.
- The Developer and the Consulting Engineer shall be responsible for carrying out all surveys and investigations necessary to prepare the design. It shall further be the responsibility of the Consulting Engineer to identify the need for any easements or additional right-of-way that may be required within or outside of the development area. Where such easements or right-of-way are required, the surveys, plans and related documents shall be prepared by a qualified licensed Alberta Land Surveyor at the Developer's expense.
- While the Consulting Engineer may arrange to have certain portions of the work carried out by other qualified persons, they shall remain responsible for the coordination of the work and the certification of its quality and accuracy.

## 2.6 GEOTECHNICAL REPORT

If the BLC and Consulting Engineer deem necessary, the Developer shall submit a Geotechnical Engineering Report, prepared by a qualified Professional Geotechnical Engineer, which identifies and evaluates the subsurface ground characteristics of the development area. For all multi-lot developments, a geotechnical report must be submitted.

Such report shall identify soil types and conditions including frost susceptibility, soil stability, water table elevations, etc. as well as any potential difficulties that could be encountered during the construction of the municipal improvements. This report shall include recommended design, construction requirements and techniques that are applicable to the specific site or sites for all the improvements required or proposed.

Where a steep slope or the bank of a body of water or a watercourse is a component or characteristic of the development area, the BLC, in his/her sole discretion may require a bank stability study to be conducted by a qualified Professional Geotechnical Engineer. The results, of which, must be to the satisfaction of BLC at the Development and/or Subdivision Application Stage.





## 2.7 SUBMISSION OF ENGINEERING DESIGN

- Three (3) complete sets of plans including a PDF and specifications for the proposed subdivision area shall be submitted to the BLC for review including the design calculations.
- All proposed roadways and streets shall be named on the drawings to the satisfaction of BLC. In addition, all Lots and Blocks shall be numbered, and Municipal addresses indicated consistent with the addressing system employed by BLC.
- The design drawings, specifications and relevant data shall be reviewed by the BLC or their designated representative who shall return one (1) marked up set to the Consulting Engineer identifying any required revisions.
- The Consulting Engineer shall incorporate the required revisions and submit four (4) sets of the Construction Drawings to the BLC for final review and “Approval to Construct”.
- Two (2) sets of the Construction Drawings stamped “Approved to Construct” shall be returned to the Consulting Engineer within two (2) weeks of the date of their receipt if final review is deemed acceptable.
- The BLC’s review of the Construction Drawings is to confirm their compliance with BLC’s Engineering, Development & Construction Standards. Approval to construct does not, in any manner, imply approval of the technical aspects of the engineering design.
- No work, respecting the Municipal Improvements shall be commenced until the subdivision is approved, the Developer’s Agreement has been executed, any required security is in place and the BLC’s review of the drawings and plans has been completed and approved.
- Final Record Drawings to be provided are as follows:
  - Two (2) Final Hard Copies
  - Electronic (PDF) File
  - AutoCad File or a digital file that is acceptable to BLC.
    - in the coordinate system consistent with BLC’s GIS (Geographical Information System)

## 2.8 ENGINEERING SUPERVISION

- For the construction of Municipal Improvements, the Consulting Engineer shall be responsible for:
  - The inspection and approval of all materials to be used.
  - Carrying out all necessary construction survey layouts to ensure the finished construction conforms to the lines and grades shown on the approved plans.
  - Carrying out all necessary construction supervision to ensure all construction is carried out to meet the requirements of the approved plans and specifications and any supplementary standards required by BLC.
  - The recording of all “as constructed” information and creation of Record Drawings.
- A complete set of all approved drawings and specifications shall be always maintained at the construction site.
- In addition to the supervision carried out by the Consulting Engineer, the BLC or their designated representative may periodically inspect the work to ensure conformance with the





- standards. The BLC may also assist in the coordination of the subdivision works with any other related municipal works.
- The BLC shall bring the use of any unacceptable materials or practices; in particular, matters related to safety, to the attention of the Consulting Engineer or their contractors. If remedial action is not taken to the satisfaction of the BLC, the work may have stopped until such time as the required corrective action has been taken.
  - If the Consulting Engineer wishes to make any changes to the design prior to or during the execution of the work, they shall first submit a marked print in red (drawing) showing the proposed revision(s) to the BLC. If approval is granted for the revision, the original drawing shall be immediately revised, and new prints issued.
  - The design exception shall be signed off by the General Manger.

## 2.9 TESTING

It shall be the responsibility of the Consulting Engineer to ensure that testing of all materials indicated in the specifications are carried out by a qualified material testing firm. The cost of all testing shall be borne by the Developer.

Underground Municipal improvements shall not be permitted to operate or be operated as part of the existing municipal systems until the respective services has been inspected, tested and approved in writing by the BLC or their designated representative.

## 2.10 REPORTING REQUIREMENTS

After satisfactory completion of all municipal improvements within the development and as a condition of the execution of the Construction Completion Certificate (CCC), the Developer shall submit to the BLC the following information:

Certification by the Consulting Engineer that all work has been completed in accordance with the plans and specifications, the Engineering, Development & Construction Standards, and that all work and deficiencies have been completed.

- All material reports, certificates and tests including, at a minimum:
  - Inspection Certificates
  - Asphalt mix designs
  - Deflection testing
  - Concrete strength tests
  - Compaction tests
  - Flushing / disinfection
  - Infiltration / ex-filtration tests
  - Video inspections (CCTV of all sewers)





The reports shall be neatly organized into a binder with tab labels separating each type of test.

- Operation and Maintenance Manuals.
- Request for a Construction Completion inspection can be submitted after 15 days from receipt of the above noted deliverables.
- Within 60 days from the issuance of the CCC, submit three (3) copies of Engineer stamped record drawings and an electronic copy in both PDF (portable document format) and DWG (AutoCad digital file or file that is acceptable to BLC). The Developer must consult with BLC for details on the required layering structures for the DWG and coordinate system employed within BLC.

## **2.11 ACCEPTANCE**

Upon the satisfactory completion of the municipal improvements in the development and after all the identified deficiencies have been corrected, a Construction Completion Certificate (CCC) shall be issued by the BLC to the Developer, noting acceptance of the work and the commencement of the maintenance period. The developer shall be responsible, at their own expense, to remedy any defect, fault, or deficiency in the completed work during the maintenance period, all in accordance with the terms and conditions of the Developer's Agreement.

Upon completion of the maintenance period and after a final inspection and correction of all deficiencies to the satisfaction of the BLC, a Final Acceptance Certificate (FAC) shall be issued to the Developer or the Consulting Engineer.





### **3 ROADWAY SYSTEMS**

#### **3.1 GENERAL**

Roadways in development areas within BLC shall be developed to either an urban or rural cross-section with either gravel or an asphalt surface. The appropriate roadway classification and design designation shall be determined during the engineering pre-design stages in consultation with BLC.

The standards outlined herein are intended to be the minimum standards. It is the Developer's responsibility to design and construct roadways to meet or exceed the standards in accordance with good engineering practices, specific site condition requirements and any requirements by the BLC.

The Developer shall be responsible for quality control testing related to the roadway construction including but not necessarily limited to sieve analysis, densities, mix design, core sampling and concrete testing. Quality control shall be performed by and certified by a qualified material testing firm. A geotechnical investigation is required for all developments and to be submitted to BLC for approval prior to construction. See Section 2.6: Geotechnical Report.

#### **3.2 ROADWAY CLASSIFICATIONS**

##### **3.2.1 General**

- All roadways within BLC other than primary and secondary highways will be considered arterial, collector and/or local roads.
- Roadway classifications and designations in any development area shall generally follow the classification system outlined in the Transportation & Economic Corridors (formerly referred to as Alberta Transportation) – Highway Geometric Design Guide.
- Individual roadway classifications are further based on their functional use as established by BLC.

##### **3.2.2 Farmland Access Road**

The farmland access road provides access from a BLC roadway or highway to the farmland.

##### **3.2.3 Local Road (Residential)**

Function of the local roads is to provide access to adjacent properties carrying traffic from higher order road to individual land parcels. Local roads are typically low speed and low volume roadways. They connect to other local roadways or collectors.

##### **3.2.4 Collector Road**

A collector road is a low-to-moderate capacity road which serves to move traffic from local roads to arterial roads. These roads will often provide access to residential properties. There are two categories:





#### 3.2.4.1 Minor Collector Roads

Minor collectors carry relatively smaller volumes of through traffic from local roads (residential, commercial, and industrial).

#### 3.2.4.2 Major Collector Roads

Major collectors carry significant volumes of through traffic, with origin and destination points outside the general area to arterials.

#### 3.2.5 Arterial Road

The Arterial Road classification is applicable to a road that collects traffic from both Commercial/Industrial Collectors and/or Residential/Collector roads and directs traffic to a major grid road that connects secondary or primary numbered highways.

### 3.3 RURAL DESIGN CRITERIA

#### 3.3.1 General

The developer is responsible to assess the traffic impact associated with the proposed development. The assessment must include the projected Average Annual Daily Traffic (AADT) and any speciality variations (over a twenty (20) year design life. Depending on the size and/or location of the development an overall Traffic Impact Assessment (TIA) may be required by BLC or Transportation & Economic Corridors (formerly referred to as Alberta Transportation (AT)).

Road right-of-way shall be of adequate width to accommodate the roadway surface and the roadside ditches, if applicable, complete with the required side slopes and backslopes or all facilities relating to a curb and gutter design.

Minimum right-of-way requirements for rural roadways are as follow:

Farmland Access	20 meters
Residential and Industrial Local	30 meters
Minor Collector	30 meters
Major Collector	40 meters
Arterial Road	40 meters

Figure 3.1 highlights the typical cross section for all rural roadways.

Minimum right-of-way requirements and cross section details for urban roadways are shown within Figure 3.2 to 3.8.





**Table 3.1 Roadway – Basic Design Parameters**

Design Criteria	Residential / Farmland Access	Residential/ Local	Commercial / Industrial Local (Minor)	Residential Collector (Major)	Commercial / Industrial Collector	Arterial Road
Drawing Reference	No. 3.2	No. 3.1 / 3.3	No. 3.1	No. 3.1/3.4	No. 3.1/3.5/3.6	No. 3.1/3.7/3.8
ADDT	>50	50-150	150-300	<600	TBD	TBD
RURAL SPECIFICATION						
AT Designation Reference	n/a	RLU-208G-60	RLU-209G-90	RLU-209G-90	RLU-210G-90	Varies
R.O.W Requirements (m)	na / 20	30	40	40	40	40 min.
Design Speed (km/hr)	60	60	90	90	90	100/110
Subgrade Width (m)	7.8m / 10.8m	TBD (Geotech.)	TBD (Geotech.)	TBD (Geotech.)	TBD (Geotech.)	TBD (Geotech.)
Finished Surface Width (m)	7.0m min / 10.0m max	8.0m	9.0m min / 10.0m max	9.0m	10.0m	Varies
Min. Radius of Curve (m)	120	120	300	300	300	300
Max. Gradient (%)	8	8	4	6	4	4
Vertical Curve min. “k” Crest	15	35	35	35	35	35
Vertical Curve min. “k” Sag	10	15	15	15	15	15
Side slope / Backslope	4:1 3:1	4:1 3:1	4:1 3:1	4:1 3:1	4:1 3:1	5:1 4:1
Min. Ditch Grade (%)	0.5	0.5	0.5	0.5	0.5	0.5
Super elevation	n/a	0.02	0.08	0.08	0.08	0.08
Crown	Gravel	4%	4%	4%	4%	4%
	Paved	2.5%	2.5%	2.5%	2.5%	2.5%
	A.S.B.C	3%		3%		N/A

### 3.3.2 Geometric Design

- Roads shall be designed in accordance with the geometric design standards outlined in the latest edition of the Transportation & Economic Corridor’s (formerly referred to as Alberta Transportation) “Geometric Design Guide” and the Transportation Association of Canada (TAC) manual “Geometric Design Standards for Canadian Roads and Streets”.
- The design speed selected should relate to the expected operating speed on the road after improvement. It should reflect public expectations and include an allowance for safety. The design speed is typically 10 km/hr higher than the anticipated posted speed limit.
- The roadway design shall be prepared considering the future requirements, economic factors, safety considerations, staging, and other road uses not associated with the development.





- In addition, the designer shall also give due consideration to the soil conditions in the area as derived through geotechnical investigations.

### 3.3.3 Road Intersections

- The grades at intersections for all roadway classifications shall not exceed 2% for a minimum distance of 30 m, measured from the shoulder edge of the receiving road.
- Flares at intersecting roadway shall have the following minimum radius from shoulder to shoulder:
  - residential access and local 10.0 m
  - residential collector 15.0 m
  - industrial local and collector 15.0 m
- Each intersection shall be designed according to the latest design guidelines (Transportation & Economic Corridors & Transportation Association of Canada). Should there be a difference in requirements compared to the specifications contained within these standards, the more stringent shall apply.
- Refer to Figure 3.10: Design of Intersections for more detail.

### 3.3.4 No Exit Roads

- Other than for a temporary solution, dead-end roads shall not be allowed in industrial subdivisions. For the temporary situation refer to Figure 3.12: Temporary Commercial/Industrial Cul-De-Sac.
- In residential subdivisions, all dead-end roads shall be provided with a cul-de-sac or turnaround consistent with the requirements outlined in Figure 3.13: Residential Cul-de-Sac.

### 3.3.5 Cul-De-Sac

- The minimum sizes and configuration of cul de sacs are detailed within Figures 3.11, 3.12 & 3.13,
- Expanded “knuckle” style bulbs may also be considered upon approval from BLC.

### 3.3.6 Culverts and Drainage

- Highway and local road ditch and drainage design shall comply with the latest edition of the Highway Geometric Design Guide (Alberta Economic Corridors & Transportation Association of Canada).
- The minimum allowable ditch grade shall be 0.5%. Ditch grades, more than 2.0%, shall be protected against erosion through structures such as rock ditch checks, silt fences, Enviroberm fences, erosion control blankets or straw bale ditch checks. A Typical ditch check installation is illustrated in Figure 3.14: Rock Ditch Check. GeoRidge/Coconut Matting Ditch Check is shown in Figure 3.15.
- The developer shall be responsible for site specific design of sediment erosion control plan and submittal to BLC for approval in writing.





- The standard ditch bottom width shall be 3m and design exceptions only when approved by the BLC in writing. Ditch widths and resultant run-off capacities must meet specific site requirements. Refer to Figure 3.1.
- Culvert size requirements shall be determined through the stormwater drainage analysis; however, the minimum size culverts shall be as follows or approved by the BLC in writing:
  - Through grade culvert 800 mm
  - Residential approach culvert 500 mm
  - Industrial approach culvert 600 mm
- Culverts shall be new galvanized C.S.P. (corrugated steel pipe) with a minimum wall thickness of 1.6 mm, or as required by the loading criteria.
- All culverts shall be installed in accordance with the manufacturer's recommendations.
- All culverts shall be installed complete with straight or bevelled end sections on both the inlet and outlet ends with the invert extended to the toe of the side slope.
- Culverts shall be installed to provide a minimum depth of cover of 300 mm or one-half (1/2) the culvert diameter, whichever is greater, as measured from the finished shoulder grade of the roadway to the top of the culvert. A typical culvert installation detail is illustrated in Figure 3.16: Culvert Installation.
- Rip Rap or Turf Reinforcement Mats (TRM) shall be placed around the inlet and outlet of each culvert, extending a minimum of 1 m beyond the ends of the culvert. Rip rap material shall consist of rock ranging in size from 150 mm to 350 mm with 50% of the rock material being larger than 200 mm.
- Typical Rip-Rap requirements for culvert size 500 – 1200 diameter. Rip-Rap methods: rock scour stop, and stapled sod details are as per Figure 3.17.

### 3.3.7 Road Approaches

This sub-section outlines the requirements respecting the design and construction of approaches within subdivision developments.

- Only two approaches will be permitted per 800 meters off of a County Road unless approved otherwise by BLC.
- Figure 3.18: Approach Locations and Limitations provides standards for the location of approaches for corner or double-fronting lots. Deviations from these standards require approval by the BLC in writing.
- A typical residential/commercial/industrial lot approach to property line is illustrated in Figure 3.18. A residential approach shall be a minimum of 7m in width; an industrial lot approach shall be a minimum of 8m in width; an agricultural lot approach shall be a minimum of 10 m in width. Any deviations from these minimum widths require the approval of the BLC in writing.
- All approaches shall be constructed using the same structure as the adjoining roadways. For roadways with asphalt surfacing, the approaches shall extend:
  - Agricultural – 4 m from road shoulder of adjoining road
  - Residential/Commercial – to property line
  - As illustrated in Figure 3.19: Asphalt Aprons.
- All developments shall require the Developer to construct one (1) approach to each lot, consistent with the standards outlined herein.





- Approaches to industrial/commercial lots are not required to be constructed by the Developer unless the access locations are known; the Owner/Developer of the lot shall be responsible for constructing such approaches, consistent with the standards outlined herein.
- Minimum clearance of approaches must be 1 m from any structure.
- Side slopes are to be 4:1 ratio and backslopes to be 3:1 ratio.

### 3.3.8 Roadway Surface Finishes

BLC presently approves two types of roadway surface finishes:

1. Graveled surface:
  - Minimum of 2 lifts of 250 tonnes/Km for 8m wide surface.
  - The surfacing gravel shall be placed in two lifts.
    - 1<sup>st</sup> lift shall be a larger rock, 4-40 designation.
    - 2<sup>nd</sup> lift shall be a surfacing rock, 4-25 designation.
  - Each lift shall be watered and compacted with a steel drum or wobbly wheeled packer.
2. Asphaltic concrete (hot mix asphalt) pavement surface.

All road structures shall be determined based upon recommendations contained with the geotechnical investigation and considering the design AADT, site specific conditions and minimum requirements as required by BLC.

Should a gravelled surface be approved, even for an interim period/phase break, the surface gravel shall be a minimum compacted layer of 50 mm depth of 20 mm crushed gravel. All approaches shall be similarly treated. If the period is to be delayed, additional gravel may be needed, as approved by the BLC in writing.

## 3.4 URBAN DESIGN STANDARD

### 3.4.1 General

The developer is responsible to assess the traffic impact associated with the proposed development. The assessment must include the projected Average Annual Daily Traffic (AADT) over a twenty (20) year design life. Depending on the size and/or location of the development an overall Traffic Impact Assessment (TIA) may be required by BLC or Alberta Transportation (AT).

Road right-of-way shall be of adequate width to accommodate the roadway surface, drainage features, swales, walkways, and landscaping (ex/ trees).





Minimum right-of-way requirements for urban roadways are as follow:

Residential and Industrial Local	18-19 meters
Minor Collector	22 meters
Major Collector (residential)	25 meters
Major Collector (industrial / commercial)	30 meters
Arterial Road	30-40 meters

Details on the required cross section elements including minimum right-of-way widths are shown within Figures 3.3 to 3.8

### 3.4.2 Geometric Design

Roads shall be designed in accordance with the geometric design standards outlined in the latest edition of the Transportation & Economic Corridor's (formerly referred to as Alberta Transportation) "Geometric Design Guide" and the Transportation Association of Canada (TAC) guidelines.

BLC presently requires all urban road section to be paved.

All road structures shall be determined based upon recommendations contained with the geotechnical investigation and considering the design AADT, site specific conditions and minimum requirements as required by BLC.

### 3.4.3 Concrete Curb and Gutter

- Concrete curb and gutter shall be constructed on all urban cross sections according to the typical cross sections shown in Figures 3.25 & 3.26.
- The vertical face curb and gutter cross section shall be used on all roads fronting public lands such as parks and public utility lots.
- Vertical face curbs shall also be used within the right-of-way when crossing pipelines unless separate vehicle barriers are provided to prevent unauthorized access. Refer to Figure 3.27 & 3.30.
- The rolled faced curb and gutter cross section may be used on all local/residential roadways allowing driveway access.
- Curb returns on all residential street intersections shall have a minimum radius of 10 m.
- Curb returns on all commercial/industrial intersections shall have a minimum radius of 15 m and shall be designed to accommodate truck turning movements.
- The minimum gutter grade shall be 0.5% except for cul-de-sac bulbs, curb returns and catch basin approaches, which shall be 0.8%. The 0.5% minimum grade shall be maintained throughout sag vertical curves to avoid the short length at near horizontal grade.
- Curbs shall be constructed using Portland Cement to CSA A3000. Materials, production, delivery, placement, and finishing shall conform to CSA A23.1.





- The minimum twenty-eight (28) day compressive strength of concrete shall be 30 MPa. Air entrainment shall be within 6 – 8 % by volume. Concrete testing is required for every 60 m<sup>3</sup> of cast in place concrete.
- Curbs shall be constructed on prepared sub-grade, cement stabilized sub-grade, granular base course, soil cement or asphalt concrete.
- For all urban cross sections, wick drains shall be placed below the curb, between the sub-grade and granular base course. The wick drain shall be connected to the nearest catch basin.
- Curbs must be backfilled with suitable clay within seven (7) days of concrete placement and prior to placement of the roadway structure. The clay material shall be backfilled to within 100 mm of the top of curb to allow for the placement of topsoil material.
- Refer to:
  - Figure 3.35- Sidewalk and Drainage Crossing for a Mono. Walk
  - Figure 3.36 – Rolled Face Monolithic Curb, Gutter and Sidewalk
  - Figure 3.37 - Straight Face Monolithic Curb, Gutter and Sidewalk
  - Figure 3.38 – Sidewalk and Boulevard Drainage for Separate Walk

### 3.4.4 Sidewalks

- Sidewalks shall be accessible to all persons as well as being safe, functional, and aesthetically pleasing.
- Sidewalks installed for new subdivisions shall integrate with the existing walkway system on intersecting roadways.
- Separate sidewalks are preferred and shall be a minimum of 1.5 m wide.
- The requirements for sidewalks in commercial and industrial areas shall be reviewed on a site-specific basis in conjunction with the proposed use and other required services.
- Curb ramps shall be used at all curbed intersections. See Figure 3.23: Curb Ramp.
- All sidewalks shall be imprinted with the Contractor's stamp indicating year of construction every 200m.
- Sidewalks shall be imprinted with a "CC" at all curb cock locations.
- Minimum twenty-eight (28) day compressive strength shall be 30 MPa. Air entrainment shall be within 6 – 8%. All sidewalks are to be adequately reinforced as per Figure 3.36 to 3.38.
- The granular base course shall consist of 150 mm compacted thickness of Designation 2-20A aggregate. The subgrade and gravel base course under the sidewalk shall be compacted to 100% Standard Proctor Density.
- Horizontal sidewalk alignment for separate sidewalks shall be at a constant offset from the adjacent roadway centreline.
- Sidewalks shall be graded to facilitate positive drainage flow. The minimum grade is 0.5%. Wick drains shall be provided under monolithic sidewalk, curb and gutter structures.
- Cold weather concrete pouring below 5°C shall require prior approval by BLC and shall be placed according to CSA A23.1.

### 3.4.5 Walkways





- Walkways are to be designed and constructed as per the Developer's Agreement. The Developer will be required to provide linkages from existing developments and/or future developments.
- Refer to:
  - Figure 3.20 - Granular Walkways
  - Figure 3.21: Asphalt Walkways/Bikeway,
  - Figure 3.22: Concrete Walkways Greater than 1.5 m

### 3.4.6 Curb Ramps

Refer to Figure 3.23 with respect to the location and construction parameters for wheelchair accessible ramps at intersection and off of sidewalks.

## 3.5 CONSTRUCTION STANDARDS

### 3.5.1 Preparatory Work

- The entire road right-of-way shall be cleared of all vegetation (trees, shrubs, brush, etc.) including removal of all tree roots and stumps. All such material shall be removed from the site for disposal at approved locations. No burying of this material, or any portion thereof, shall be permitted within the R.O.W.
- Organic soils and material are not acceptable as subgrade materials and shall be stripped within the roadway, ditch and backslope portion of the new construction. Organic soils (clean topsoil) shall be stockpiled in approved locations and then spread on the ditches and backslopes after completion of the roadway construction.

### 3.5.2 Road Grade Construction

This sub-section deals with the requirements covering roadway excavation, roadway embankment and subgrade preparation.

#### 3.5.2.1 Roadway Excavation

- All materials excavated for placing in roadway embankment shall be suitable road construction material.
- Where unsuitable material is encountered at the subgrade level of a cut, the subgrade shall be sub-excavated to an acceptable depth and replaced with suitable material.
- The compaction of subgrade surfaces in excavations and the placement and compaction of materials replacing sub-excavations shall be in accordance with section 3.5.2.2 Roadway Embankment and section 3.5.2.3 Subgrade Preparation.
- Excavation shall be carried out to conform to the lines, grades, and cross-section of the approved roadway design.





### 3.5.2.2 Roadway Embankment

- All material used in roadway embankment shall be approved road construction material free from all wood, brush, roots, topsoil, frost and other organic materials.
- All topsoil and/or organic materials shall be excavated prior to embankment placement.
- Where embankments are to be placed on a slope or against an existing slope, the sloped surface shall be benched and scarified in a manner that the new material will bond with the existing surface.
- Prior to fill being placed the exposed surface shall be scarified to minimum depth of 300 mm and re-compacted to 100% of Standard Proctor Density.
- Successive lifts of embankment material shall be placed in uniform layers of 150 mm compacted maximum thickness across the entire width of the embankment.
- Suitable compaction equipment shall be used to thoroughly compact each layer of embankment material.
- The top 300 mm of the embankment material shall be compacted to not less than 100% of Standard Proctor Density at optimum moisture content.
- Embankment construction shall be carried to the lines, grades, and cross-section of the approved roadway design.

### 3.5.2.3 Subgrade Preparation

- The completed subgrade shall be scarified to a minimum depth of 300 mm.
- There shall be two separate 150 mm sub-grades unless otherwise approved by BLC in writing.
- The loosened material shall be windrowed to the side and the exposed surface shall be thoroughly compacted.
- The windrowed material shall then be uniformly mixed and compacted to obtain 100% Standard Proctor Density at optimum moisture content. The material shall be dried or watered as required to attain the optimum moisture content.
- The finished subgrade shall be shaped to conform to the required lines, grades and cross-section of the approved roadway design and be no less than 97% SPD compacted.

### 3.5.3 Surfacing Gravel

- Prior to the application of the surfacing gravel at the minimum rate stated in Section 3.3.8, the compacted subgrade shall be scored to ensure embedment of the gravel in the subgrade. The surfacing gravel shall be placed in two (2) lifts including watering and compaction with a steel drum or wobbly wheeled packer.
- Surfacing gravel material shall be consistent with the Transportation & Economic Corridors' (formerly referred to as Alberta Transportation) specification for Aggregate gradation as follows:





Table 7.4.3.2. Specifications for Aggregate.

TABLE 3.2.3.1, SPECIFICATIONS FOR AGGREGATE																							
DESIGNATION	1			2			3			4			5		6		7	8	9				
	Class (mm)	10	12.5	16	*16(N2)	20	25	40	12.5A1W	12.5BW	12.5C	16	20	25	40	10A	10B	80	125	40	25	8	
Percent Passing Metric Sieve	125,000																	100					
	80,000																	100					
	50,000																	55-100	55-100				
	40,000							100												100			
	25,000						100	70-94						100				38-100	38-100		100		
	20,000					100	82-97						100										
	16,000			100		100	84-94	70-94	55-85			100						32-85	32-85		90-100		
	12,500		100	80-92	89-100					100	100	100	72-95										
	10,000	100	83-92	70-84		78-94	63-86	52-79	44-74	35-65	55-75	70-93	53-82	35-77	30-77	25-72	100	100			85-100	45-75	
	8,000																					100	
8-GP- 2M) μm	5,000	60-75	55-70	50-65	55-70	40-67	35-64	32-62	0-15	0-15	30-60	27-54	15-55	15-55	8-55	70-90	45-70	20-65	20-65		40-100	0-15	
	1,250	26-45	26-45	26-45	26-45	20-43	18-43	17-43	0-3	0-3	9-28	9-28	0-30	0-30	0-30	20-45	20-45					0-5	
	630	18-38	18-38	18-38	18-38	14-34	12-34	12-34															
	315	12-30	12-30	12-30	12-30	9-26	8-26	8-26			0-15	0-15											
	160	8-20	8-20	8-20	8-20	5-18	5-18	5-18			0-11	0-11				9-22	9-22	6-30	6-30	17-100			
	80	4-10	4-10	4-10	4-10	2-10	2-10	2-10	0-0.3	0-0.3	0-8	0-8	0-12	0-12	0-12	0-10	0-10	2-10	2-15	6-30			
	% FRACTURE BY WEIGHT (2 FACTS)									75+ (100% 1 Factor)	75+ (100% 1 Factor)												
	ALL +5000		60+	60+		60+	60+	50+															
	PLASTICITY INDEX (PI)	NP	NP	NP	NP	NP	NP-6	NP-6	NP-6	N/A	N/A	NP-4	NP-4	NP-8	NP-8	NP-8	NP-6	NP-6	NP-8	NP-8	NP-5	NP-5	NP
	L.A. ABRASION LOSS PERCENT MAX.	40	40	40		50	50	50		35	35	35	35	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	35
FINENESS INDEX	N/A																						
COEFFICIENT OF UNEQUALITY (C/U)	N/A																						
	N/A																		3+	N/A			

TABLE 3.2.3.1, SPECIFICATIONS FOR AGGREGATE

## Designations:

Designation 1 - Asphalt Concrete Pavement

Designation 2 - Base Course Aggregate

Designation 3 - Seal Coat Aggregate

Designation 4 - Gravel Surfacing Aggregate

Designation 5 - Sanding Material

Designation 6 - Pit- Run Gravel Fill

Designation 7 - Cement Stabilized Base Course Aggregate

## Notes:

N1. Asphalt Concrete Mix Type 1 - 90+ (98% 1 face)

Asphalt Concrete Mix Type 2 - 70+

Other Asphalt Concrete Mix Types - 60+

N2. Designation 2 Class 16 Material is for ASBC

N3. For crushed aggregates other than all Designation 5 and Designation 9 materials, a tolerance of three percent in the amount passing the maximum size sieve will be permitted provided all oversize material passes the next larger standard sieve size.





## Rip Rap Specification Chart (from Transportation &amp; Economic Corridors)

Gradation		Heavy Rock Riprap Class			
Required Properties	Units	1M	1	2	3
Nominal Mass	kg	7	40	200	700
Nominal Diameter	mm	175	300	500	800
None greater than:	kg	40	130	700	1800
	mm	300	450	800	1100
20% to 50%	kg	10	70	300	1100
	mm	1200	350	600	900
50% to 80%	kg	7	40	200	700
	mm	175	300	500	800
100% greater than:	kg	3	10	40	200
	mm	125	200	300	500

**Notes:**

- (1) Percentages quoted are by mass. Sizes quoted are equivalent spherical diameters, and are for guidance only.

**3.5.4 Base Course Construction**

- Base course shall consist of a mixture of crushed aggregate and water, which is placed in layers upon the previously prepared surface, compacted and finished to the specified thickness, approved grade, lines, and typical cross-section.
- Base course material shall be consistent with the AT specification for Aggregate Gradation Designation 2, class 20 or approved by the BLC in writing.
- The depth or thickness of granular base course material will depend upon the soil conditions and design structure.
- All granular base course material shall be placed in lifts not exceeding 150 mm and compacted to 100% of Standard Proctor Density at optimum moisture content.

**3.5.5 Pavement Structure**

- A geotechnical report with recommended pavement designs shall be prepared by a recognized geotechnical engineering firm, employed by the Developer and/or Consulting Engineer, and submitted to the BLC for review.
- Paved roadways shall be designed in accordance with the Asphalt Institute method of pavement design using minimum design loadings of 8,165.0 kg axle loads for local streets and 10,886.0 kg axle loads. The design parameters such as traffic count,





percentage of trucks, California Bearing Ratio (CBR), etc., are to be outlined to the BLC. The BLC reserves the right to request the Developer to engage a geotechnical engineering agency to carry out CBR tests on the subgrade prior to paving to confirm adequacy of design.

- The following table highlights the minimum accepted roadway structures regardless of whether the geotechnical report indicates a lesser recommended structure:

### **Minimum Road Structures**

\*\* to be verified / adjusted as per geotechnical assessment \*\*

Roadway	Local	Minor/Major Collector	Arterial
	<i>All measurements in mm</i>		
Subgrade Prep	300	300	300
Aggregate Base Course	200	300	300
Surfacing Gravel	85	100	100
Asphalt Surface	100	100	100

## **3.5.6 Asphaltic Concrete Pavement**

### **3.5.6.1 Description**

All asphalt design and construction specifications shall meet or exceed those outlined in the latest Standard Specifications for Highway Construction issued by Alberta Transportation. Should there be any discrepancy between the requirements listed within as compared to the Transportation & Economic Corridors' (formerly referred to as Alberta Transportation) Specifications, the more stringent shall apply.

Asphaltic concrete pavements shall consist of mineral aggregate, filler and asphaltic binder, and shall be laid and compacted to specified thickness and shall conform to the approved lines, grades and typical cross-sections.

### **3.5.6.2 Mix Design**

- The mix design shall be carried out by an accredited testing agency and shall be submitted to the BLC for approval. A minimum of ten (10) working days shall be required to evaluate the mix design and issue an approval.

### **3.5.6.3 Surface Smoothness**

- The finished surface shall be smooth and true to established crown and grade and have an entirely smooth riding quality. The surface shall have a tight knit texture and shall be free from segregation and surface cracking.





- The surface of the finished pavement shall be free from depressions exceeding 6 mm as measured with a 3.0 m straight edge, parallel to the centre of the road.
- Any low or defective areas shall be immediately remedied by cutting out the asphalt layer and using fresh, hot mixture and compacting immediately to conform to the surrounding area and be thoroughly bonded to the underlying and adjacent asphalt surfaces.

#### **3.5.6.4 Weather Limitation**

- Asphaltic Concrete surfaces shall be placed and compacted during daylight hours, when the air temperature is not less than 5 degrees Celsius, and the road surface is dry.

#### **3.5.6.5 Prime and Tack Coats**

- An asphaltic prime coat shall be applied to the finished granular base course prior to placing of the asphaltic concrete surface.
- An asphaltic tack coat shall be applied to previously constructed paved surfaces.

#### **3.5.6.6 Final Density Requirements**

- All asphaltic concrete to be compacted to minimum 98% of Marshall Density prepared from the samples of the asphalt mixture being used.
- Asphalt densities less than 97% of Marshall Density may require asphalt to be removed, or alternately the Developer may be required to provide an extended maintenance period at the Developer's entire cost.

#### **3.5.6.7 Asphalt Thickness**

- All asphaltic concrete pavements shall be of the thickness indicated on the approved design drawings.
- Areas deficient in thickness by more than 10% of the total design thickness shall require the developer to place an additional 25 mm thickness of asphalt over the portion of roadway deficient.

#### **3.5.6.8 Testing**

- The following tests shall be carried out for each 1,000 Tonnes of asphalt pavement or at least one each shift during placing operations:
  - Marshall Stability
  - Sieve Analysis
  - Bulk Specific Gravity of Compacted Mixture
  - Bitumen Content
  - % voids in the mineral aggregate
  - Air voids in compacted mix
  - Stratified Random Testing
  - Line paint sampling
- A minimum of one density test for each 1000 m<sup>2</sup> of compacted asphalt layer shall be taken.

#### **3.5.6.9 Staged Asphalt Construction**

- All roadways in Residential Developments shall be constructed with the final surface lift placed in the year the subdivision is eligible for Final Acceptance. BLC may accept cash-





in-lieu for the final lift of asphalt if significant development has not occurred at the time of Final Acceptance.

- Asphalt placement shall bring the roadway to its original design crown as shown on the approved engineering drawings.
- An additional one (1) year Labour and Materials warranty shall be required for the final lift after the Final Acceptance Certificate is issued for surface improvements where cash-in-lieu has not been negotiated.

### **3.5.7 Asphalt Stabilized Base Course (ASBC)**

#### **3.5.7.1 Description**

Asphalt stabilized base course shall consist of a mixture of crushed aggregate and asphalt, which is placed in layers upon the previously prepared surface, compacted and finished to the specified thickness, approved grades, lines, and typical cross-section.

#### **3.5.7.2 ASBC Mix Design**

The mix design shall be carried out by an accredited testing agency and shall be submitted to the BLC for approval. A minimum of ten (10) working days shall be required to evaluate the mix design and issue an approval.

#### **3.5.7.3 Production**

- Asphalt stabilized material shall be mixed through a central mixing plant.
- The asphalt plant shall be calibrated to produce the designated mix gradation and asphalt content to ensure mix uniformity and consistency.
- Crushed aggregate shall be dried such that the moisture content of the final mix is 1% or less at the plant discharge.
- Asphalt binder shall be uniformly applied to the crushed aggregate at the rate designated in the mix design. Neither aggregate nor asphalt shall exceed 95°C at the time of plant mixing. Mixing shall continue until all the asphalt is uniformly dispersed throughout the mix and the aggregate particle are coated with asphalt. The drying and mixing process shall not reduce the cutback level to such a degree that the mix cannot be properly placed. Up to the time of spreading and placing, the amount of cutback in the mix shall not be reduced to less than 25% of the original cutback weight.

#### **3.5.7.4 Spreading and Compaction**

- The mix shall be spread and compacted to specified grade and cross-section, be uniform in gradation, density and asphalt content at the values specified or designated, and the finished surface shall be smooth, waterproof, and free of roller marks.
- The mix shall be compacted to not less than 99% of Marshall Density.
- The mix shall be produced, placed, and compacted in a uniform and non-segregated manner at the application rate and asphalt temperatures designated. Air temperature at the time of application shall be 5°C or higher. All necessary steps as required shall be taken to remedy the causes of any aggregate segregation or non-uniform asphalt distribution which may occur. Any areas which are segregated or excessively rich, lean, or wet shall be corrected by whatever means necessary.
- Additions such as asphalt binder, mixing and/or aeration of the mix to reduce cutback shall be pre-formed as is necessary to produce a satisfactory mix prior to final spreading and compaction.





**3.5.7.5 Prime and Fog Coat**

- An asphalt prime coat shall be applied to the finished granular base course prior to placing of the ASBC.
- An asphalt fog coat shall be applied to the finished ASBC.

**3.5.7.6 Final Density Requirements**

- All asphaltic stabilized base courses shall be compacted to minimum 99% of Standard Proctor Dry Density.
- Asphaltic densities less than 95% may require asphalt to be removed or alternately the Developer may be required to provide an extended maintenance period at his/her cost.
- If a deficiency is found, there will be a penalty.

**3.5.7.7 Asphalt Thickness**

- All asphaltic stabilized base courses shall be of the thickness indicated on the approved design drawings.
- Areas deficient in thickness by more than 10% of the total design thickness shall require the developed to place an additional 25 mm thickness of asphalt over the portion of roadway deficient.

**3.5.7.8 Testing**

- A minimum of one (1) moisture content and one (1) extraction test shall be taken for each 1000 tonnes of mix placed.
- A minimum of one (1) density test for each 1500 m<sup>2</sup> of compacted 50 mm lift of ASBC shall be taken.
- A minimum of three (3) material thickness tests per 100.0 lineal metres of compacted ASBC shall be taken.

**3.5.8 Prime Coats, Tack Coats, and Fog Coats****3.5.8.1 Description**

- Prime coats shall be the application of bituminous material to subgrade on previously prepared gravel base course prior to placing bituminous surfacing materials.
- Tack coats shall be the application of bituminous material to a previously constructed asphalt surface of any type in preparation of placing bituminous surfacing materials.
- Fog coat shall be the application of bituminous material to seal small cracks and surface voids and as a curing seal for Asphalt Stabilized Base Course.

**3.6 QUALITY CONTROL AND TESTING**

Copies of all quality control testing shall be forwarded for review to the BLC within five days of performance of the tests and prior to the issuance of a Construction Completion Certificate.





### 3.7 BRIDGES

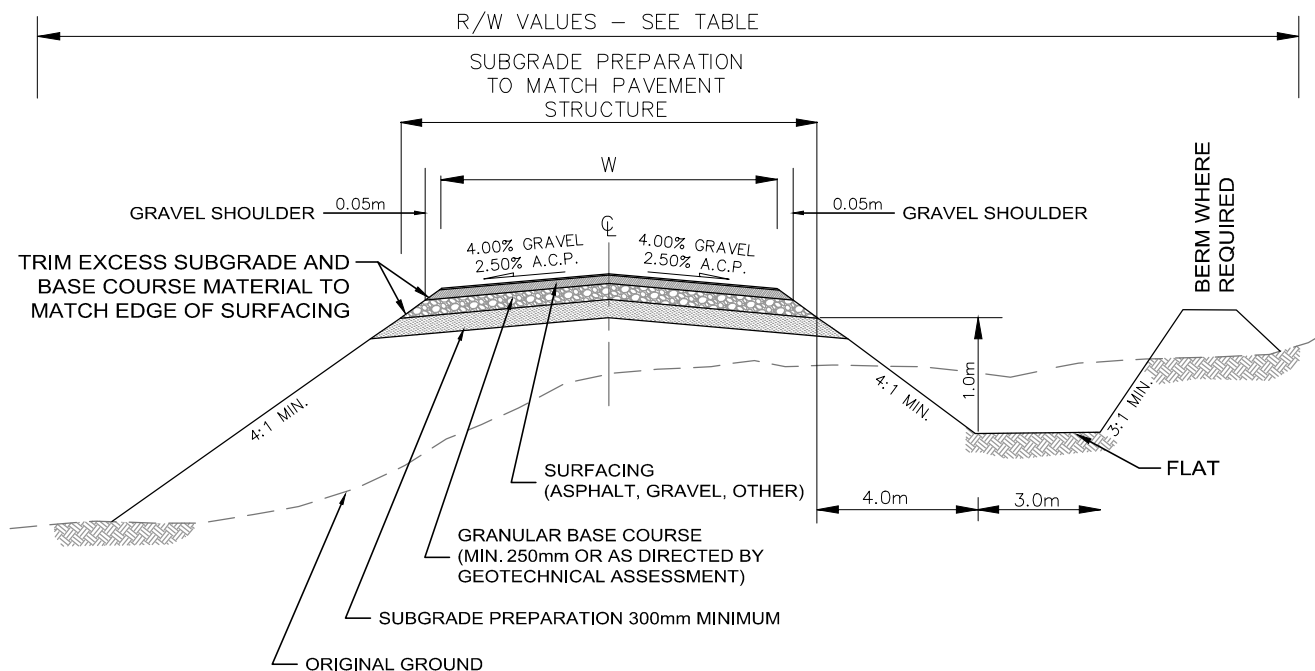
Any bridges shall follow the Transportation and Economic Corridors' bridges and structure technical standards.

All bridges must be designed by a certified Bridge Design Engineer.

Oilfield bridges, such as a "Bailey Bridge" must be certified as compliant with design standards by a professional engineer.







FILL SLOPE TABLE

DEPTH OF FILL	SLOPE
0 – 2.5m	4:1
2.5 – 3.5m	3:1
3.5 – 4.5m	2.5:1
> – 4.5m	GEOTECH. ASSESSMENT

ROAD CLASSIFICATION	ROADWAY	MIN. ROW
Farmland Access	7.0m	20m
Residential/Local	8.0m	30m
Minor Collector	9.0m	30m
Major Collector	10.0m	40m
Commercial/Industrial	9.0m	30m
Commercial/Industrial	10.0m	40m
Secondary & Primary Highways	11.0m	40m

NOTE:

- 1) ALL BACK SLOPES 3:1 UNLESS NOTED OTHERWISE.
- 2) SLOPES STEEPER THAN 3:1 REQUIRES 1m SHOULDER WIDENING & GUARD RAIL INSTALLATION.
- 3) FILL SLOPES GREATER THAN 3.5m AND/OR STEEPER THAN 3:1 REQUIRE GEOTECHNICAL DESIGN.
- 4) EROSION PROTECTION REQUIRED ON ALL EXPOSED CUT AND FILL SLOPES.

N.T.S.



# TYPICAL RURAL CROSS SECTION RURAL ROADS MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

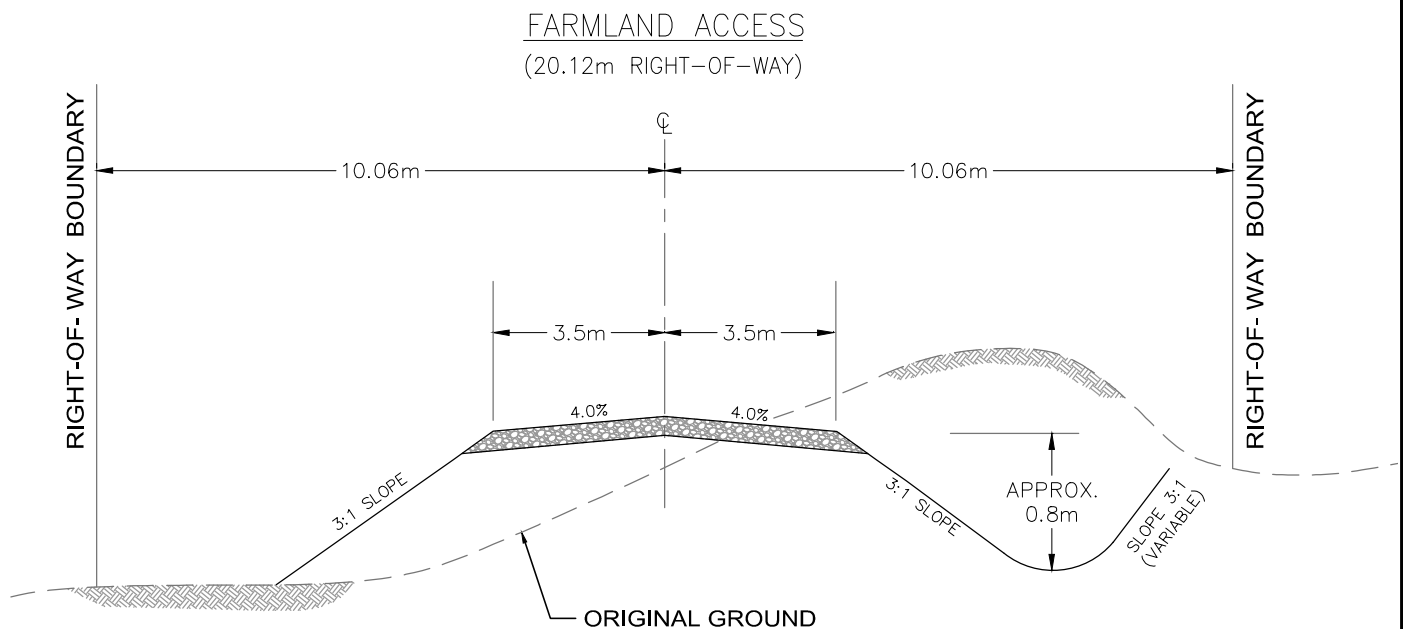
SEPT. 2023

REVISED:

DRAWING NO:

3.1





**NOTE:**

- 1) NON ENGINEERED ROAD
- 2) GRAVEL REQUIREMENTS (1st lift 4-40 SPEC., 2nd lift 4-25 SPEC.)  
NEW CONSTRUCTION – 250 Tonnes /Km (MINIMUM)  
MAINTENANCE – 150 Tonnes/Km (MINIMUM)
- 3) GRADE TO PROVIDE REASONABLE RIDEABILITY AT 40Km/hr
- 4) DITCH GRADES VARIABLE FOR POSITIVE DRAINAGE

SURFACE WIDTH (m)	R.O.W. REQUIRED (m)	NORMAL SIDE SLOPE	MAXIMUM SIDE SLOPE	NORMAL BACK SLOPE	MAXIMUM BACK SLOPE	MINIMUM CURVE RADIUS (m)	MAXIMUM SUPER ELEVATION (%)	MAXIMUM GRADIENT (%)
7.0	20.12	3:1	3:1	3:1	2:1	N/A	N/A	N/A

N.T.S.



**CROSS SECTION TYPICAL  
FARMLAND ACCESS  
MUNICIPAL SERVICING STANDARDS  
BIG LAKES COUNTY**

SPEC. REFERENCE

DATE: SEPT. 2023

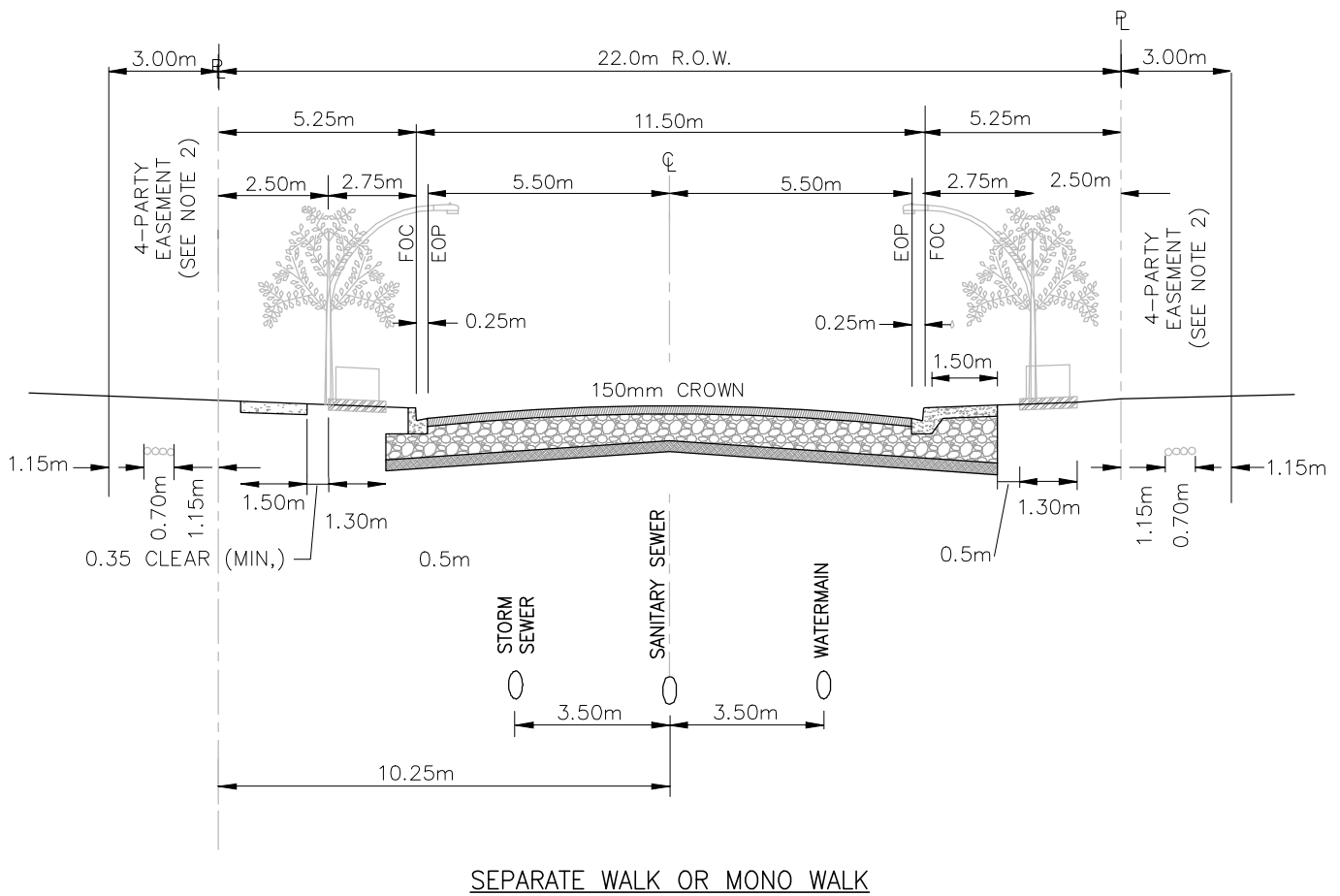
REVISED: -

DRAWING NO: **3.2**









**NOTE:**

- 1) 4-PARTY TRENCH CONTAINS GAS, POWER, PHONE AND CABLE LINES.
- 2) EOP- EDGE OF PAVEMENT.
- 3) FOC- FACE OF CURB.
- 4) HARD SURFACING ENTIRE BOULEVARD MAY BE REQUIRED FOR COMMERCIAL AREAS WHERE STORE FRONTS FACE THE STREET.

N.T.S.

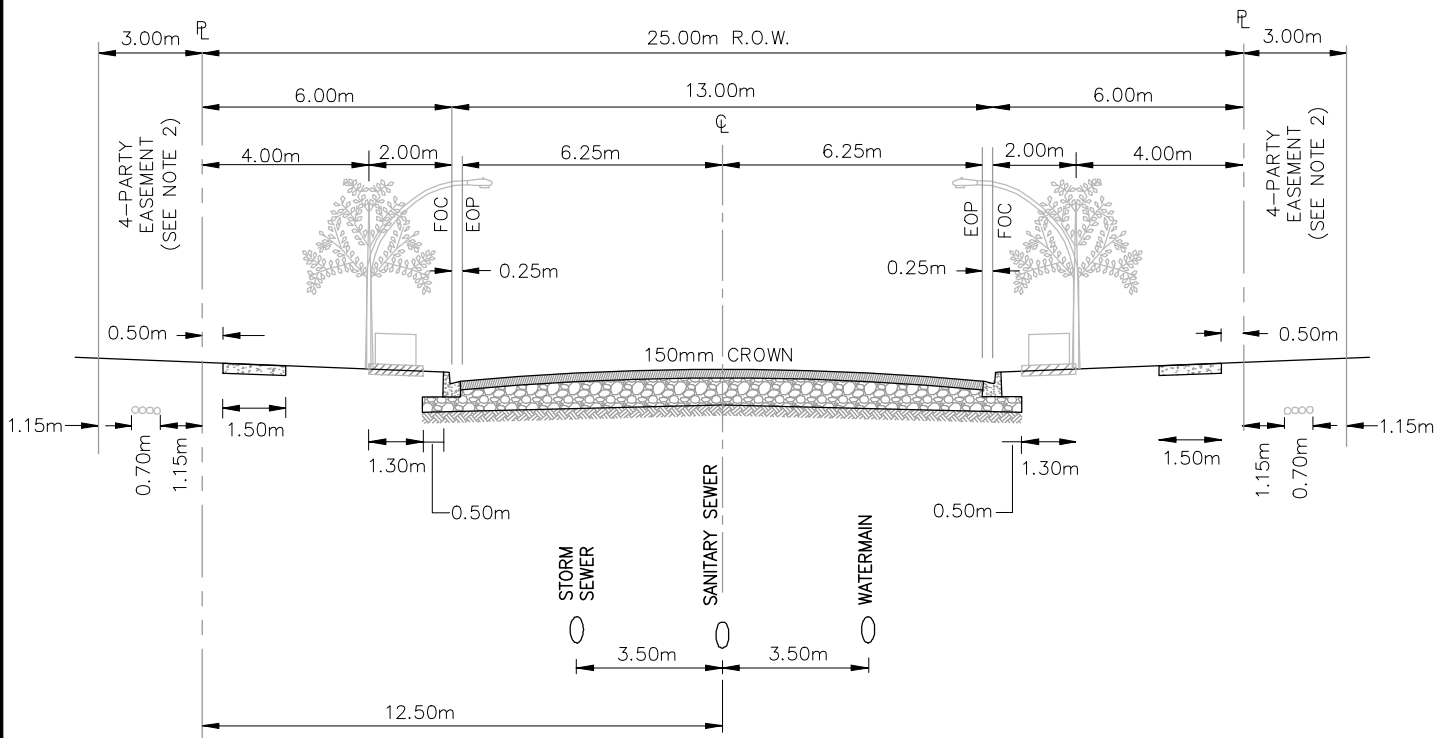


# **MINOR COLLECTOR RESIDENTIAL ROADWAYS MUNICIPAL SERVICING STANDARDS** BIG LAKES COUNTY

URBAN

SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	
DRAWING NO:	3.4





**NOTE:**

- 1) 4-PARTY TRENCH CONTAINS GAS, POWER, PHONE AND CABLE LINES.
- 2) EOP- EDGE OF PAVEMENT.
- 3) FOC- FACE OF CURB.
- 4) HARD SURFACING ENTIRE BOULEVARD MAY BE REQUIRED FOR COMMERCIAL AREAS WHERE STORE FRONTS FACE THE STREET.

N.T.S.



# MAJOR COLLECTOR MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

URBAN

SPEC. REFERENCE

DATE:

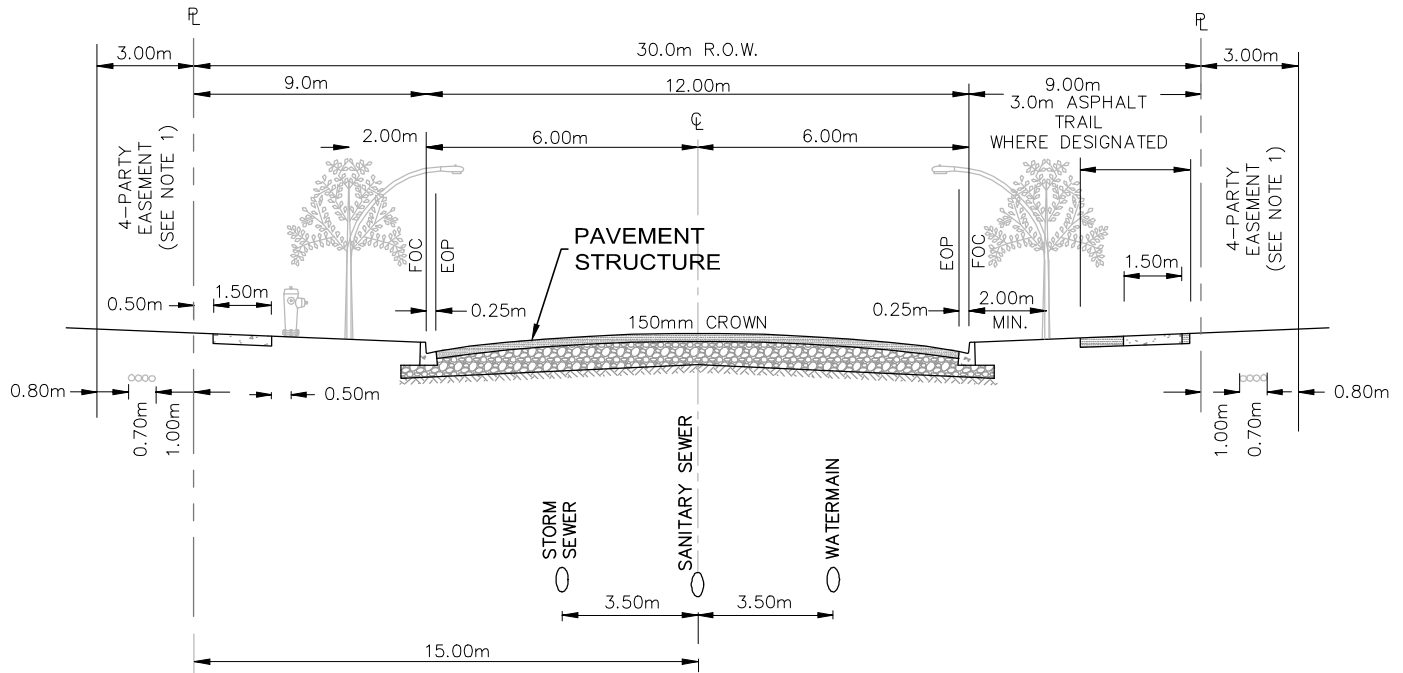
SEPT. 2023

REVISED:

DRAWING NO:

3.5





# URBAN COLLECTOR INDUSTRIAL/COMMERCIAL ROADWAY

Ⓟ = PARKING

## NOTES:

- 1) 4-PARTY TRENCH CONTAINS GAS, POWER, PHONE AND CABLE LINES.
- 2) EOP - EDGE OF PAVEMENT
- 3) FOC - FACE OF CURB

N.T.S.



## COLLECTOR INDUSTRIAL/COMMERCIAL ROADWAYS MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

URBAN

SPEC. REFERENCE

DATE:

SEPT. 2023

REVISED:

DRAWING NO:

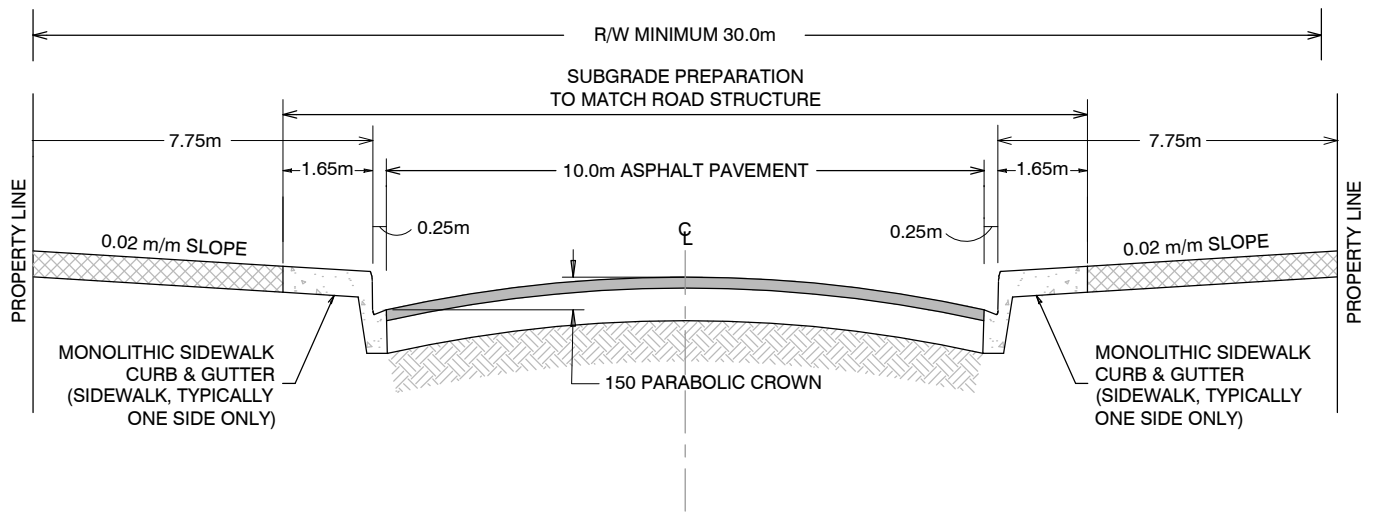
3.6





DRAWING NO: 3.7





STRUCTURE DESCR.	MIN. SPECIFICATION
SUBGRADE PREP.	300mm
BASE COURSE (GBC)	300mm
GRAVEL SURFACING	N/A
ASPHALT SURFACING	ASPHALT 80mm (HD, LIFT 1) 45mm (HD, LIFT 2)

Note:

1. LD = Low Density, HD = High Density
2. Road structure shown above is a minimum. All designs for pavement structures shall be prepared by a professional engineer.

N.T.S.



# ARTERIAL ROAD PAVED CURB & GUTTER (2 LANE) MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

URBAN

SPEC. REFERENCE

DATE:

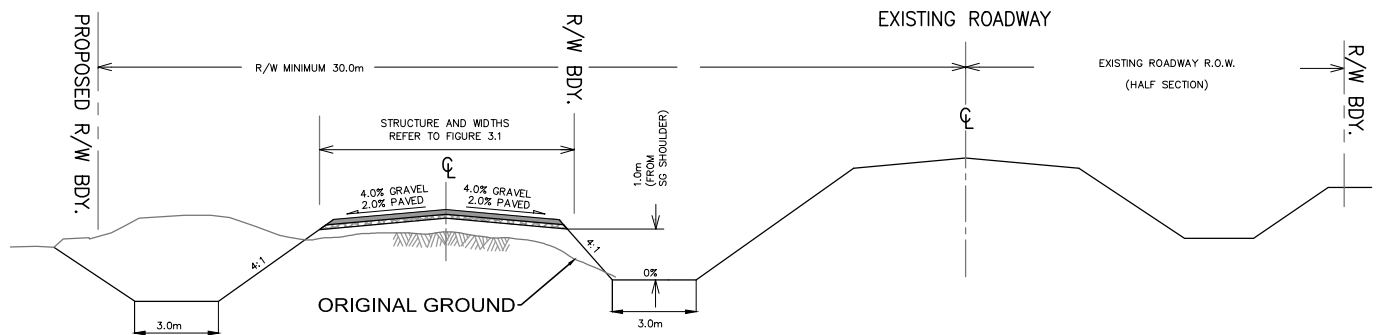
SEPT. 2023

REVISED:

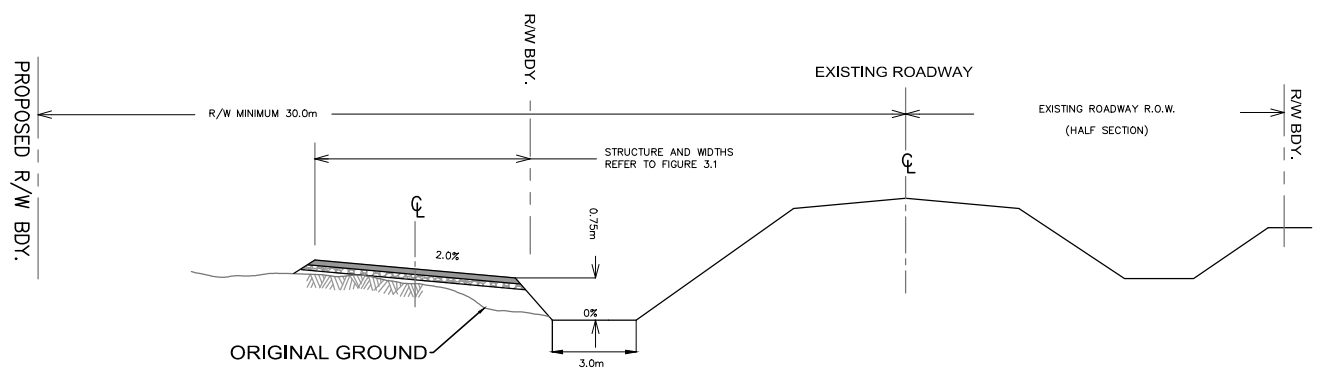
DRAWING NO:

3.8





ALTERNATIVE 1



ALTERNATIVE 2

N.T.S.



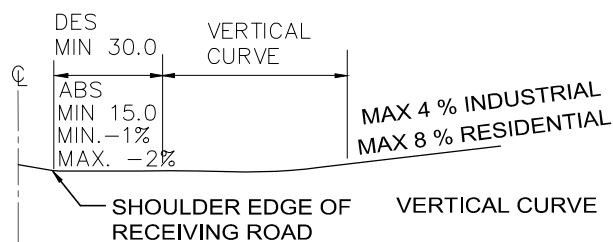
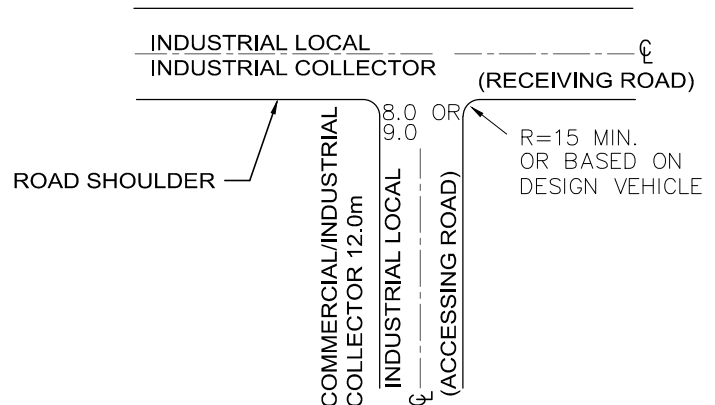
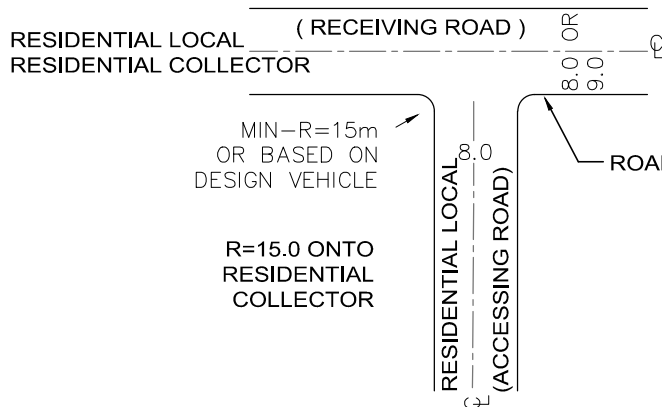
# SERVICE ROAD

## MUNICIPAL SERVICING STANDARDS

### BIG LAKES COUNTY

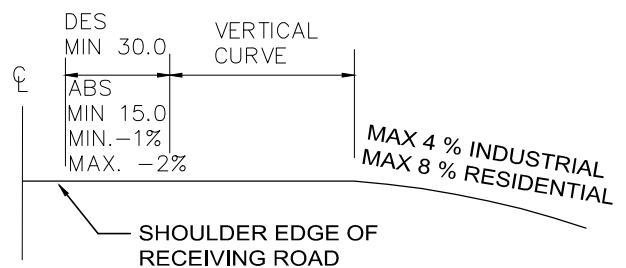
SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	
DRAWING NO:	3.9





PROFILE - ACCESSING ROAD IN CUT

NOTE;  
LENGTH OF VERTICAL CURVE SHALL BE  
ACCORDING TO TAC MANUAL



PROFILE - ACCESSING ROAD IN FILL

TABLE 1 - SUGGESTED APPROACH SIDESLOPES \*

	DESIRABLE SLOPE ON NEW APPROACH
RECEIVING ROAD <= 100 km/hr	4:1
RECEIVING ROAD POSTED > 100 km/hr	6:1

DIMENSIONS SHOWN IN METRES

N.T.S.



# DESIGN OF INTERSECTIONS

## MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

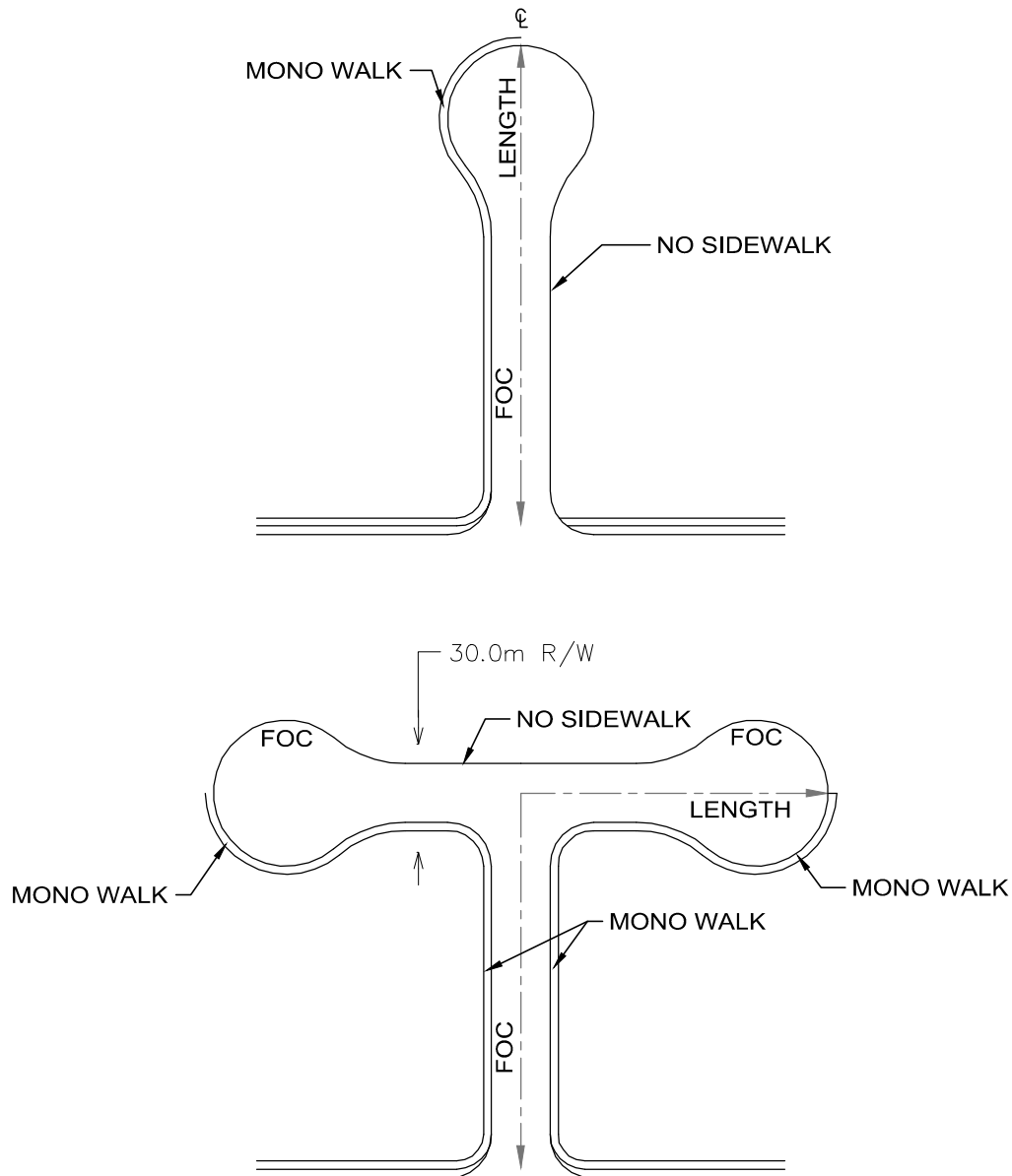
SPEC. REFERENCE

DATE: SEPT. 2023

REVISED:

DRAWING NO: 3.10





**NOTES:**

- 1) WHERE POSSIBLE, PROVIDE PEDESTRIAN CONNECTIVITY FROM TERMINUS OF CUL-DE-SAC TO REGIONAL TRAIL OR WALKWAY NETWORK, VIA A P.U.L.
- 2) ONLY APPLICABLE TO CUL-DE-SACS WITH FEWER THAN 18 LOTS AND LENGTH LESS THAN 120m. LARGER CUL-DE-SACS REQUIRE SIDEWALK ON BOTH SIDES.

N.T.S.



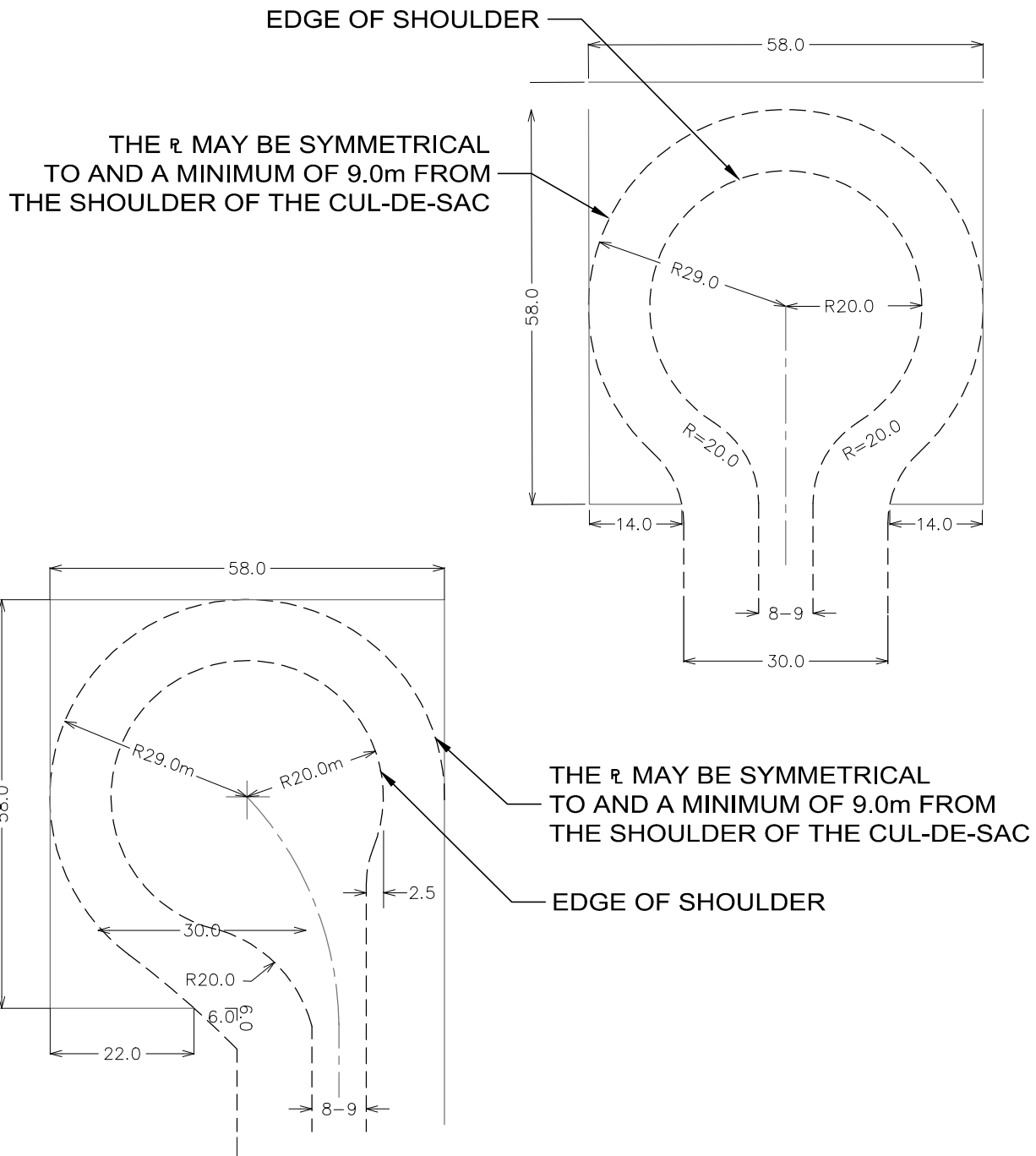
# CUL-DE-SAC SIDEWALK REQUIREMENTS

## MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	
DRAWING NO:	3.11





NOTE:  
THE MINIMUM CROWN SLOPE WITHIN THE  
CUL-DE-SAC SHALL BE 0.040 METRES/METRE

ALL DIMENSIONS ARE IN METRES

N.T.S.



COMMERCIAL / INDUSTRIAL  
CUL-DE-SAC  
MUNICIPAL SERVICING STANDARDS  
BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

SEPT. 2023

REVISED:

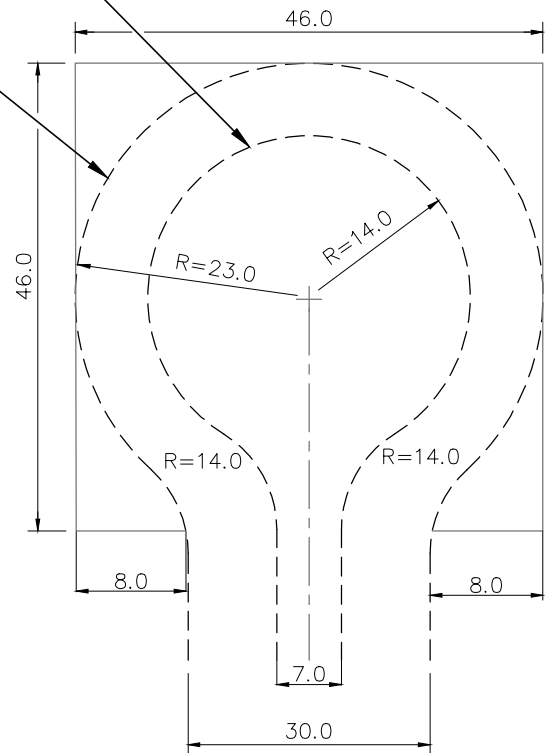
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3.12



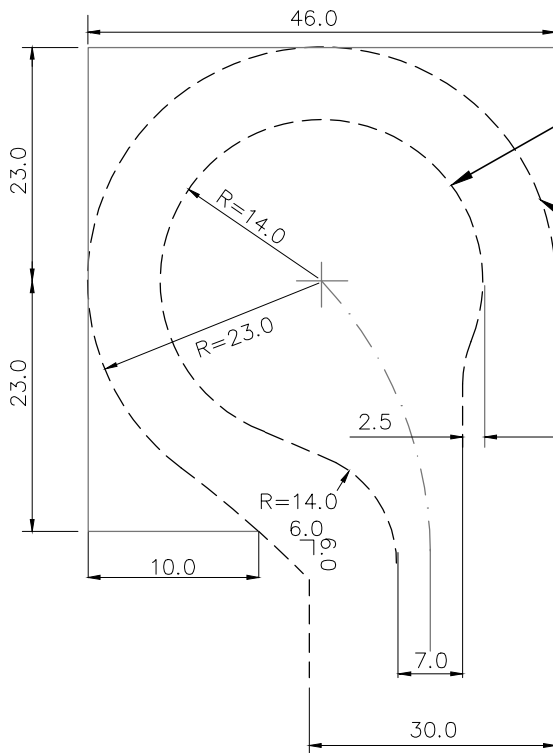
EDGE OF SHOULDER

THE  $r$  MAY BE SYMMETRICAL  
TO AND A MINIMUM OF 9.0m FROM  
THE SHOULDER OF THE CUL-DE-SAC



EDGE OF SHOULDER

THE  $r$  MAY BE SYMMETRICAL  
TO AND A MINIMUM OF 9.0m FROM  
THE SHOULDER OF THE CUL-DE-SAC



NOTE:  
THE MINIMUM CROWN SLOPE WITHIN THE  
CUL-DE-SAC SHALL BE 4%.

ALL DIMENSIONS ARE IN METRES

N.T.S.



# RESIDENTIAL CUL-DE-SAC

## MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

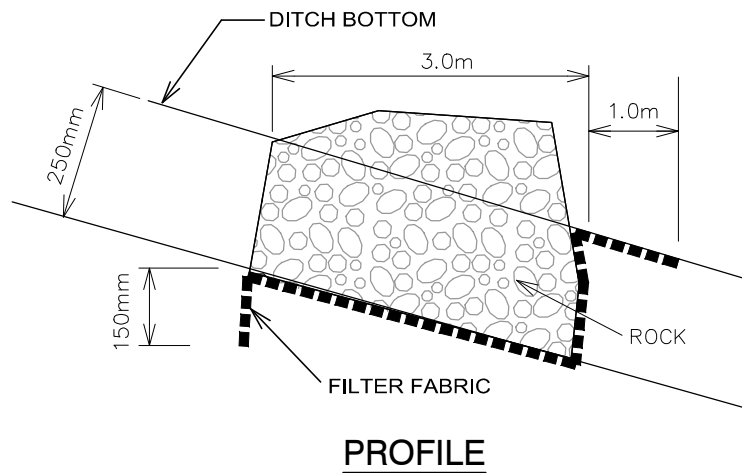
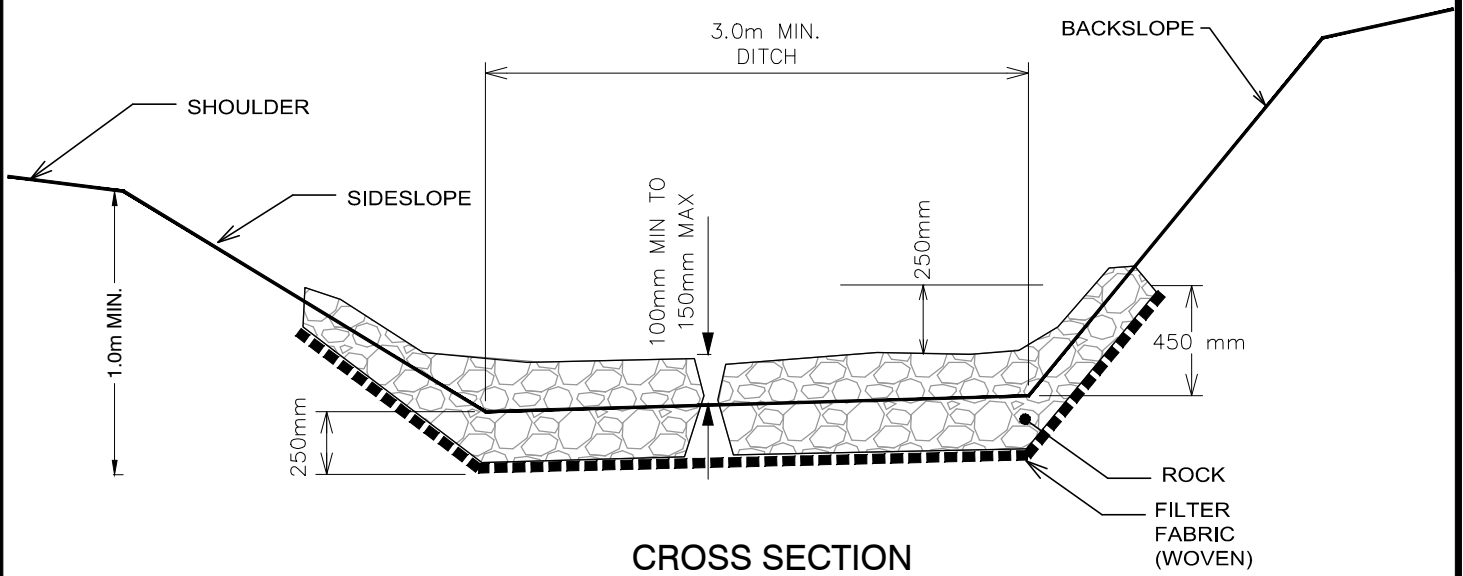
SEPT. 2023

REVISED:

DRAWING NO:

3.13





**NOTES:**

1. ROCK SHALL BE TRENCHED INTO THE SIDESLOPE AND BACKSLOPE AT A POINT AT LEAST 450mm ABOVE THE DITCH BOTTOM AND AT LEAST 250mm ABOVE THE LOW POINT OF THE SURFACE OF ROCK IN THE DITCH.
2. THE ROCK SHALL BE TRENCHED INTO THE DITCH BOTTOM AND SLOPES A MIN. OF 250mm. THE LOWEST POINT OF THE DITCH CHECK MUST BE A MIN. OF 100mm TO A MAX OF 150mm ABOVE THE DITCH BOTTOM.
3. ROCKS TO BE USED SHALL BE AS NEARLY CUBICAL IN FORM AS POSSIBLE AND MUST NOT BE SMALLER THAN 150mm.
4. ROCKS SHALL BE LAID IN CLOSE CONTACT SO AS TO BREAK JOINTS WITH THE LARGER STONES ON THE BOTTOM.
5. FILTER FABRIC SHALL BE PLACED IN THE BOTTOM OF THE TRENCH.

N.T.S.



# **ROCK DITCH CHECKS** **MUNICIPAL SERVICING STANDARDS** **BIG LAKES COUNTY**

SPEC. REFERENCE

DATE:

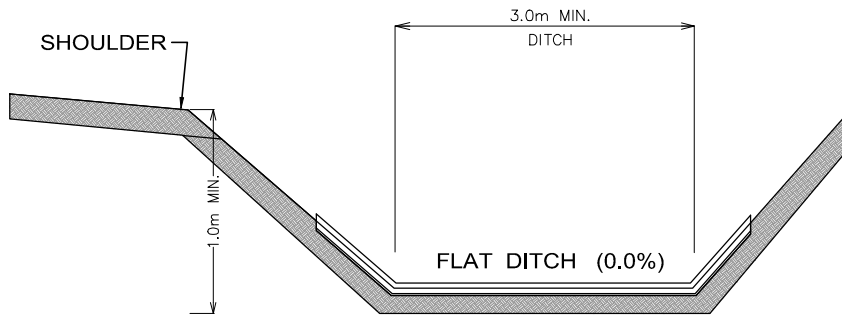
SEPT. 2023

REVISED:

DRAWING NO:

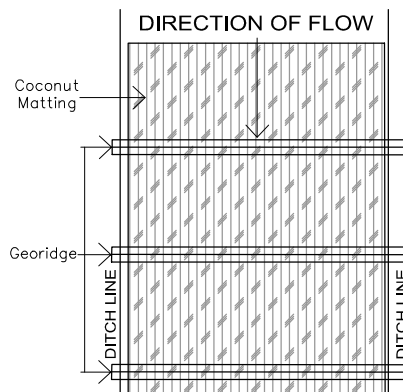
**3.14**



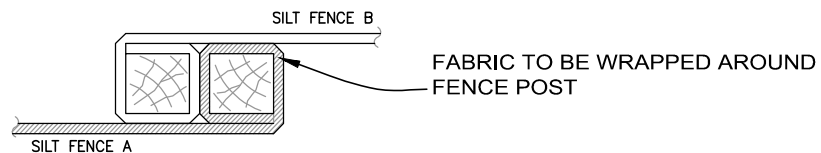
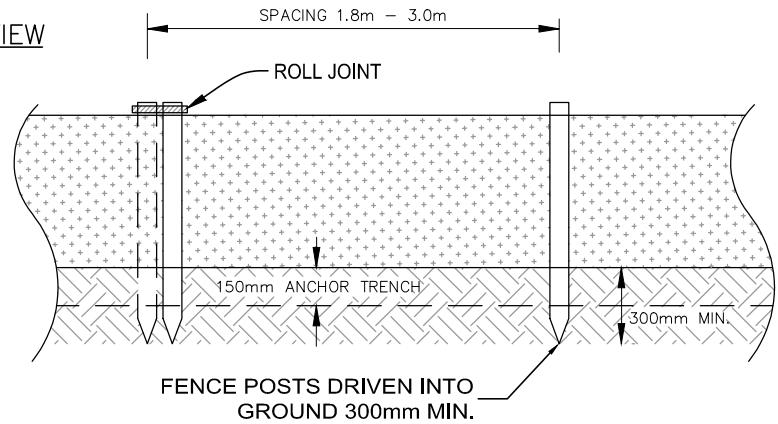


X-SECTION VIEW

## SILT FENCE

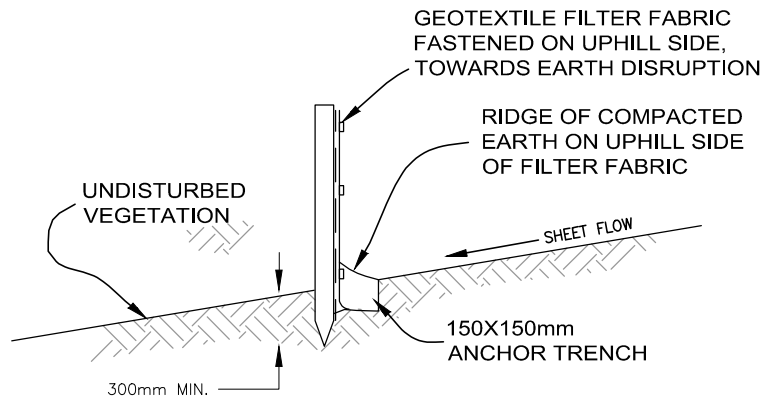


TOP VIEW



ROLL JOINTS

- 1 EROSION CONTROL MATTING SHALL INTERSECT AND BE TRENCHED INTO THE SIDESLOPE AND BACKSLOPE AT LEAST 300mm ABOVE THE LOWEST POINT IN THE SURFACE OF THE MATTING IN THE DITCH. COCONUT MATTING OR AN EQUIVALENT PRODUCT (AS APPROVED BY THE COUNTY) SHALL BE USED.
- 2 GEORIDGE SHALL BE USED IN CONJUNCTION WITH EROSION CONTROL MATTING AND PROPERLY ANCHORED TO THE SUB-GRADE AS PER THE MANUFACTURER'S RECOMMENDATIONS.
- 3 SPACING OF THE GEORIDGE SHALL MEET MANUFACTURER'S RECOMMENDATIONS AND SPECIFIC TO THE DESIGN REQUIREMENTS FOR THE PROJECT.
- 4 WHERE DITCHES LEAD TO A DRAINAGE COURSE AND/OR CREEK, RIVER OR WATER BODY, SILT FENCING WILL BE REQUIRED PRIOR TO THE INLET DURING CONSTRUCTION TO PREVENT SEDIMENTATION FROM ENTERING THE FEATURE.
- 5 PROJECT SPECIFIC REQUIREMENTS MAY NECESSITATE THE DESIGN OF OTHER EROSION AND SEDIMENT CONTROL PRODUCTS AS APPROVED BY THE M.D.. AN EROSION AND CONTROL SEDIMENT PLAN (ESC) MAY BE REQUIRED.
- 6 TO BE INSTALLED AS PER MANUFACTURERS SPECIFICATIONS OR B.M.P. (BEST MANAGEMENT PRACTICES).



N.T.S.



# GEORIDGE / COCONUT MATTING AND SILT FENCE DITCH CHECKS MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

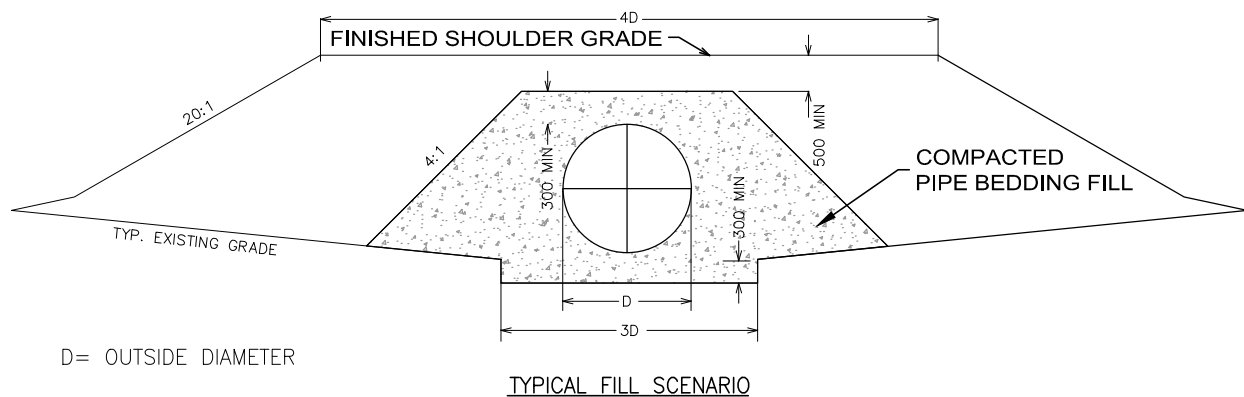
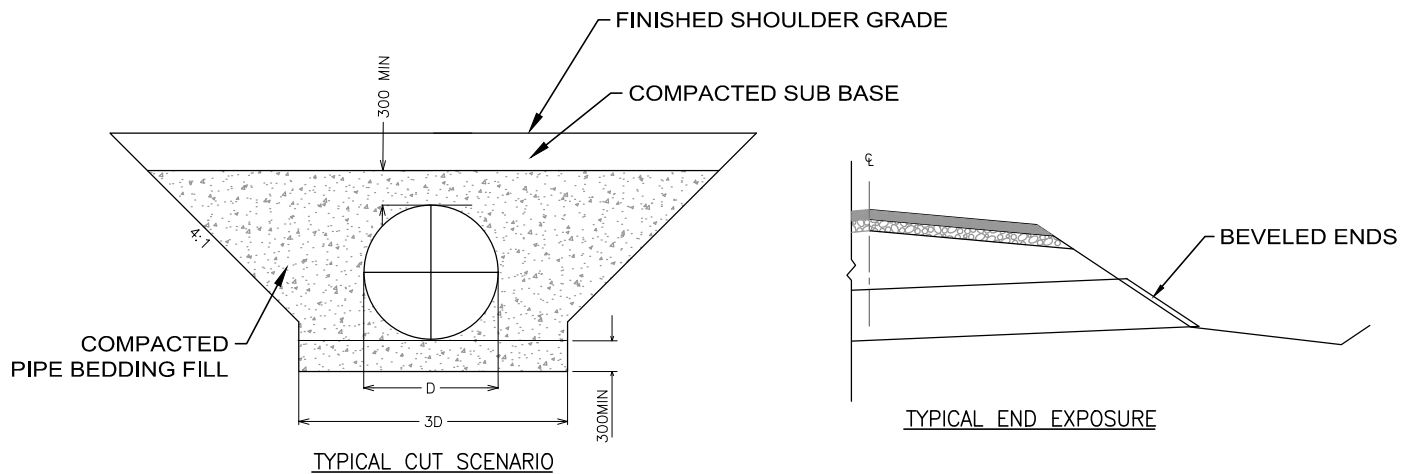
SEPT. 2023

REVISED:

DRAWING NO:

3.15





D= OUTSIDE DIAMETER

#### NOTES:

1. SELECT DRY MATERIAL SHALL BE PLACED IN 150mm COMPACTED LIFTS. A 600mm LONG CLAY PLUG SHALL BE PLACED AT INLET & OUTLET ENDS OF THE PIPE.
2. IN SOFT WET AREAS (ie MUSKEG) DEPTH OF SUBCUT BELOW THE PIPE WILL BE DETERMINED BY THE DEVELOPERS ENGINEER AS APPROVED BY THE COUNTY.
3. WHEN PIPES ARE PLACED PRIOR TO EMBANKMENT CONSTRUCTION, A MINIMUM OF 1000mm OF MATERIAL SHALL BE PLACED OVER TOP OF PIPES FOR PROTECTION DURING CONSTRUCTION OR AS APPROVED BY MD.
4. ALL CULVERT INVERTS WILL BE STAKED IN THE FIELD BY THE DEVELOPERS ENGINEER.
5. THROUGH GRADE: 800mm , RESIDENTIAL APPROACH : 500mm , INDUSTRIAL APPROACH : 600mm OR AS APPROVED BY THE COUNTY.
6. SLOPED END PIPES ONLY.
7. STRAIGHT END PIPES ONLY TO BE USED IN SPECIAL CIRCUMSTANCES AS APPROVED BY THE COUNTY.

ALL DIMENSIONS ARE IN METRES

N.T.S.



## CULVERT INSTALLATION

### MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

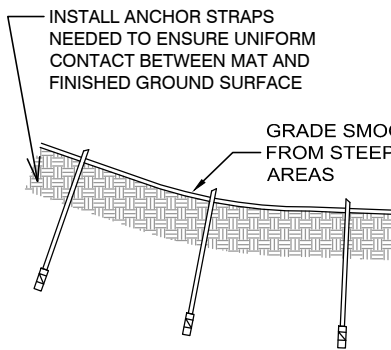
SEPT. 2023

REVISED:

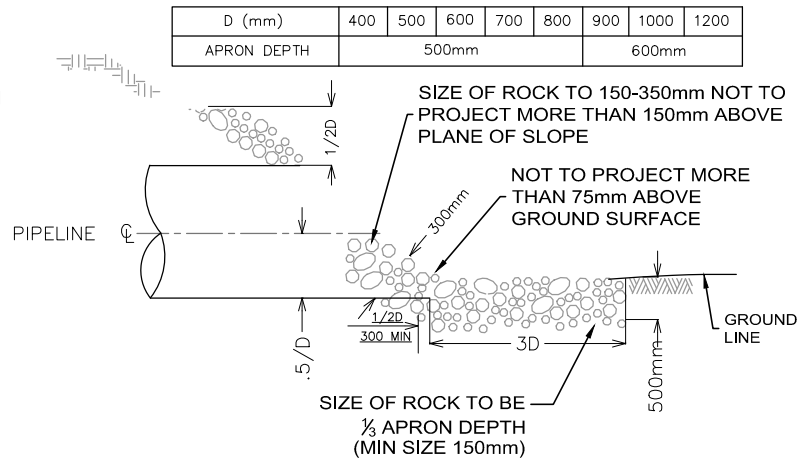
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3.16



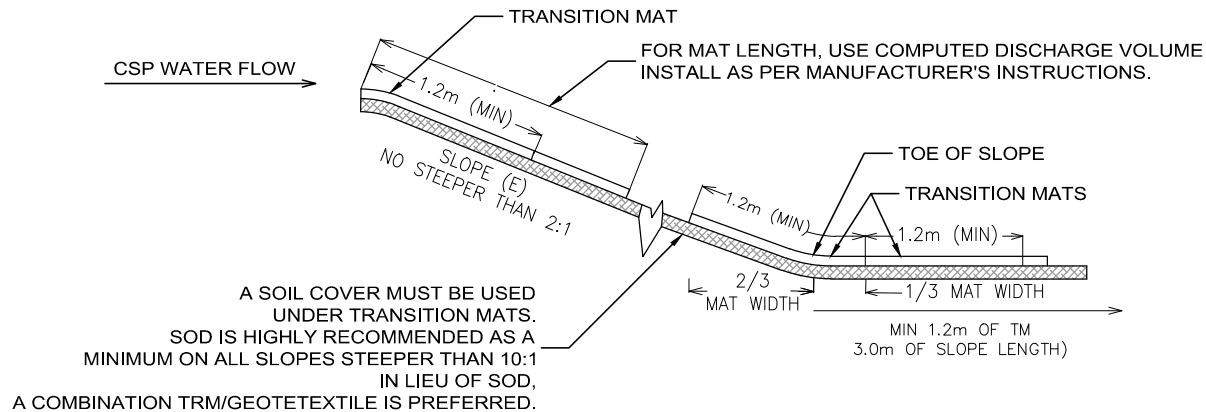


TOE OF SLOPE INSTALLATION  
N.T.S.



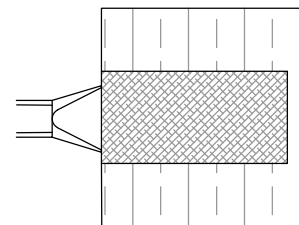
RIP RAP DETAIL  
N.T.S.

SECTION A-A  
N.T.S.



SCOURSTOP TRANSITION MAT DETAIL  
N.T.S.

PIPE DIAMETER	SCOURSTOP WIDTH X LENGTH
300 mm	1.2 X 1.2 m
500 mm	1.2 X 2.0 m
600 mm	1.2 X 2.4 m
800 mm	2.4 X 3.2 m
900 mm	2.4 X 3.6 m
1000 mm	2.4 X 4.0 m
1200 mm	3.6 X 4.8 m
1500 mm	3.6 X 6.1 m



STAPLE SOD EVERY 250mm  
WITHIN 100mm OF LEADING  
EDGE AND RANDOMLY THROUGHOUT

STAPLED SOD DETAILS  
N.T.S.

ALL DIMENSIONS ARE IN MILLIMETRES

N.T.S.



# GENERAL RIP RAP FOR CULVERTS MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

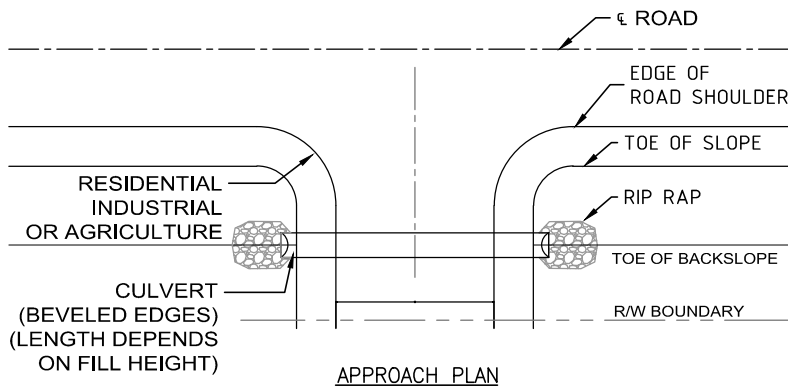
DATE: SEPT. 2023

REVISED:

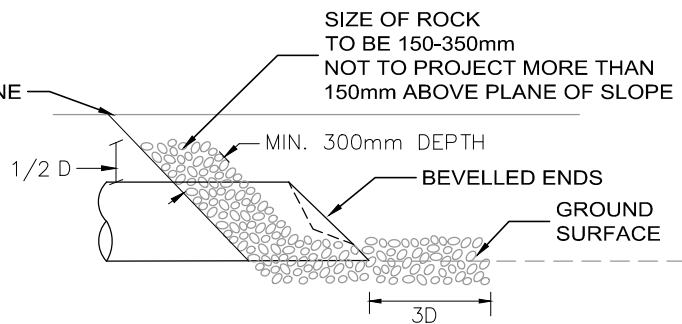
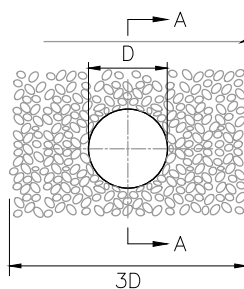
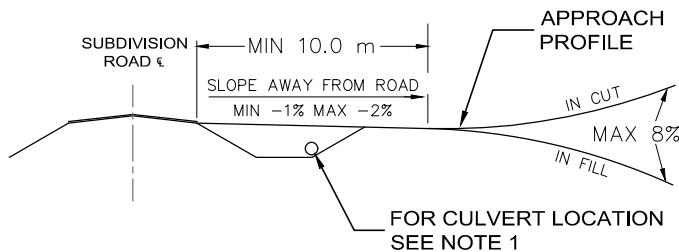
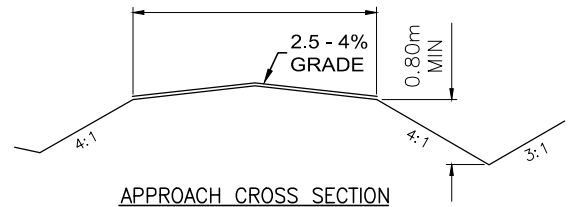
DRAWING NO:

3.17





MIN. APPROACH WIDTHS  
REFER TO DRAWING 3.1



#### NOTES:

- WHEN CULVERTS ARE REQUIRED, THEY MUST BE NEW GALVANIZED CORRUGATED STEEL PIPE (CSP) WITH 3:1 BEVELED ENDS AND BE THE FOLLOWING DIAMETERS:
  - RESIDENTIAL - 500 mm UNLESS APPROVED BY THE COUNTY.
  - THROUGH-GRADE - 800 mm UNLESS APPROVED BY THE COUNTY.
  - INDUSTRIAL - 600 mm UNLESS APPROVED BY THE COUNTY.
 STRAIGHT END PIPES SHALL BE USED EXCEPT FOR PAVED ROAD, WHICH SHALL UTILIZE SLOPED ENDS.  
 CULVERT LENGTH WILL VARY WITH DEPTH OF FILL.  
 CULVERT TO BE PLACED  $\frac{1}{2}$  CULVERT DIAMETER INTO THE TOE OF BACKSLOPE.  
 MINIMUM COVER OVER CSP - 300mm OR AS SPECIFIED BY A PROFESSIONAL ENGINEER.
- SURFACE STRUCTURE TO MATCH ADJOINING ROAD STRUCTURE  
 NOTE: CSP TO BE COUNTERSUNK - DIAMETER DIVIDED BY 4.

DIMENSIONS SHOWN IN METRES

N.T.S.



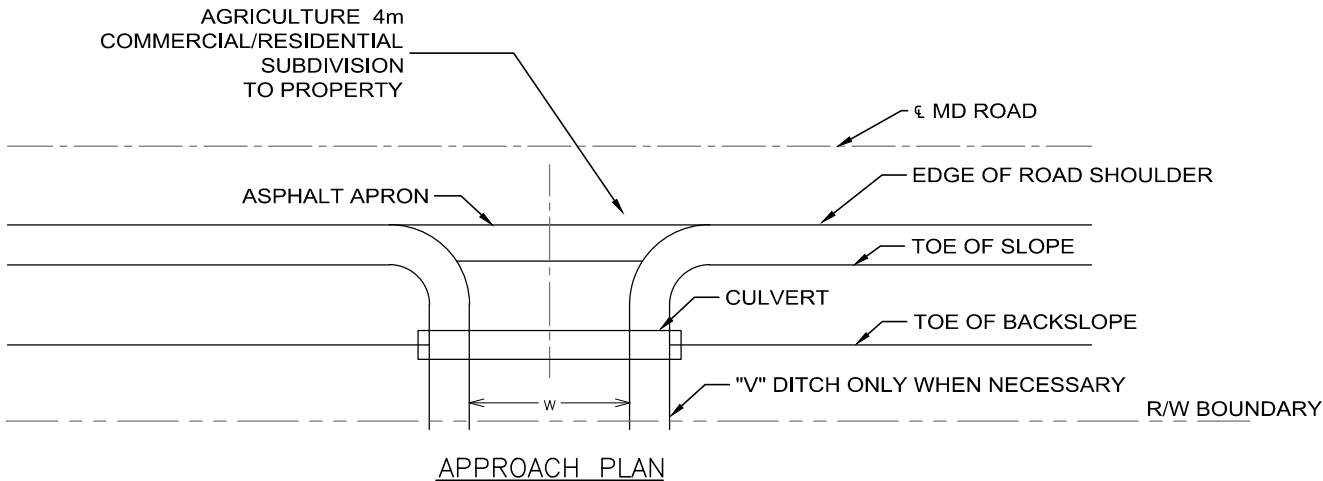
# RESIDENTIAL, COMMERCIAL & INDUSTRIAL APPROACHES

## MUNICIPAL SERVICING STANDARDS

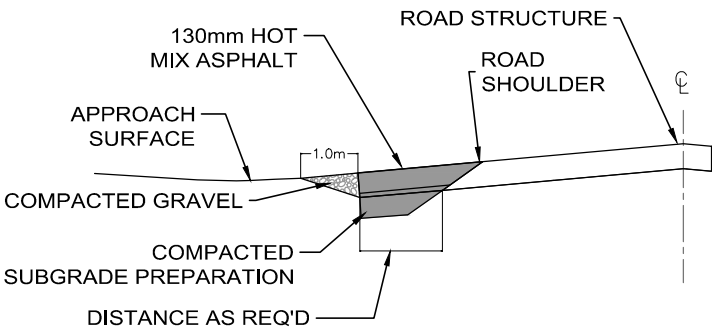
BIG LAKES COUNTY

SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	
DRAWING NO:	3.18

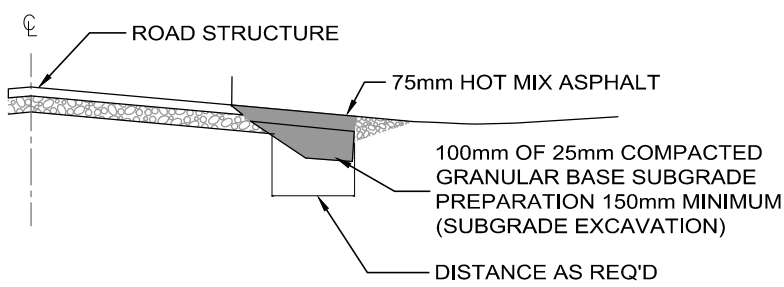




NOTE:  
INDUSTRIAL / COMMERCIAL APRONS TO BE  
CONSTRUCTED TO MATCH EXISTING ROAD  
STRUCTURE AND TO DISTANCE IDENTIFIED



NOTE:  
PRIVATE ASPHALT APRON TO EXTEND  
REQUIRED DISTANCE FROM SHOULDER OF  
PAVED COUNTY OR SUBDIVISION ROADS.



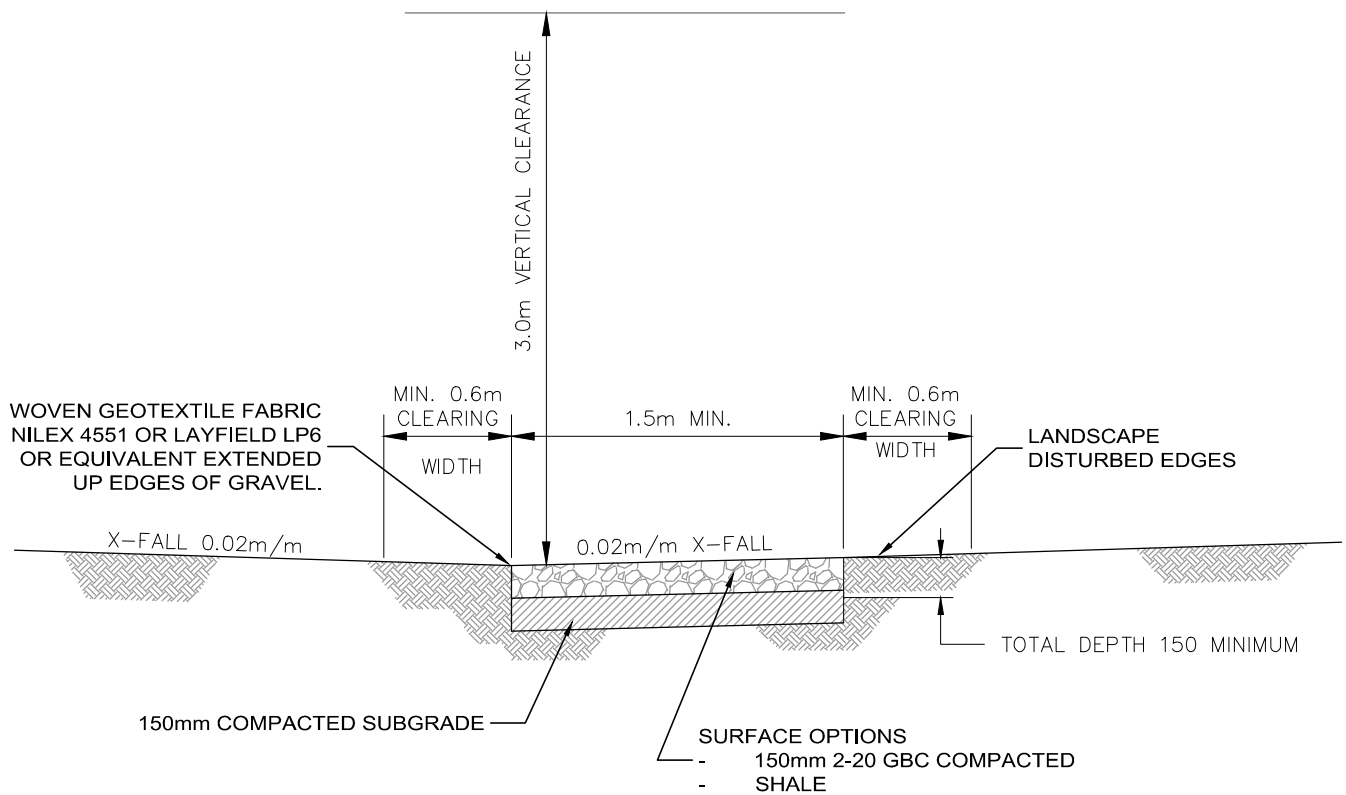
N.T.S.



# ASPHALT APRONS MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE
DATE: SEPT. 2023
REVISED:
DRAWING NO: 3.19





TYPICAL SECTION

NOTES:

1. ASPHALT STRUCTURES TO BE DESIGNED BY A PROFESSIONAL ENGINEER.

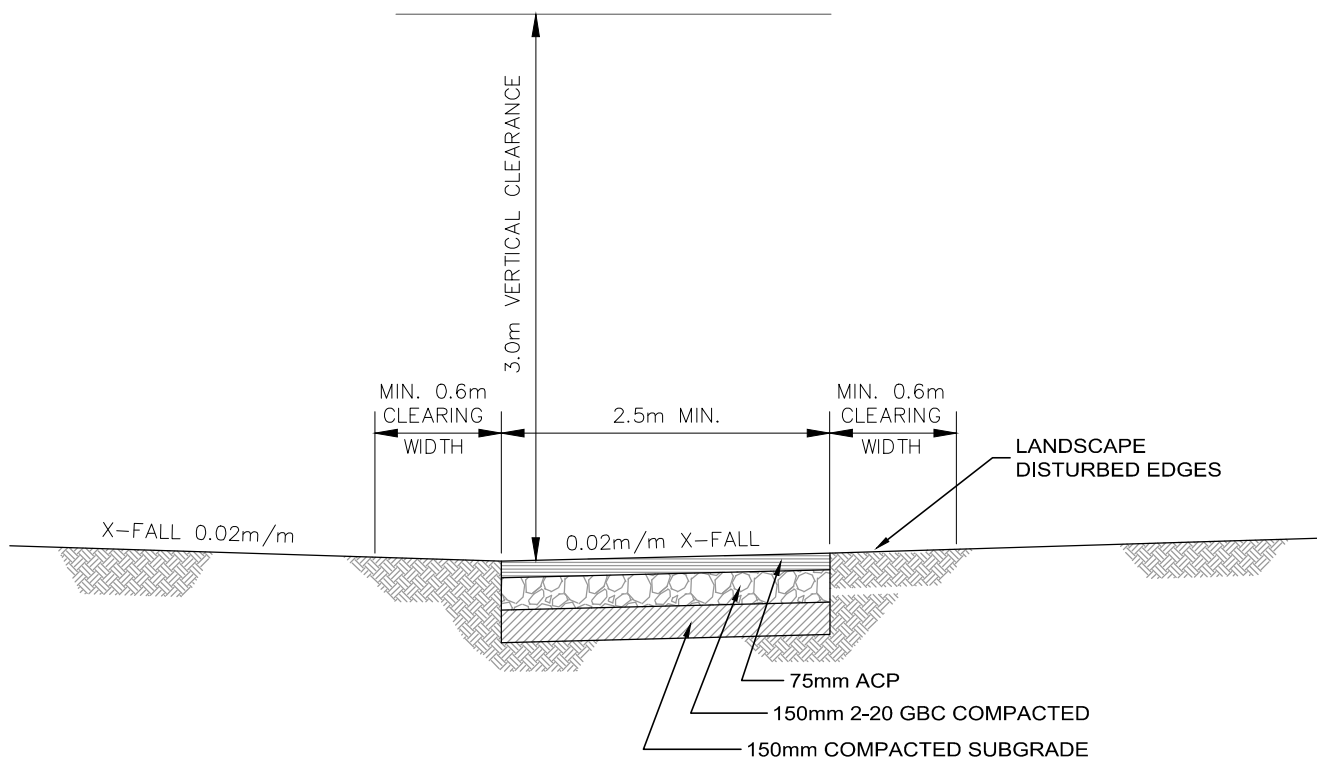
N.T.S.



# GRANULAR WALKWAYS MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	
DRAWING NO:	3.20





TYPICAL SECTION

NOTES:

1. FOR BIKEWAY WIDTH 3.0m OR GREATER, A 100mm SOLID YELLOW CENTRE LINE IS REQUIRED.
2. ASPHALT STRUCTURE TO BE DESIGNED BY A PROFESSIONAL ENGINEER.

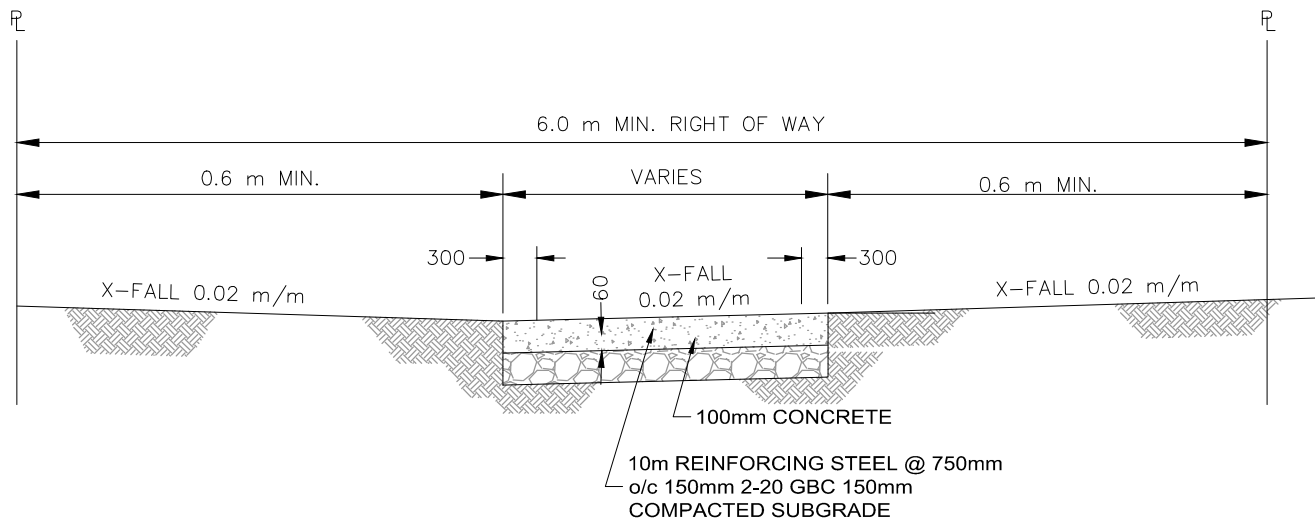
N.T.S.



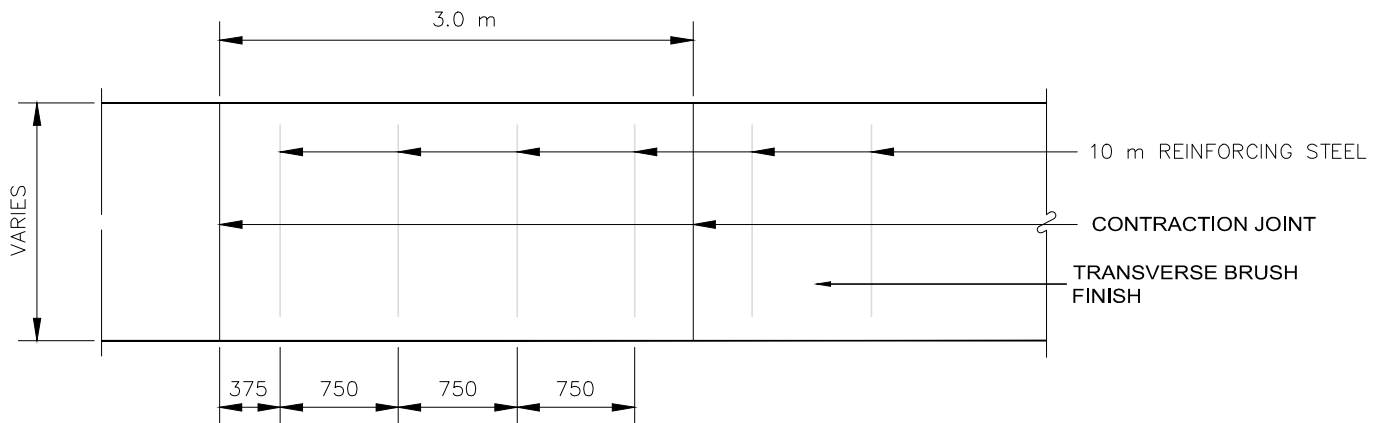
# ASPHALT WALKWAY / BIKEWAY MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	
DRAWING NO:	3.21





TYPICAL SECTION



PLAN VIEW  
N.T.S.

ALL DIMENSIONS IN  
MILLIMETRES UNLESS  
OTHERWISE NOTED

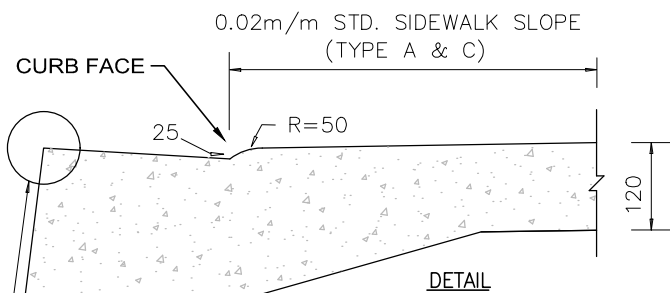
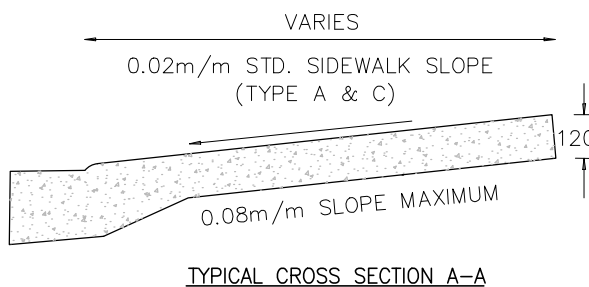
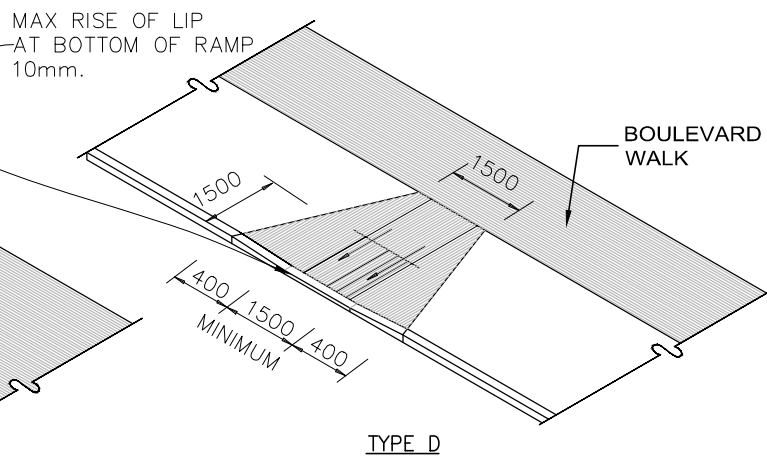
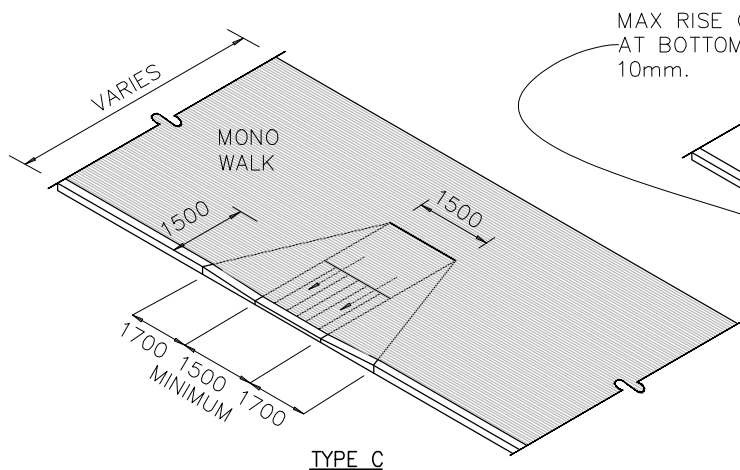
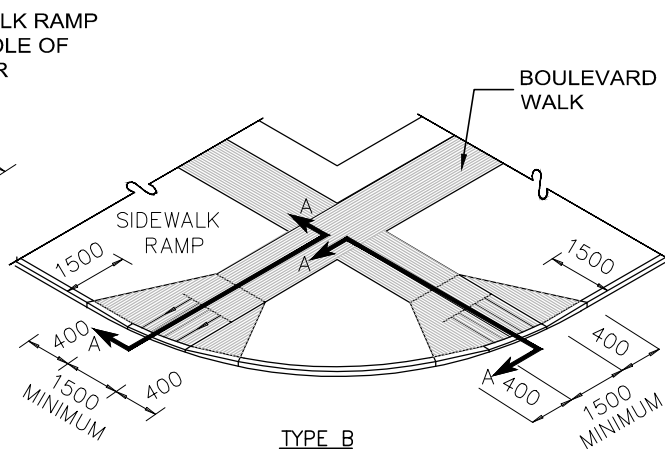
N.T.S.



# CONCRETE WALKWAY GREATER THAN 1.5 M WIDTH MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	
DRAWING NO:	3.22





- b) IF ASPHALT TOPLIFT IS DEFERRED, PLACE ASPHALT RAMP FOR THE WIDTH OF PARARAMP, AND EXTEND MINIMUM 1.0m INTO ROAD.

NOTES:

1. TOOLED GROOVES 5mm WIDE X 10mm DEEP, BROOM FINISH GROOVE MINIMUM 1.0m SPACING 150mm o.c. ADJACENT TO CURB.
2. WHERE RAMP IS TO BE USED AS A TRANSITION, USE THE CENTRE OF
3. CURBS AND RAMPS TO BE POURED MONOLITHICALLY.
4. IT MAY BE NECESSARY TO BUILD RAMPS WIDER AT HIGH VOLUME PEDESTRIAN TRAFFIC LOCATIONS.
5. WHEN THE CURB RETURN RADIUS IS LESS THAN 4.0m TWO RAMPS ARE REQUIRED.

ALL DIMENSIONS IN  
MILLIMETRES UNLESS  
OTHERWISE NOTED

N.T.S.



# CURB RAMP

## MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE

DATE: \_\_\_\_\_

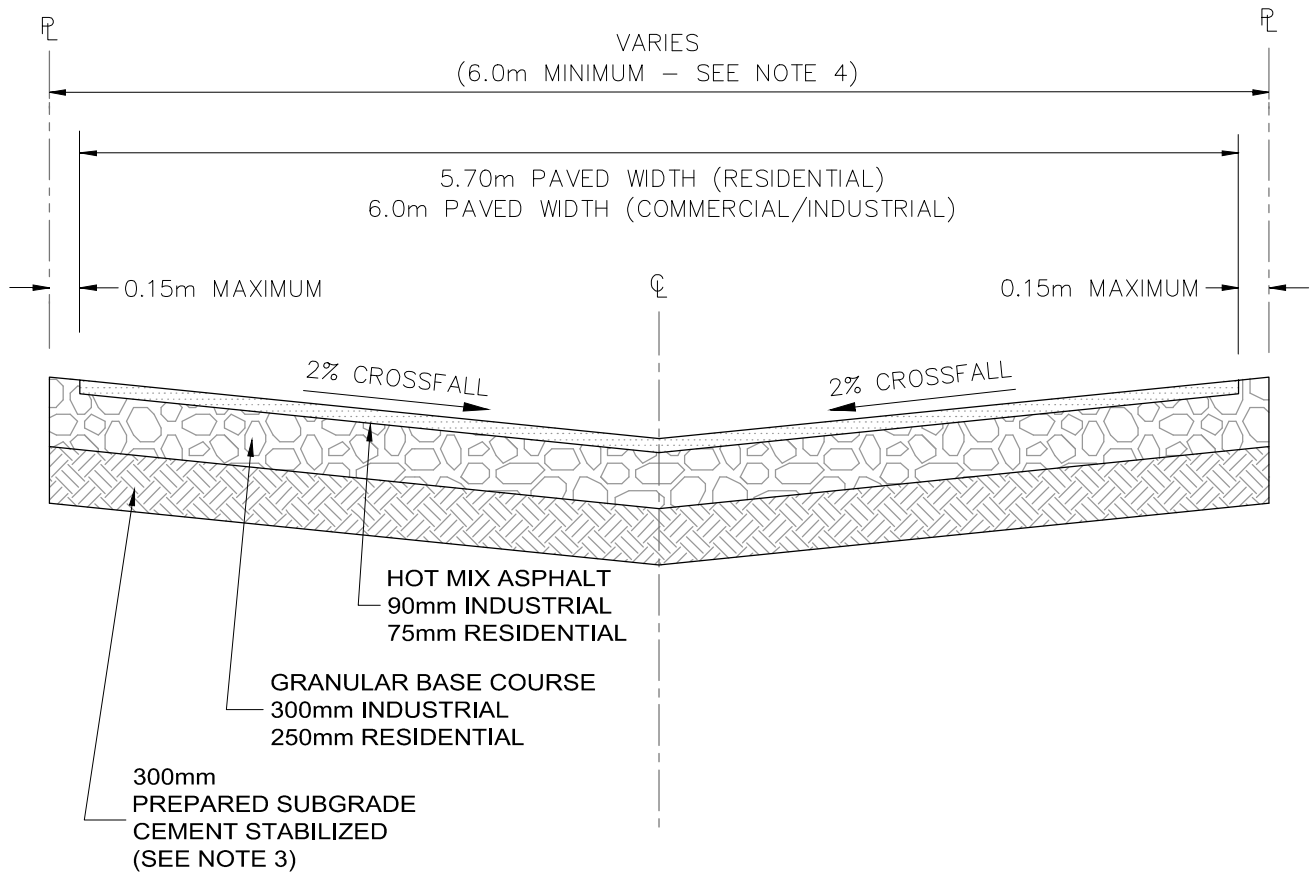
SEPT. 2023

REVISÉ:

DRAWING NO:

### 3.23





**NOTES:**

- 1) PROVIDE FULL DEPTH ASPHALT PAVEMENT STRUCTURE TO ADJACENT HARD SURFACED PARKING AREAS.
- 2) WATER AND SANITARY SERVICING IN LANES ONLY UPON MUNICIPALITY APPROVAL.
- 3) CEMENT STABILIZED SUBGRADE PREPARATION 16kg/m<sup>2</sup>, to 30kg/m<sup>2</sup>, 300mm DEPTH.
- 4) WIDTH TO BE MINIMUM 6.0m FOR LANES WITH UP TO ONE DEEP UTILITY. ADD MINIMUM 3.0m FOR EACH ADDITIONAL DEEP UTILITY.

N.T.S.



**TYPICAL LANE  
CROSS SECTION  
MUNICIPAL SERVICING STANDARDS  
BIG LAKES COUNTY**

SPEC. REFERENCE

DATE:

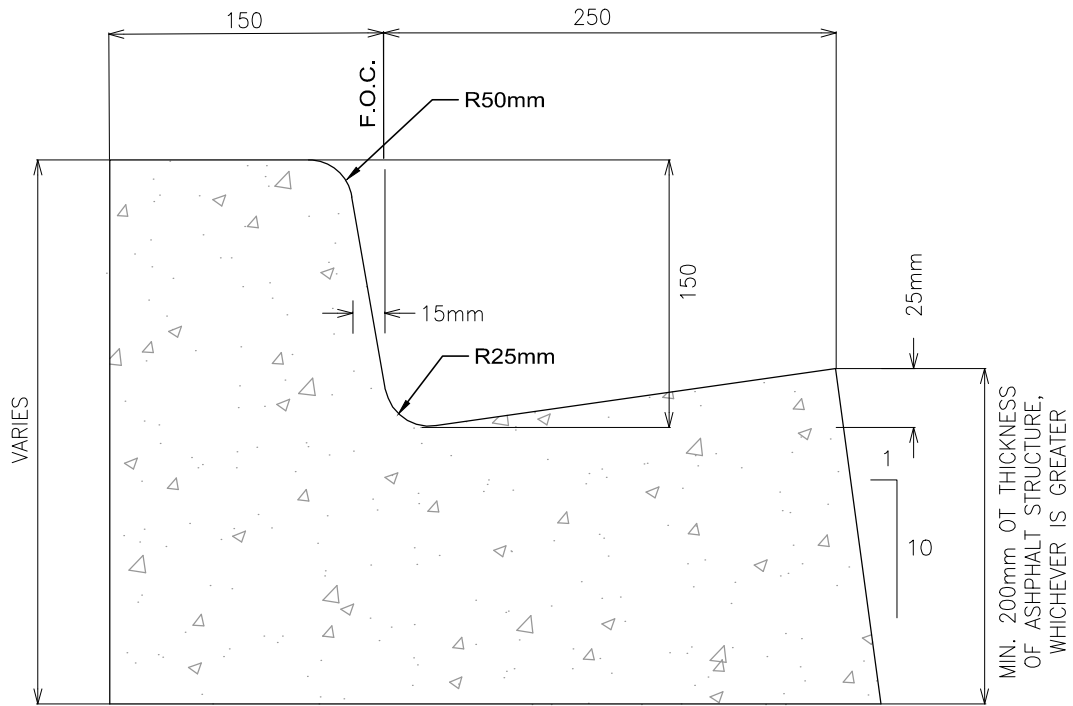
SEPT. 2023

REVISED:

DRAWING NO:

**3.24**





ALL DIMENSIONS  
IN MILLIMETERS UNLESS  
OTHERWISE NOTED

N.T.S.



# STRAIGHT FACED CURB AND GUTTER

## MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

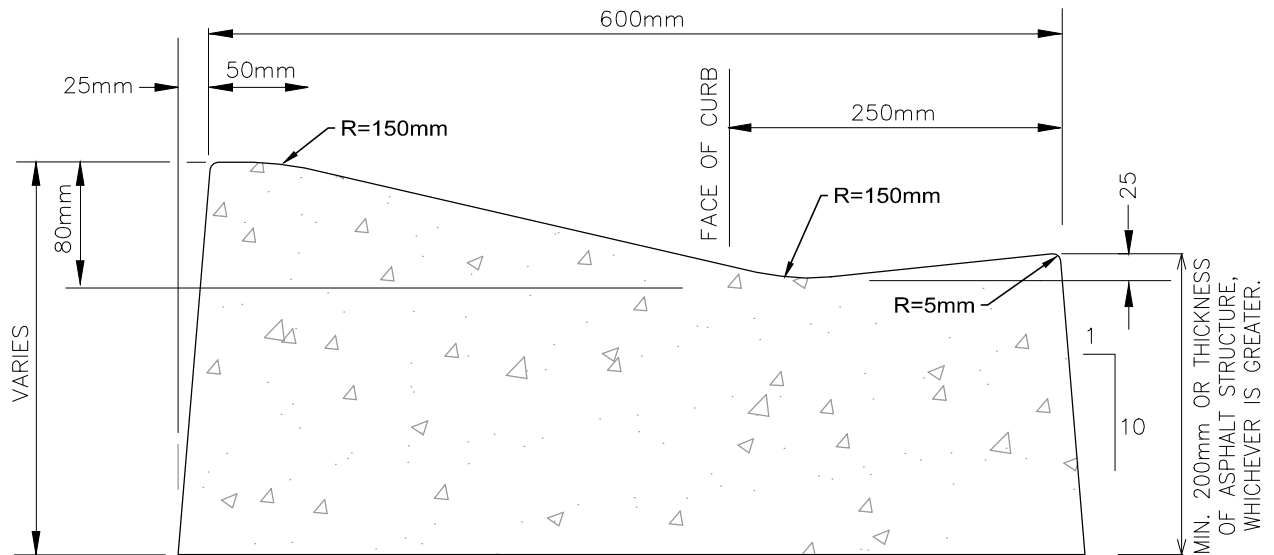
SEPT. 2023

REVISED:

DRAWING NO:

3.25





ALL DIMENSIONS  
IN MILLIMETERS UNLESS  
OTHERWISE NOTED

N.T.S.



# ROLLED FACE CURB AND GUTTER MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

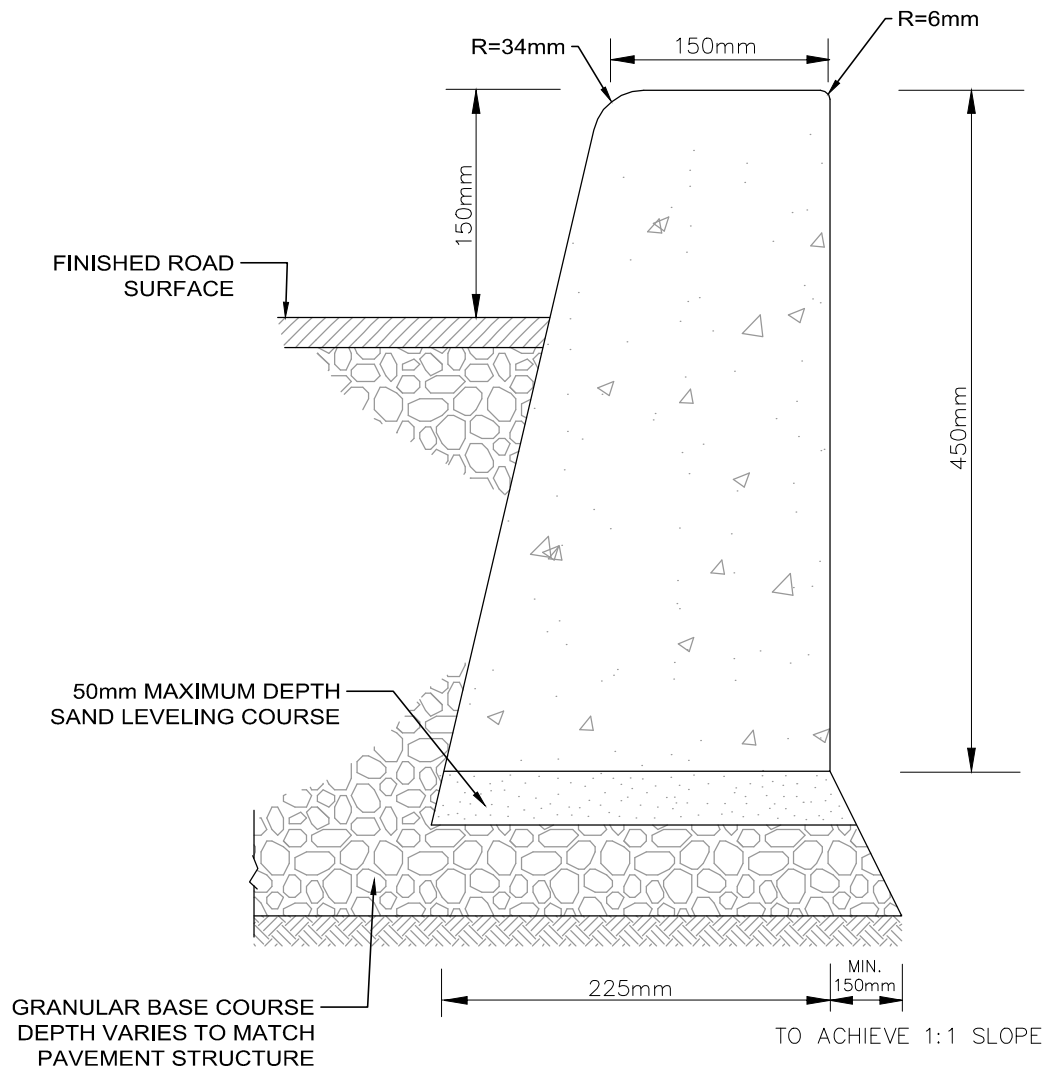
SEPT. 2023

REVISED:

DRAWING NO:

3.26





NOTES:

- 1) CONCRETE TO BE TYPE HS, 32Mpa COMPRESSIVE STRENGTH AT 28 DAYS WITH 5% TO 8% AIR ENTRAPMENT.
- 2) COMPACT TO 97% FOR 500mm FROM BACK OF CURB.

N.T.S.

**STANDARD BARRIER CURB  
(NO GUTTER)**

**MUNICIPAL SERVICING STANDARDS**

**BIG LAKES COUNTY**

SPEC. REFERENCE

DATE DRAWN

JAN. 2015

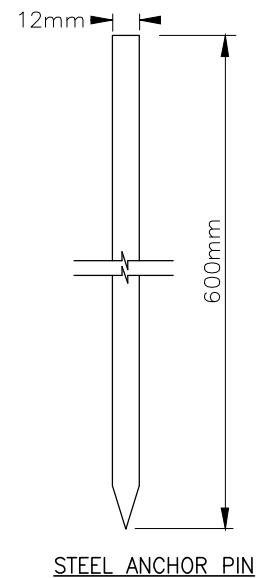
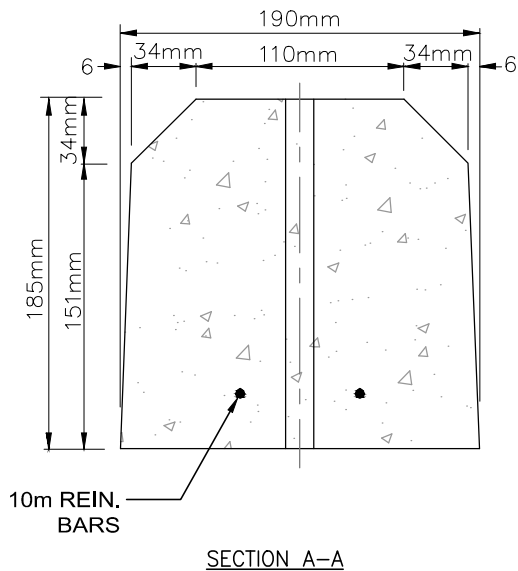
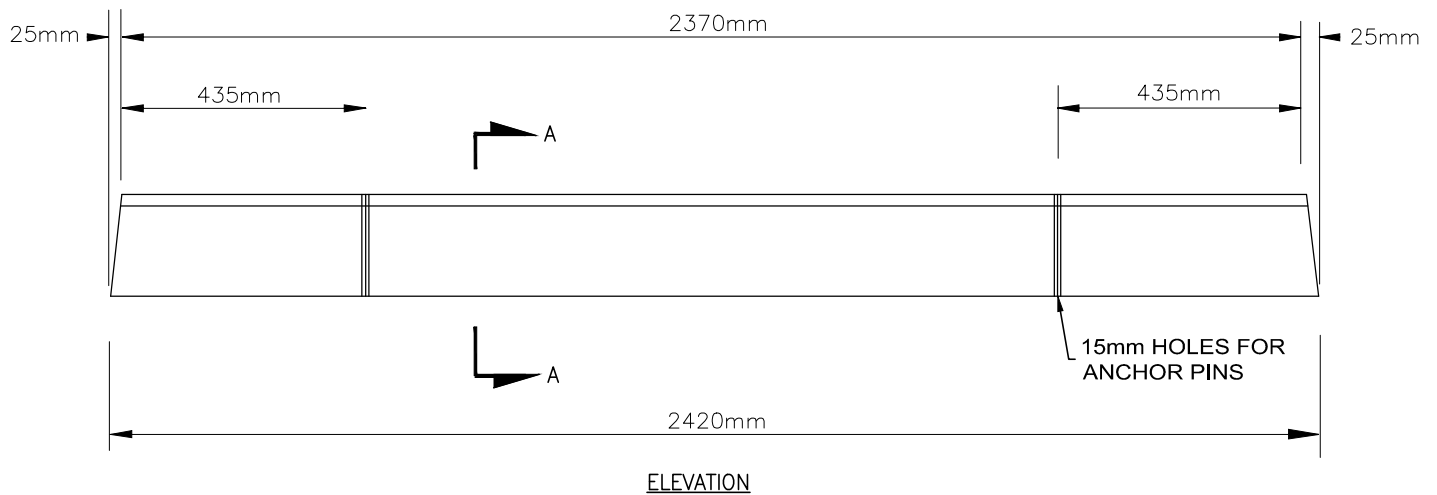
DATE REVISED

JAN. 2017

DRAWING NO:

**3.27**





NOTES:

- 1) CURB TO BE INSTALLED WITH 300mm CLEAR SPACE BETWEEN SECTIONS, END TO END.
- 2) CONCRETE TO BE TYPE HS, 40Mpa COMPRESSIVE STRENGTH AT 28 DAYS WITH 6% TO 8% AIR ENTRAPMENT.
- 3) FOR OFF ROAD USE ONLY.

N.T.S.



**PRECAST CONCRETE CURB  
WHEEL STOP**

**MUNICIPAL SERVICING STANDARDS**

**BIG LAKES COUNTY**

SPEC. REFERENCE

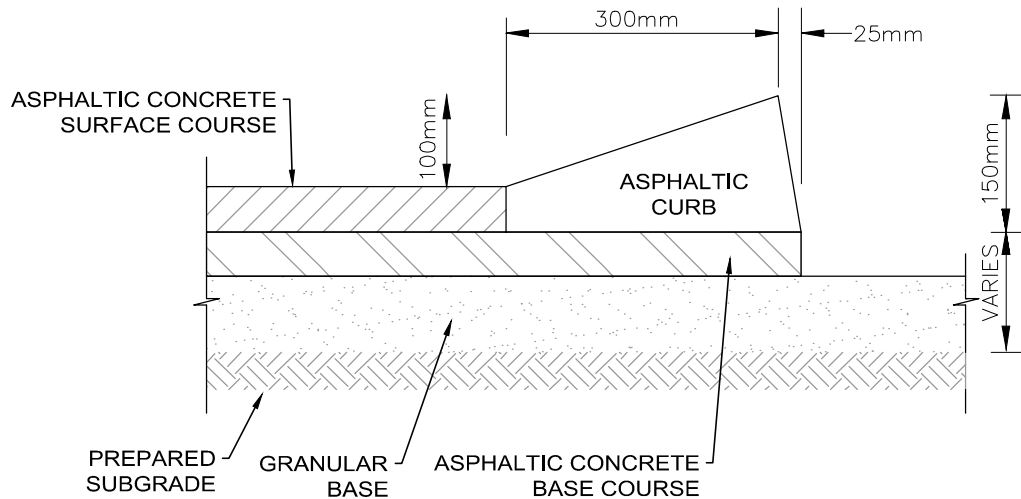
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REVISED:

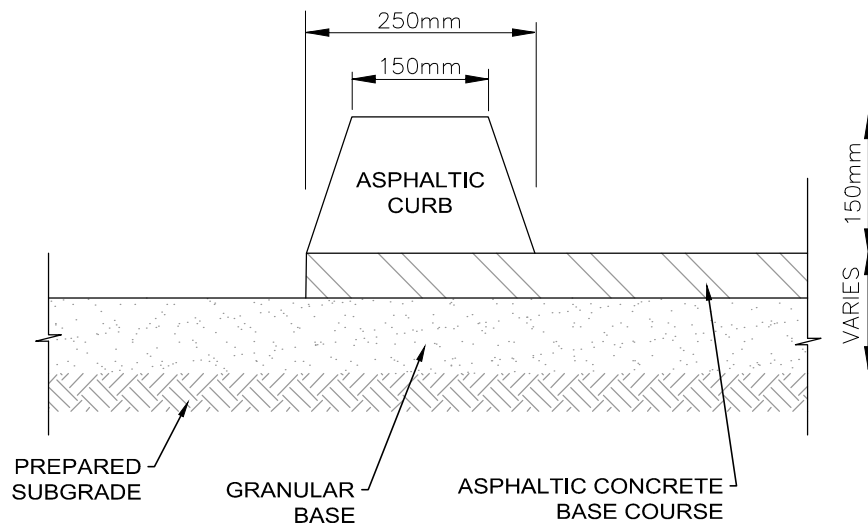
DRAWING NO:

**3.28**





MACHINE LAID MOUNTABLE ASPHALT CURB



MACHINE LAID BARRIER ASPHALT CURB

NOTES:

- 1) BACKFILL CURB WITHIN 24 HOURS TO MINIMUM 97% STANDARD PROCTOR DENSITY.
- 2) TACK COAT SHALL BE PLACED BETWEEN ASPHALT LIFTS.
- 3) COMPACT TO 97% FOR 600mm FROM BACK TO CURB.
- 4) FOR OFF-ROADWAY USE ONLY.

N.T.S.



# ASPHALT CURB

## MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

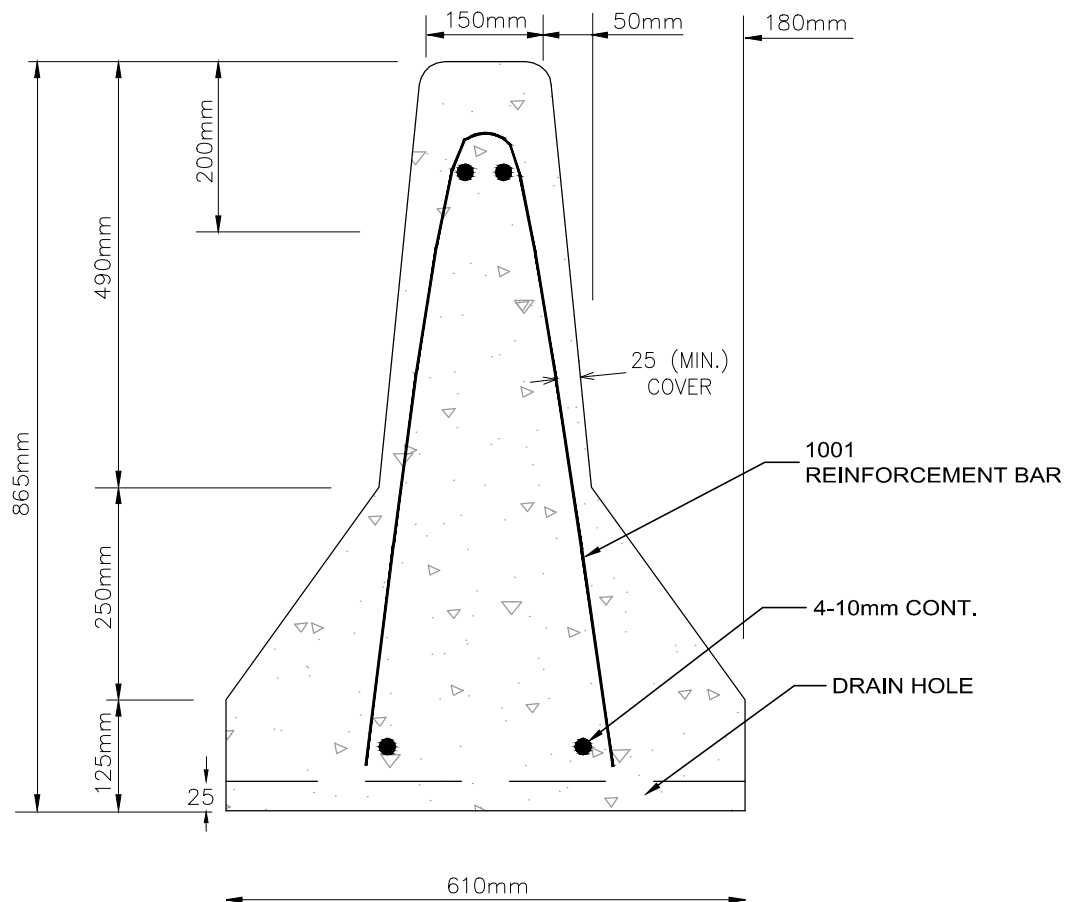
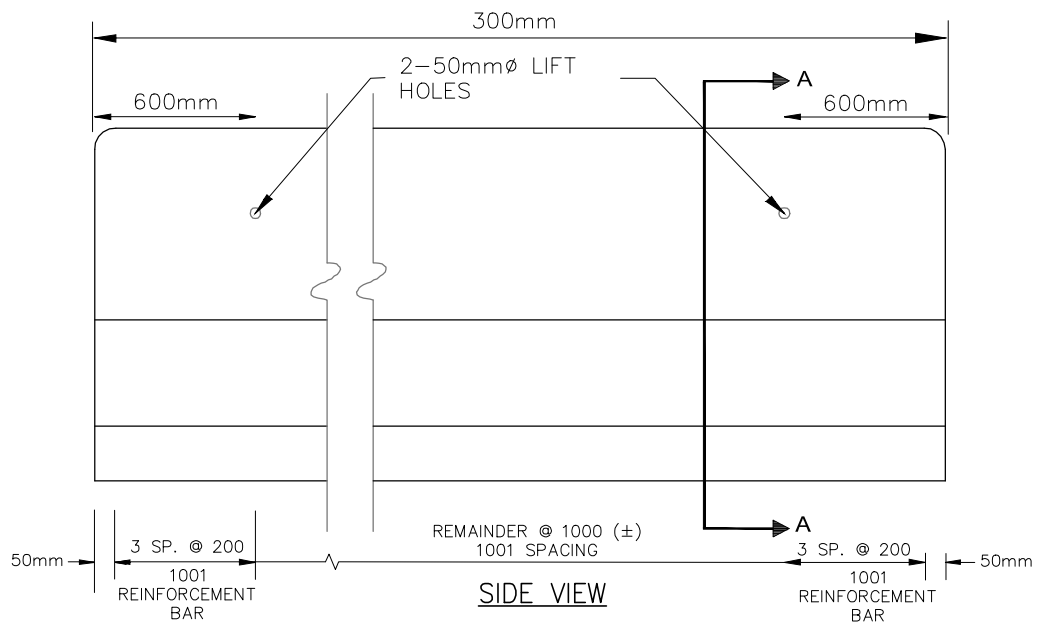
SEPT. 2023

REVISED:

DRAWING NO:

3.29





SECTION A-A

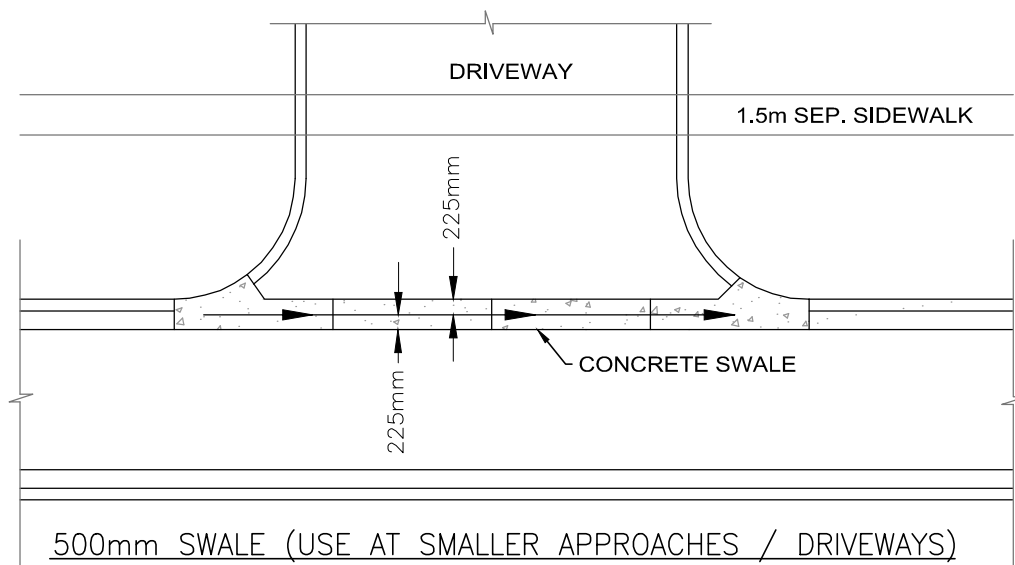
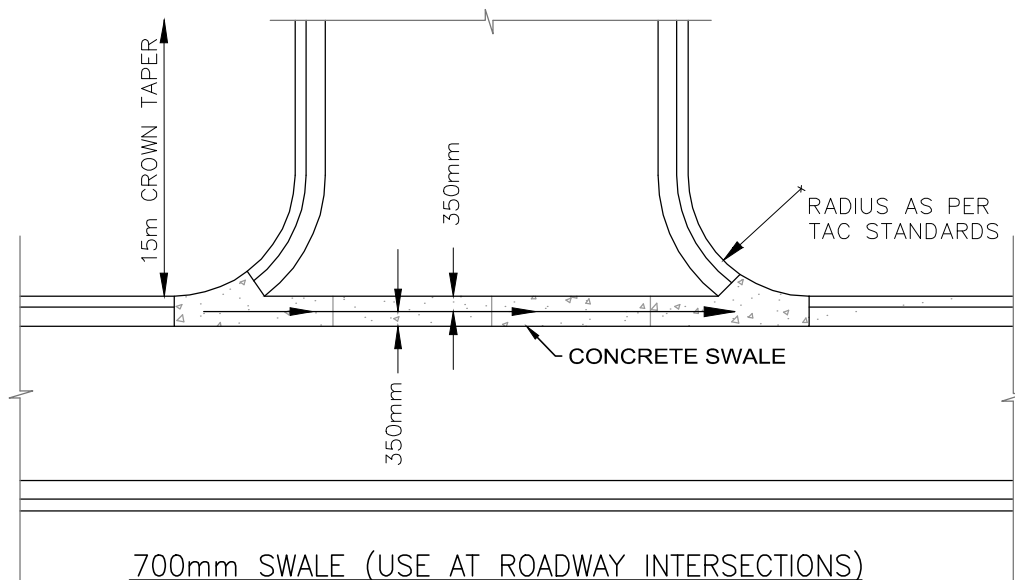
N.T.S.



# PRECAST CONCRETE BARRIER MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	
DRAWING NO:	3.30





**NOTES:**

- 1) CROWN OF ROAD TO BE TAPERED STARTING 15m FROM SWALE EDGE.
- 2) CONTRACTION JOINTS 50mm DEEP AND 5mm WIDE TO BE CONSTRUCTED ON 3m CENTRES ALONG SWALE.
- 3) EXPANSION JOINTS TO BE CONSTRUCTED WHERE SWALE SECTIONS ABUT CURB AND GUTTER.
- 4) SWALE TO BE FORMED AND FINISHED SUCH THAT UPSTREAM AND DOWNSTREAM ENDS MATCH GUTTER ELEVATIONS.
- 5) CONCRETE SHALL BE TYPE HS, COMPRESSIVE STRENGTH AT 28 DAYS WITH 6% TO 8% AIR ENTRAPMENT.
- 6) ASPHALT SHALL BE FULL DEPTH AT FACE OF SWALE TAPERED TO DESIGN ROAD DEPTH IN 2m.

N.T.S.



# CONCRETE SWALE (PLAN) MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

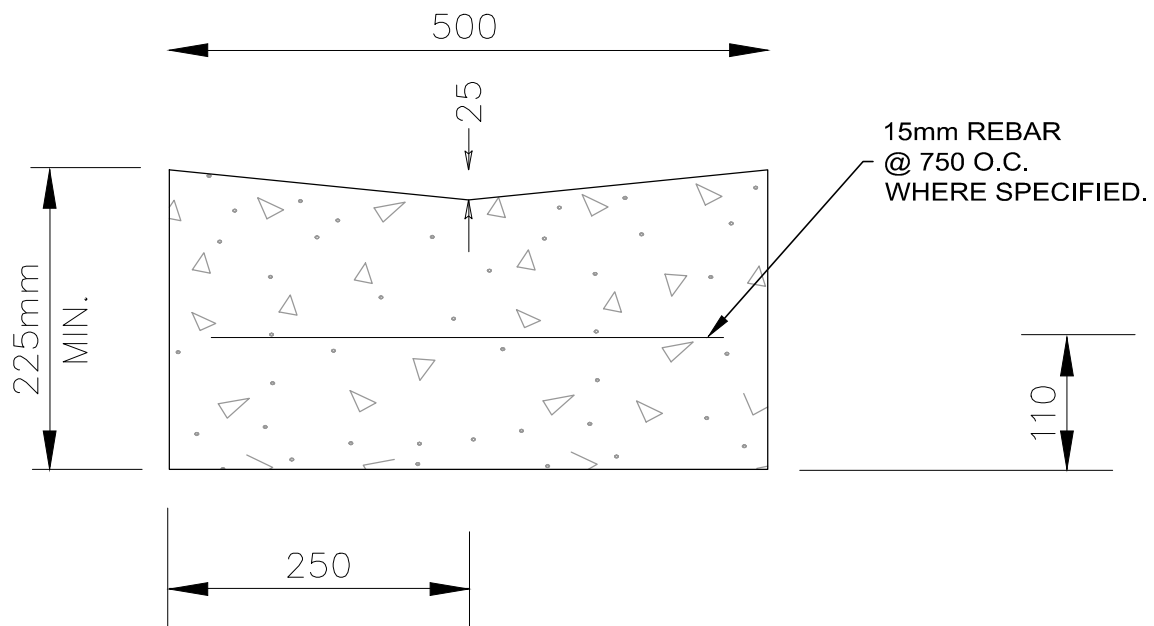
SEPT. 2023

REVISED:

DRAWING NO:

3.31





DIMENSIONS SHOWN IN MILLIMETERS

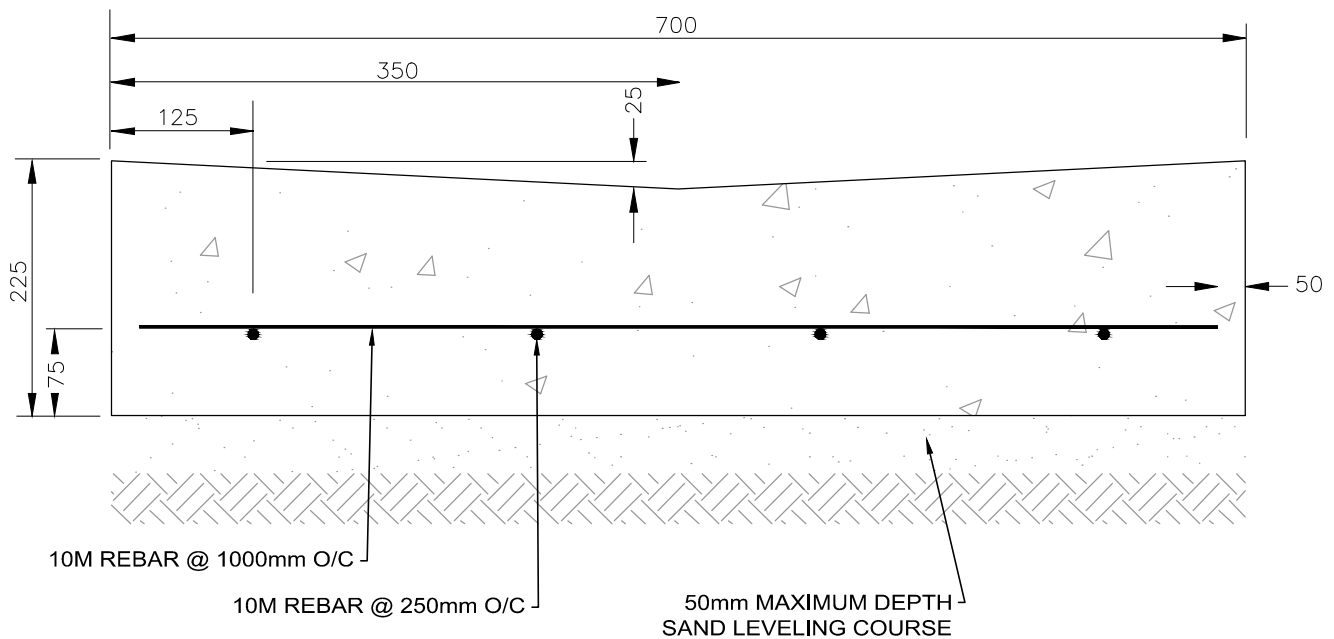
N.T.S.



# CONCRETE GUTTER OR SWALE MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	
DRAWING NO:	3.32





700mm SWALE (USE AT HIGHWAY INTERSECTIONS)

NOTES:

- 1) C/L SWALE TO MATCH GUTTER ELEVATION AT UPSTREAM END. LOWER GUTTER LIP TO MEET SWALE EDGE.
- 2) SWALE EDGE TO MATCH GUTTER ELEVATION ON DOWNSTREAM END. LOWER GUTTER LIP TO MATCH C/L OF SWALE.
- 3) EXPANSION JOINTS TO BE CONSTRUCTED AT ENDS OF SWALE WHERE SWALE ABUTS GUTTERS.
- 4) CONTRACTION JOINTS 50mm DEEPP AND 5mm WIDE TO BE CONSTRUCTED 3m ON CENTRES ALONG SWALE.
- 5) CROWN OF ROAD TO BE TAPERED, STARTING 15m FROM SWALE, TO PROVIDE SMOOTH VEHICULAR CROSSING OF SWALE.
- 6) CONCRETE TO BE TYPE HS, 40Mpa COMPRESSIVE STRENGTH AT 28 DAYS WITH 6% TO 8% AIR ENTRAPMENT.

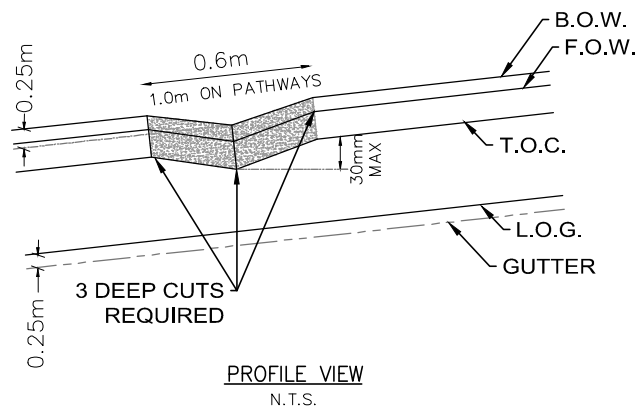
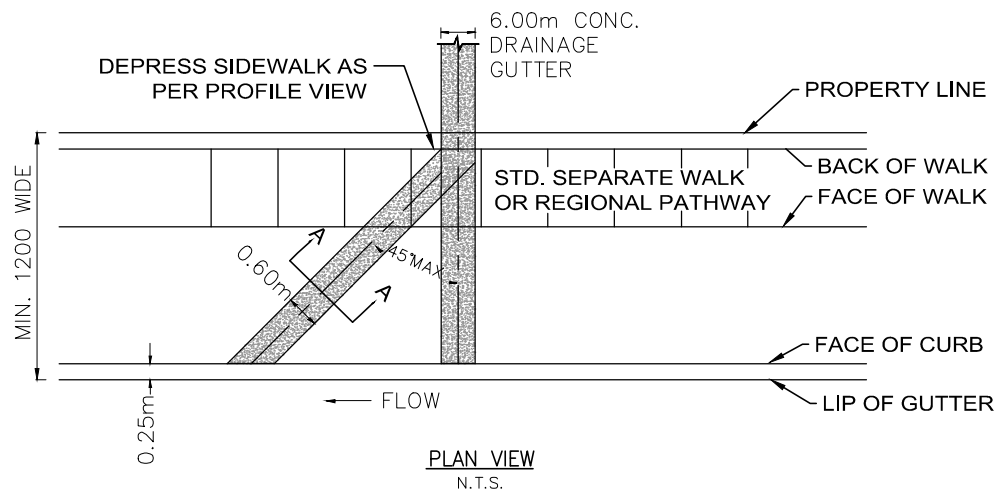
N.T.S.



**LARGE CONCRETE SWALE  
(CROSS SECTION)**  
**MUNICIPAL SERVICING STANDARDS**  
BIG LAKES COUNTY

SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	
DRAWING NO:	3.33



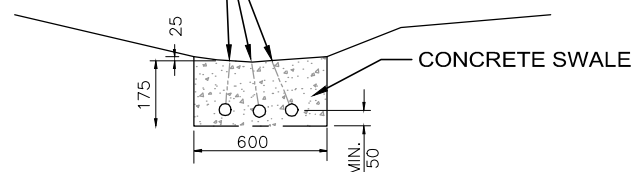


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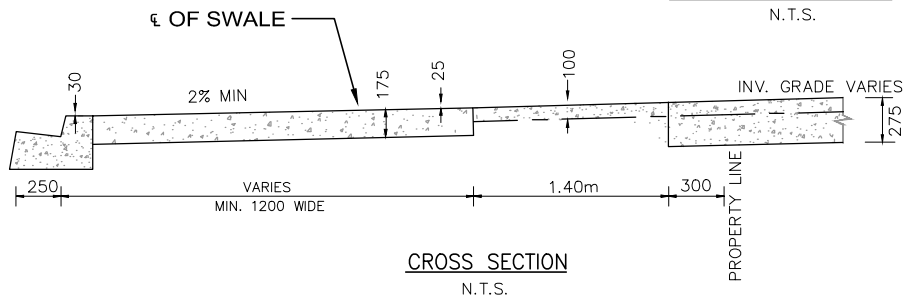
1) ON ROAD WITH GRADE  $>3\%$ . THE SWALE MUST BE "OFFSET" TO ALLOW BETTER FLOW.

10m BARS @ 230mm

REINFORCEMENT OPTIONS  
ACCEPTABLE REINFORCEMENT  
FIBRE CONCRETE OR STEEL BARS



SECTION A-A TYPICAL  
N.T.S.



# SIDEWALK AND BOULEVARD DRAINAGE CROSSING FOR SEPARATE WALK MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

N.T.S.

SPEC. REFERENCE

DATE:

SEPT. 2023

REVISÉ:

DRAWING NO:

3.34

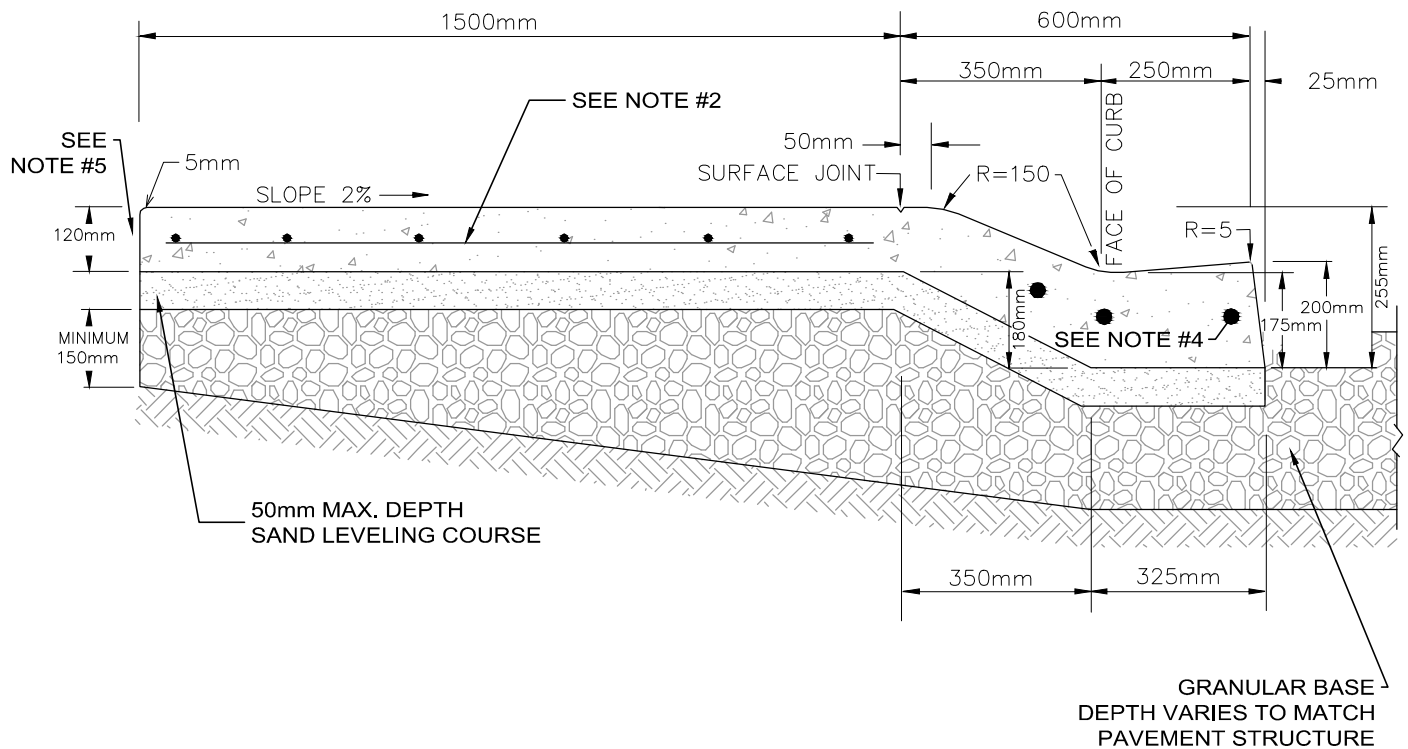




N.T.S.

3.35





**NOTES:**

- 1) 15mm MAXIMUM BATTER AT BACK OF WALK FOR EXTRUDED SECTIONS.
- 2) 150X150 P18/P18 GAUGE WIRE MESH TO BE PLACED IN SIDEWALK ACROSS ALL COMMERCIAL, INDUSTRIAL, LANES AND APARTMENT BUILDING DRIVEWAY ENTRANCES.
- 3) CONCRETE TO BE HS, 40Mpa. COMPRESSIVE STRENGTH AT 28 DAYS WITH 6% TO 8% AIR ENTRAPMENT.
- 4) 3-10M REINFORCEMENT BARS AT ALL COMMERCIAL, INDUSTRIAL, LANES AND APARTMENT BUILDING DRIVEWAY ENTRANCES
- 5) \*150mm AT COMMERCIAL, INDUSTRIAL, LANES AND APARTMENT BUILDING DRIVEWAY ENTRANCES

N.T.S.



**ROLLED FACE MONOLITHIC CURB,  
GUTTER AND SIDEWALK**

**MUNICIPAL SERVICING STANDARDS**

**BIG LAKES COUNTY**

SPEC. REFERENCE

DATE:

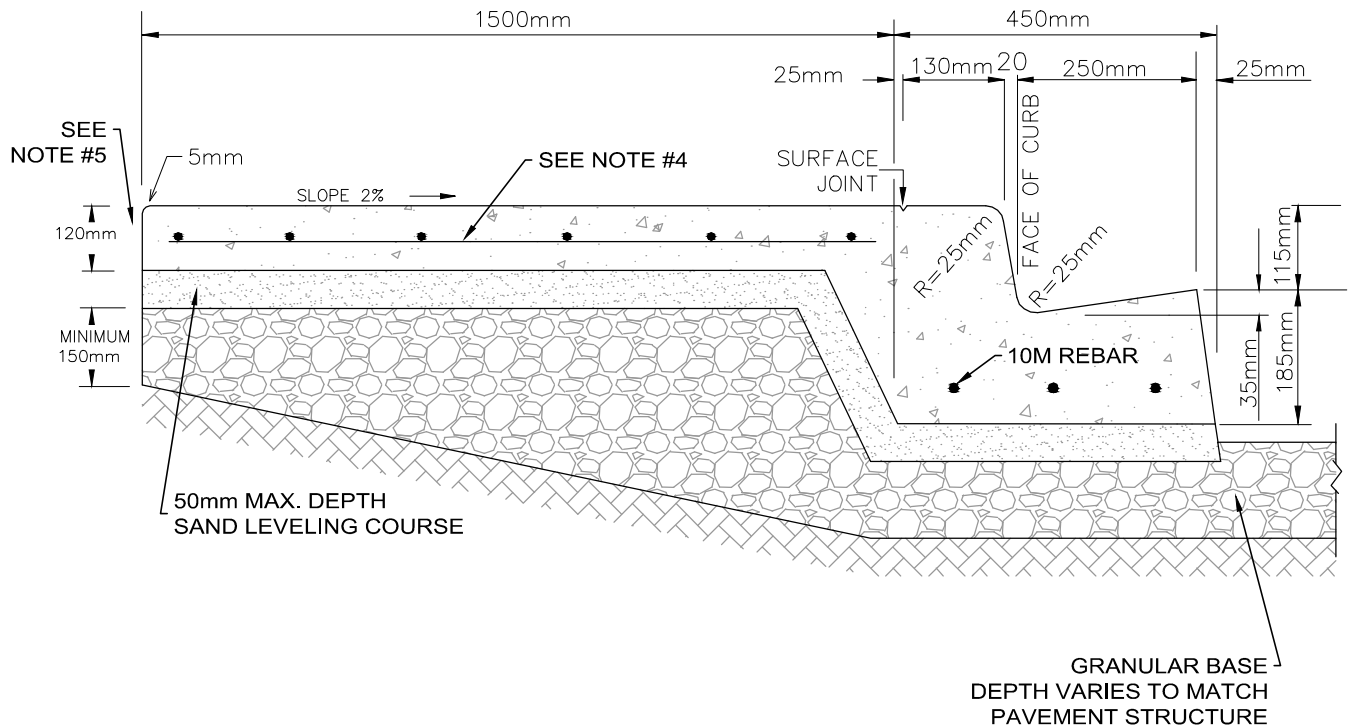
SEPT. 2023

REVISED:

DRAWING NO:

**3.36**





**NOTES:**

- 1) 3-10M REINFORCEMENT BARS AT ALL COMMERCIAL, INDUSTRIAL, LANES AND APARTMENT BUILDING DRIVEWAY ENTRANCES
- 2) CONCRETE TO BE HS, 40MPa. COMPRESSIVE STRENGTH AT 28 DAYS WITH 6% TO 8% AIR ENTRAPMENT.
- 3) COMPACT TO 95% FOR 500mm FROM BACK OF CURB.
- 4) 150X150 P18/P18 GAUGE WIRE MESH TO BE PLACED IN SIDEWALK ACROSS ALL COMMERCIAL, INDUSTRIAL, LANES AND APARTMENT BUILDING DRIVEWAY ENTRANCES.
- 5) \*150mm AT COMMERCIAL, INDUSTRIAL, LANES AND APARTMENT BUILDING DRIVEWAY ENTRANCES

N.T.S.

**STRAIGHT FACE MONOLITHIC CURB,  
GUTTER AND SIDEWALK  
MUNICIPAL SERVICING STANDARDS  
BIG LAKES COUNTY**

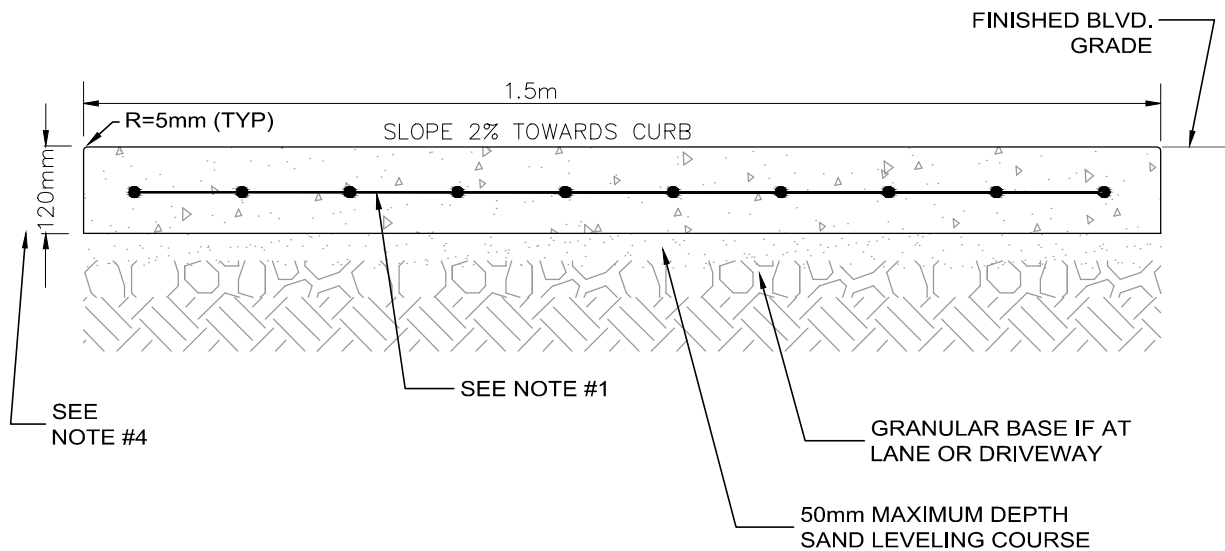
SPEC. REFERENCE

DATE: JAN. 2015

REVISED: JAN. 2017

DRAWING NO: 3.37





**NOTES:**

- 1) 150X150 P18/P18 GAUGE WIRE MESH TO BE PLACED IN SIDEWALK ACROSS ALL COMMERCIAL, INDUSTRIAL, LANES AND APARTMENT BUILDING DRIVEWAY ENTRANCES.
- 2) ELEVATION OF FRONT OF WALK TO BE SET SUCH THAT A MINIMUM SLOPE OF 4% IS MAINTAINED ACROSS BOULEVARD BETWEEN FRONT OF WALK AND TOP OF CURB.
- 3) CONCRETE TO BE HS, 40MPa, COMPRESSIVE STRENGTH AT 28 DAYS WITH 6% TO 8% AIR ENTRAPMENT.
- 4) \*150mm AT COMMERCIAL, INDUSTRIAL LANES AND APARTMENT BUILDING DRIVEWAY ENTRANCES. DRIVEWAY ENTRANCES REQUIRE GRANULAR BASE TO LANE STANDARD.

N.T.S.



# 1.5M SIDEWALK

## MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

SEPT. 2023

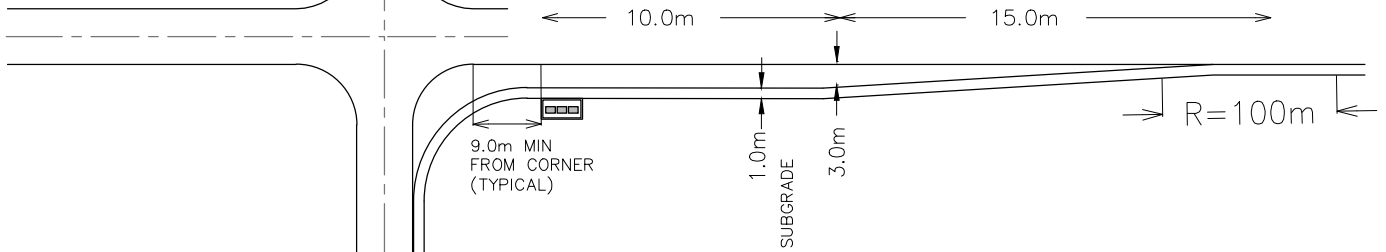
REVISED:

DRAWING NO:

3.38

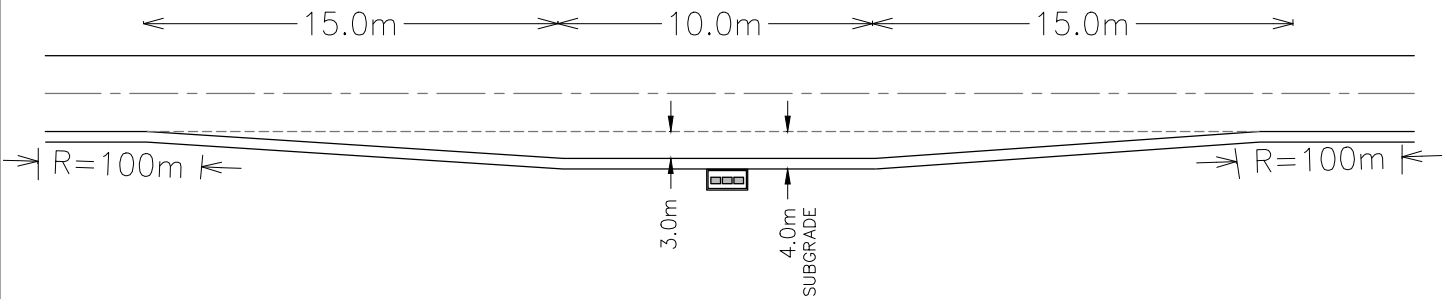


(ONLY IN INTERNAL SUBDIVISION ROADS)



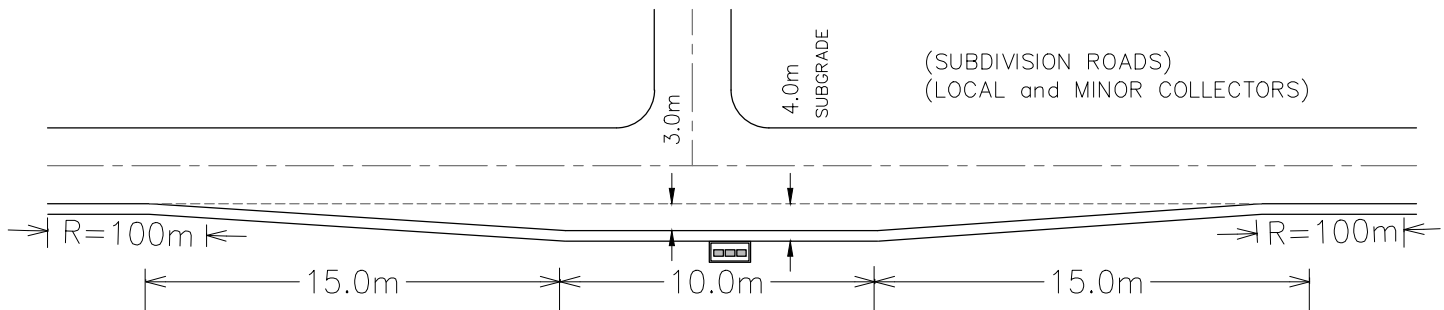
CORNER LOCATION

(SUBDIVISION ROADS)  
(LOCAL and MINOR COLLECTORS)



MID BLOCK LOCATION

(SUBDIVISION ROADS)  
(LOCAL and MINOR COLLECTORS)



TEE LOCATION

**NOTE:**

STANDARD COMMUNITY MAILBOX INSTALLATIONS ARE DONE BY CANADA POST.

EACH COMMUNITY MAILBOX (CMB) LOCATION IS CHOSEN BY THE DELIVERY PLANNER AFTER CONSULTATION WITH THE PROPERTY DEVELOPER AND THE LOCAL MUNICIPALITY.

CMB SHOULD BE LOCATED A MINIMUM OF NINE METRES FROM INTERSECTION CORNERS, SO AS NOT TO HAMPER DRIVER VISIBILITY. SITES ARE NOT INSTALLED AT MAJOR INTERSECTIONS

SITE SELECTION CRITERIA MUST BE CONSIDERED WHEN PLANNING THE LOCATION.

- AT A NATURAL ENTRY POINT TO A DEVELOPMENT,
- WITHIN A BOULEVARD OR AT A CONVENIENT LOCATION WITHIN A DEVELOPMENT,
- NEAR EXISTING LIGHTING FIXTURES

WHERE A COMMUNITY MAILBOX IS TO BE LOCATED ON PRIVATELY HELD LAND, THE PROPERTY OWNER MUST GRANT CANADA POST A LICENSE TO OCCUPY THE LAND. THIS LICENSE IS AVAILABLE FROM YOUR DELIVERY PLANNER.

N.T.S.



# MAILBOX PULLOUT LOCATIONS MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

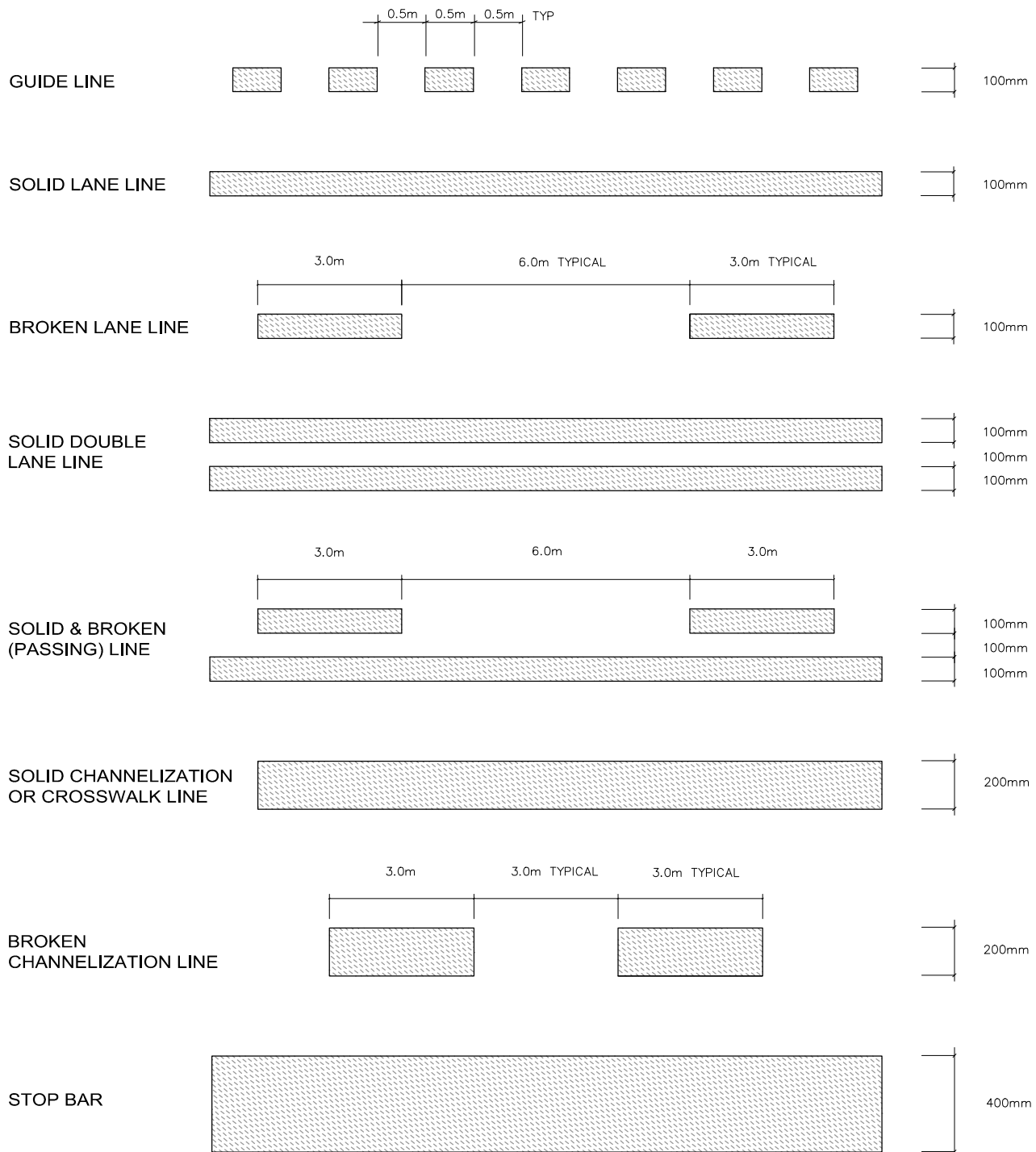
SEPT. 2023

REVISED:

DRAWING NO:

3.39





**NOTES:**

- 1) SEE STANDARD DRAWING 4-701 FOR APPLICATION
- 2) ARROWS PER TAC STANDARDS

N.T.S.



# PAVEMENT MARKING DIMENSIONS

## MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE
DATE: SEPT. 2023
REVISED:
DRAWING NO: 3.40



LINE TYPE	WIDTH	WHITE	YELLOW
GUIDE LINE (0.35m LINE: 0.5m GAP)	100mm (4")	1) GUIDE TURNING TRAFFIC THROUGH INTERSECTION, POSITIONED BETWEEN TWO OR MORE TURNING LANES	1) GUIDE TURNING TRAFFIC THROUGH INTERSECTION, POSITIONED ON THE LEFT SIDE, FOR ONE TURNING LANE
SOLID LANE LINE	100mm (4")	1) DELINEATE LANES OF TRAFFIC IN SAME DIRECTION WHERE LANE CHANGE IS PROHIBITED 2) RIGHT EDGE LINE (NO CURB)	1) DELINEATE LANES OF OPPOSING TRAFFIC, 2) LEFT EDGE LINE (DIVIDED ROADWAY, NO CURB)
BROKEN LANE LINE (3m LINE: 6m GAP)	100mm (4")	1) DELINEATE LANES OF TRAFFIC IN SAME DIRECTION WHERE LANE CHANGE IS PERMITTED	1) DELINEATE LANES OF OPPOSING TRAFFIC WHERE PASSING IS PERMITTED
SOLID DOUBLE LANE LINE (SEPARATION 100mm)	100mm 100mm (4")	1) DELINEATE LANES OF TRAFFIC IN SAME DIRECTION WHERE LANE CHANGE IS PROHIBITED	1) DELINEATE LANES OF OPPOSING TRAFFIC WHERE PASSING IS PROHIBITED
SOLID & BROKEN CENTERLINE (3m LINE: 6m GAP) SEPARATION 100mm)	100mm 100mm (4")	NOT USED	1) DELINEATE LANES OF OPPOSING TRAFFIC WHERE PASSING IS PERMITTED FROM BROKEN LINE SIDE ONLY 2) TWLT LANES, IN PAIRS
SOLID CHANNELIZATION OR CROSSWALK LINE	200mm (8")	1) DELINEATE LANES OF TRAFFIC IN SAME DIRECTION WHERE LANE CHANGE IS PROHIBITED BETWEEN THROUGH AND TURN LANES 2) USED IN PARALLEL PAIRS TO GUIDE PEDESTRIANS 3) USED DIAGONALLY TO INDICATE WHERE TRAFFIC SHOULD NOT CROSS	NOT USED
BROKEN CHANNELIZATION LINE (3m LINE: 3m GAP)	200mm (8")	1) DELINEATE LANES OF TRAFFIC IN SAME DIRECTION WHERE LANE CHANGE IS PERMITTED BETWEEN MERGING AND DIVERGING LANES	NOT USED
STOP BAR	400mm (16")	1) DELINEATE WHERE VEHICLES ARE TO STOP	NOT USED

NOTES:

- 1) PARKING STALLS TO BE IN ACCORDANCE WITH LAND USE BYLAW

N.T.S.



# PAVEMENT MARKING APPLICATIONS

## MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

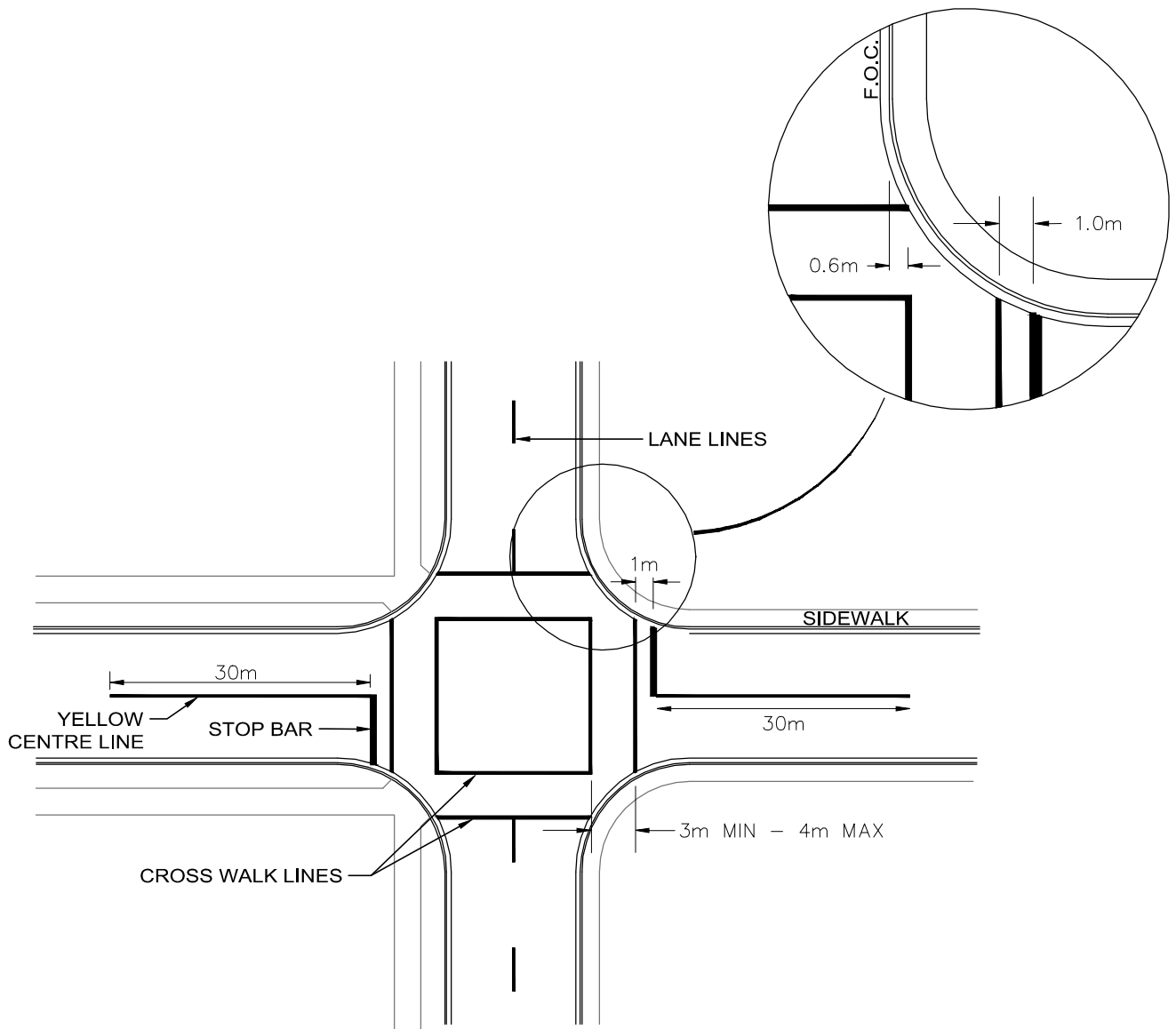
SEPT. 2023

REVISED:

DRAWING NO:

3.41





NOTES:

- 1) ALL LINES TO BE WHITE EXCEPT AS NOTED.

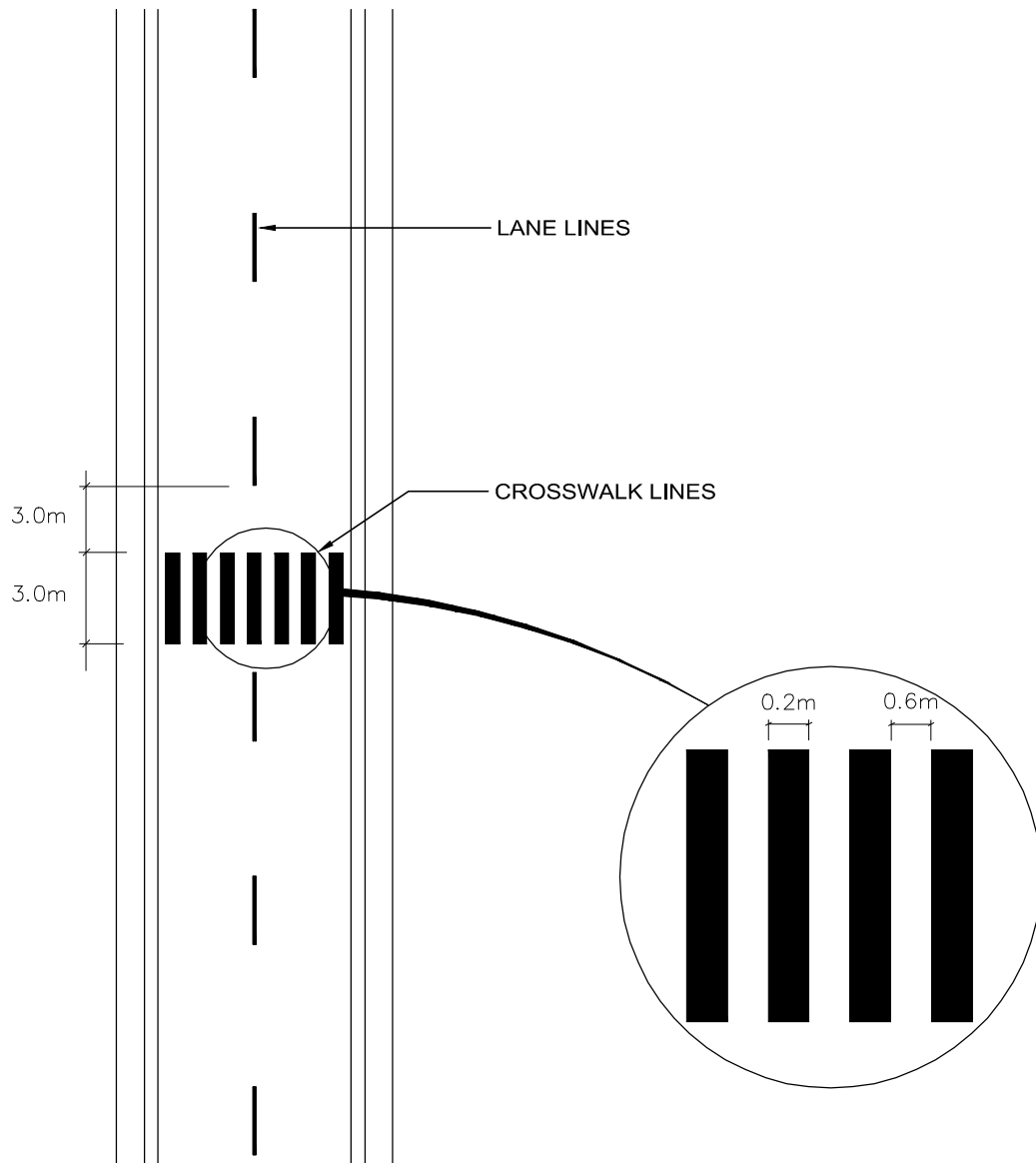
N.T.S.



**STANDARD INTERSECTION  
CROSSWALK PAVEMENT MARKINGS**  
MUNICIPAL SERVICING STANDARDS  
BIG LAKES COUNTY

SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	
DRAWING NO:	3.42





NOTE:

- 1) CROSSWALK LINES TO BE WHITE IN COLOUR

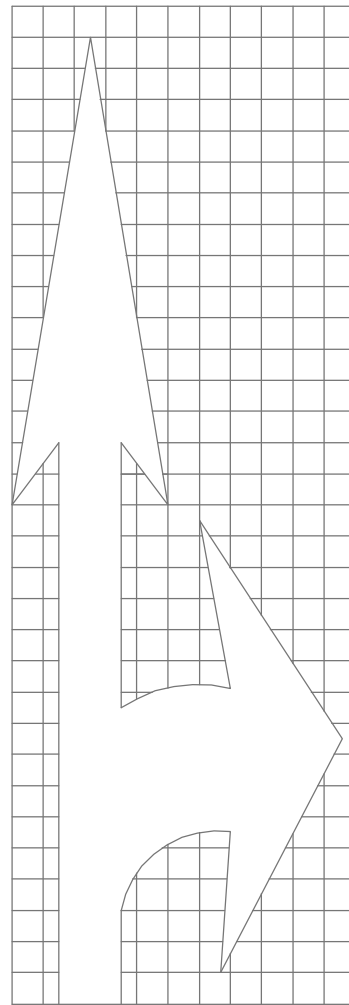
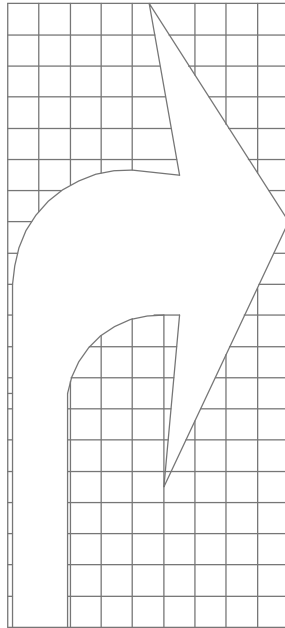
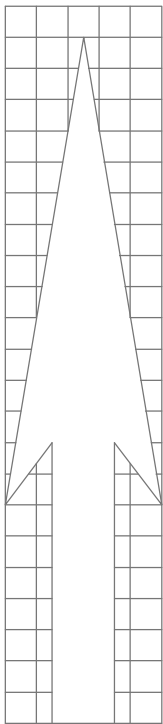
N.T.S.



**STANDARD MID-BLOCK  
CROSSWALK PAVEMENT MARKINGS**  
MUNICIPAL SERVICING STANDARDS  
BIG LAKES COUNTY

SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	
DRAWING NO:	3.43





NOTE:

- 1) GRID SHOWN IS 150mm X 150mm

N.T.S.

# PAVEMENT ARROWS

## MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

JAN. 2015

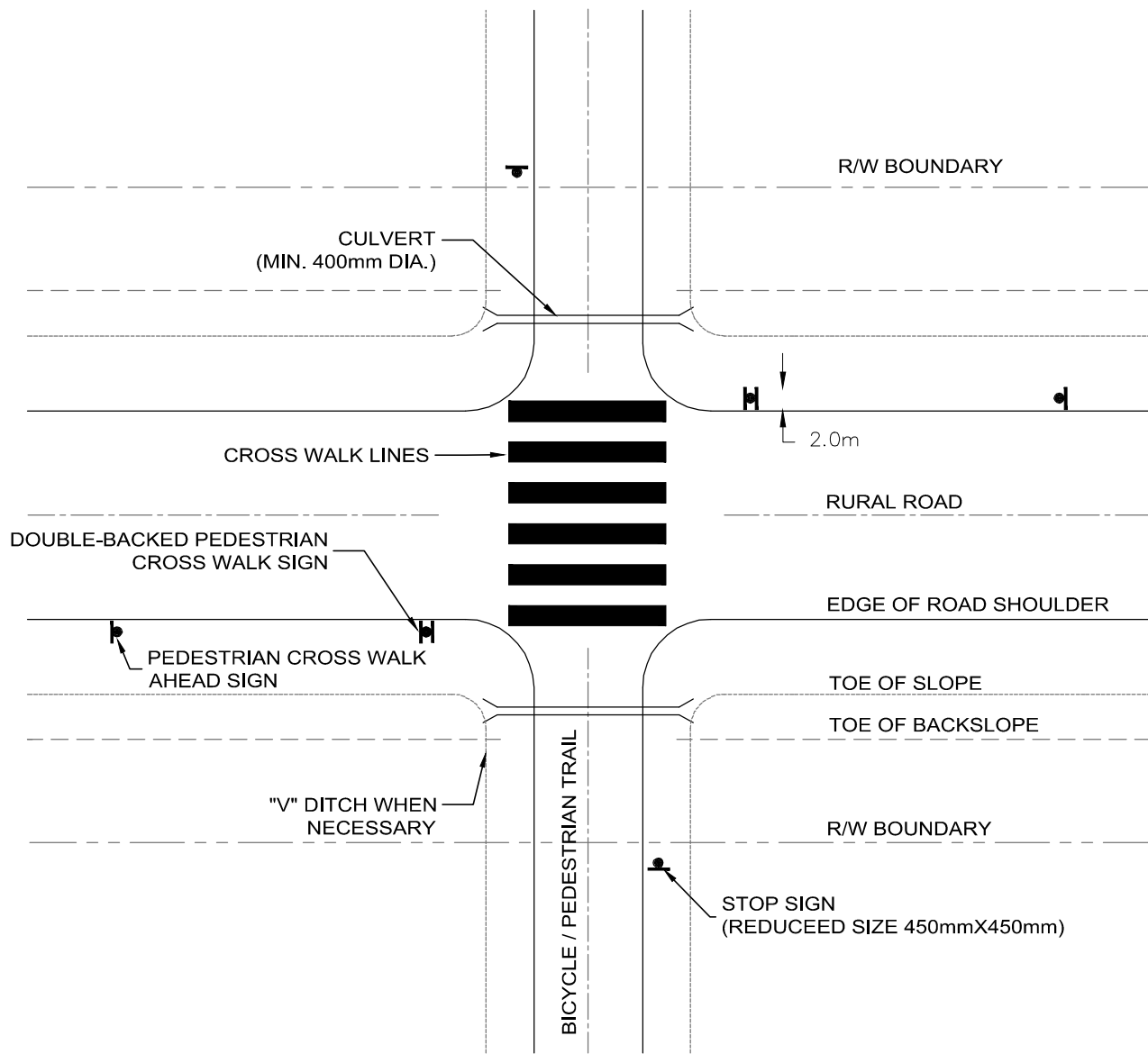
REVISED:

JAN. 2017

DRAWING NO:

3.44





**NOTES:**

- 1) ALL SIGNAGE TO BE IN ACCORDANCE WITH THE TAC MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR CANADA.

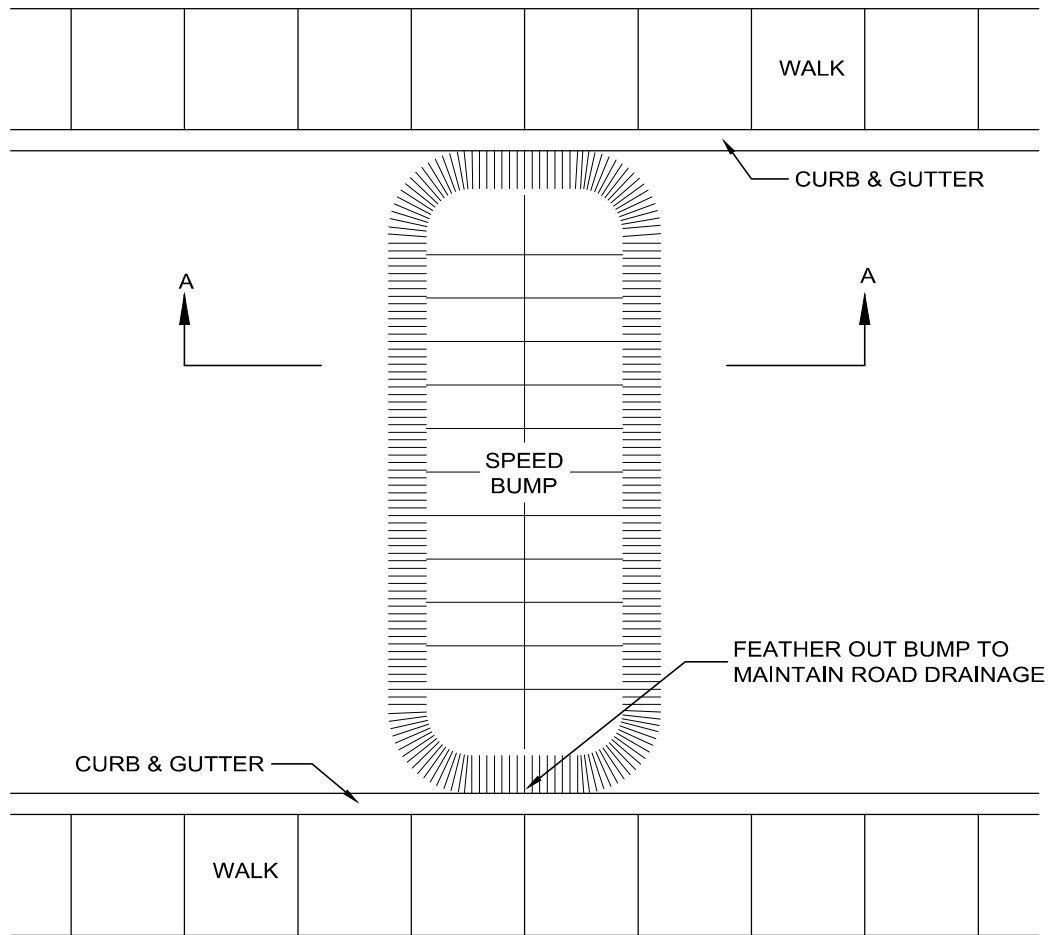
N.T.S.



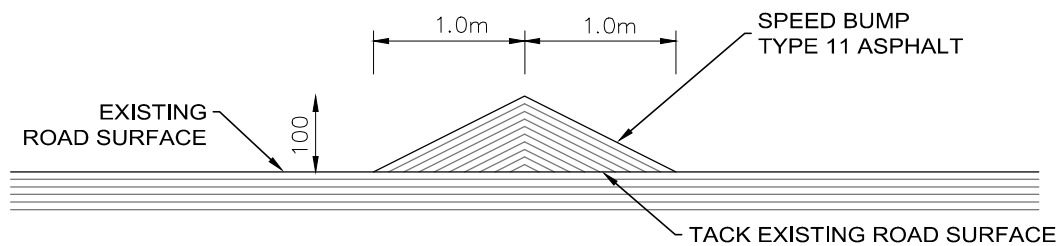
# TYPICAL MID BLOCK RURAL TRAIL / PATH CROSSING DETAIL MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	
DRAWING NO:	3.45





PLAN  
SCALE: 1:100



SECTION A-A  
SCALE: HORZ. 1:50  
VERT. 1:10

DIMENSIONS SHOWN IN MILLIMETRES  
UNLESS OTHERWISE SHOWN

N.T.S.



# ASPHALT SPEED BUMP

## MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	
DRAWING NO:	3.46



## 4 STORM DRAINAGE SYSTEMS

### 4.1 GENERAL

- The management of stormwater is an integral part of any development and must be handled effectively to preserve and promote the general health, welfare, security, and economic well-being of the public.
- The general level of service required by BLC regarding stormwater management shall be in keeping with the minor/major drainage concept wherein:
  - The minor system shall be designed and implemented to accommodate drainage to avoid property damage and flooding and to minimize inconvenience to the public for one (1) in five (5) year rainfall events.
  - The major system shall be designed and implemented for flood control to avoid loss of life, injuries, and significant damage to property from events greater than one (1) in one hundred (100) year return producing unusual high intensity rainfall and/or large volume run-off.
- The minor stormwater system in subdivision development areas in BLC shall be accommodated by either rural ditching or in urban development, via curb and gutter and an underground piped system.
- The major system shall typically be designed as an open channel system with detention/retention facilities, as may be required, to control flows to the design criteria.
- The use of Wetlands shall follow the Alberta Wetland Policy.

#### 4.1.1 STORMWATER MANAGEMENT PLAN

A Stormwater Management Plan shall be required and shall be consistent with the storm drainage engineering design criteria outlined in subsequent sections and as per Alberta Environment's "Stormwater Management Guidelines".

- Identify the impact of the proposed development on the watershed.
- Identify and quantify the amount of upstream drainage entering onto the proposed development lands, including all points(s) of entry.
- Identify all existing flow channels, drainage patterns or routes, and containment areas.
- Identify the point(s) of discharge from the lands as well as the type and calculated capacity of the receiving drainage facility(s), whether natural, anthropogenic, or a combination of both.
- Provide details of required stormwater retention/detention facilities.
- Provide details of water quality enhancement facilities.
- Identify and comply with all licensing requirements as may be required by Alberta Environment, BLC and Department of Fisheries and Oceans (DFO) or all Statutory and Regulatory Approval Agencies.

#### 4.1.2 MINOR & MAJOR DRAINAGE SYSTEMS

- Whenever possible, rural type drainage systems, E.g., roadside ditches, culverts, swales, open channels, and storage facilities, for both the minor and major systems, shall be used in the





evaluation, design, and implementation of stormwater drainage systems, except in situations warranting piped systems for transmission of stormwater.

- The minor system shall be designed to carry the peak flow resulting from a one (1) in five (5) year rainfall event.
- The major system design shall be based on a one (1) in one hundred (100) year rainfall event. Detention shall be provided to attenuate peak run-off flows.
- When the minor system capacity is exceeded, the major system must provide a continuous route for run-off to follow.
- Any stormwater system, or part thereof, must be designed to serve not only the area within the development boundary, but also any area which is tributary to the system and to the development area.
- Stormwater drainage systems shall be consistent with Alberta Environment's current stormwater management guidelines. Post development impact of flow rates, duration and run-off quality must be analyzed on a case-by-case basis. This may also require an assessment of the impact on the body into which the effluent is ultimately released.
- Stormwater drainage systems shall be designed as a separate system with no connection to any wastewater sewer system.
- All lots shall be graded to provide drainage away from all foundations and/or buildings.

#### 4.1.3 Run-off Analysis

Run-off analysis methods outlined herein are appropriate for most circumstances encountered in BLC. The BLC may, however, consider and approve in writing other methods as deemed to be appropriate.

- Rational method for stormwater drainage design may be used for:
  - High density country residential and commercial/industrial development areas up to 40.0 hectares (99 acres) in size.
  - Low density country residential development area up to 65.0 hectares (161 acres) in size, provided the system does not require storage facilities over and above the in-line storage.
- Computer modeling shall be used for stormwater drainage design for:
  - High density country residential and commercial/industrial development areas greater than 40.0 hectares in size.
  - Low density country residential development areas greater than 65.0 hectares in size.
  - Any system requiring storage or detention facilities in addition to on-line storage such as may be provided by parking lot detention, roadside ditches, or pipe over- sizing.
  - Alternatively, computer modeling may be used for areas smaller than those outlined above.
  - The computer model chosen by the Consulting Engineer shall meet with the approval of the BLC.
  - A complete report from the modeling software including the pre and post parameters and the results shall be provided to BLC.





#### 4.1.4 Run-off Coefficients

Run-off coefficients are to be consistent with the respective land use and site-specific characteristics. As a rule, the coefficients listed under section 4.4.1 may be utilized as a starting guideline subject to the site-specific characteristics.

#### 4.1.5 Storage Facilities

- These sub-sections deal with the requirements for detention/retention facilities hereinafter referred to as “separate storage facilities”, in addition to the in-line storage provided by way of planned ponding in ditches, swales and channels during peak run-off events. All Storage Facilities shall be designed in accordance with the Stormwater Management Guidelines of Alberta Environment.
- The requirements for separate storage facilities shall be determined using computer modeling irrespective of the size of the development area.
- The facilities must be sized to control the total post-development run-off release equal to or less than the pre-development flows during peak run-off conditions for all events up to and including the one hundred (100) year event.
- The pre-development and post-development run-off conditions shall be analyzed for the five (5) year, twenty-five (25) year and one hundred (100) year event.
- Sufficient outlet capacity shall be provided to permit post-event drawdown of the water levels in the storage facilities such that the availability of storage capacity is restored within the following time frames:
  - Five (5) year event capacity within twenty-four (24) hours.
  - Twenty-five (25) year event capacity within forty-eight (48) hours.
  - 95% of one hundred (100) year event capacity within ninety-six (96) hours.
- An emergency overflow, suitably protected against erosion, shall be provided to ensure that run-off more than the storage capacity is safely directed to the downstream receiving facility.
- Wherever practical, separate storage facilities shall be designed as wet ponds.
- Storage pond facilities shall be appropriately fenced and signed for the protection of the public.

##### 4.1.5.1 Dry Pond Design Criteria

- Pond shall be sized to store storm run-off more than the pre-development flows.
- Side slopes shall not be steeper than 5:1.
- Pond bottom shall be graded to provide positive drainage to the outlet at a minimum slope of 2%, refer to Figure 4.4.
- Topsoil shall be placed on all surfaces, including the bottom, and then seeded with a seed mixture approved by BLC.
- All piped outlet structures (and inlet structures if applicable) shall be provided with a grate affixed with hinges and locked to prevent unauthorized entry.
- All outflow piping shall be sized for the flow 25% greater than the maximum designed control flow. Water release shall be controlled by means of an orifice or other approved means and shall include provisions for increasing the release rate in an emergency event.





#### 4.1.5.2 Wet Pond Design Criteria

- Wet pond shall ideally be in a natural depression preferably adjacent to a natural drainage course.
- Pond shall have a minimum depth of 2.0 m at normal water level (level above which outflow commences).
- Designed maximum level for the pond shall be no higher than any designated basement level and at least 600 mm below the lowest ground surface level for any adjacent property.
- Side slopes shall be no steeper than 3:1 from the pond bottom to 1.0 m below normal water level; above this to at least 600 mm above the maximum flood level, the side slopes shall be no steeper than 7:1. Refer to Figure 4.5.
- An erosion resistant rock or equivalent shoreline treatment shall be provided from 1.0 m horizontally below to 2.0 m horizontally above the normal water level.
- Topsoil shall be placed on all side slopes and then seeded with an approved seed mixture approved by BLC.
- The outlet pipe (and inlet pipe if applicable) shall be submerged so that its top is at least 500 mm below the normal water level. The exposed end of the outlet pipe shall be provided with an affixed hinge and locked grate to prevent unauthorized entry.
- All outflow piping shall be sized for a flow 25% greater than the maximum designed release flow. Water release shall be controlled by means of an orifice or other approved means and shall include provision for increasing the release rate in an emergency event.
- Wet ponds shall be constructed in impervious soils to minimize water losses during dry weather periods and to minimize groundwater contamination.

#### 4.1.5.3 Wetlands Design Criteria

- Approximately 10% of the wetland surface area should contain a 1.5 m to 2.0 m deep sediment forebay upstream of the wetland area for the settling of solids (removal).
- Average permanent water wetland depth to be determined on a case-by-case basis to ensure flow redistribution and for fish and submerged or floating aquatic vegetation habitat.
- Active storage is 0.3 m to 0.6 m deep.
- Length to width ratios can be as low as 1:1.
- Shape of the treatment cell(s) may vary and will depend on landscaping features required for attracting wildlife and for public enjoyment, as well as the configuration and attributes of available land.
- Gravity flow is the preferred method of movement of water into, through and out of the treatment wetland.
- Incorporate a bypass that will collect first flush flows and divert high flows during extreme rainfall events around the wetland.
- Regulated inflow and outflow structures are required that will consider a wide range of rainfall intensities. Figure 4.6: Storm Pond Release Control Manhole.

#### 4.1.5.4 Lot Grading

- Lot grading is directly linked to surface drainage of stormwater (and snowmelt), along with human-induced types of drainage, such as grass-watering and car-washing.





- The level of service involved in lot grading tries to strike a balance between protecting private property against 1:100-year storm flooding and routing the stormwater too quickly to the public major and minor storm drainage systems (E.g., the road allowance).
- At minimum, the design gets stormwater away from the house foundation, but still allows for some infiltration into lawn, garden, and mulched areas, to reduce the run-off to the road allowance.
- Since hydraulic pressures on house concrete walls, along with possible entire foundation uplift, can be a major source of expense for the homeowner, sump pumps can be specified in lower areas to aid in reducing the pressures on foundation walls. These can present a false sense of security if the lot grading is insufficient and there is constant heavy ponding of water up against the outside of the house foundation after major storms.
- Side and end swales through and around the lot perimeters allow for orderly routing of the stormwater off the lot once the infiltration areas (E.g., lawns) are saturated. These swales are usually grass or mulch and route this water to the front and/or back of the lot. Figure 5.7: Swales.
- Concrete swales are used where it is unavoidable that multiple (more than three) lots have flows join. Then there is an urgency to contain this flow and route it to the street as quickly as possible by use of the concrete swale.
- Overall, the design is to achieve a balance between street/building grade elevations and their relationship to the surrounding development and existing topography.
- Refer to Figure 4.1: Lot Grading Guidelines.

#### 4.1.5.5 Swales

- Drainage swales on private or municipal lands must be constructed prior to the development of the lots. All swales located on private lands will be protected by an easement in favour of BLC.
- The following minimum design parameters will apply:
  - Earth swales must be protected from erosion by grass cover or other measures approved by BLC.
  - Concrete swales shall be used when drainage is being accommodated from more than three (3) lots (for lots less than 0.5 Ha).
  - The minimum design slope for grassed swales is 1.0%.
  - The minimum design slope for concrete swale is 0.75% on private property and 0.50% on public property.
- Refer to:
  - Figure 3.32 & 3.33 - Concrete Gutters (500mm & 700mm)
  - Figure 4.7 - Swale





## 4.2 RURAL AREAS

Most of the drainage systems within the County are comprised of rural style ditches and drainage channels & swales.

The County has several registered large irrigation ditches and channels registered through Alberta Environment.

Offsite drainage must be evaluated when developing rural lands. The proponent must thoroughly review and determine existing drainage patterns and flows surrounding the proposed development and design for any stormwater features required to accommodate both onsite and offsite runoff.

Standard roadway cross sections are provided within these standards; however, they are subject to change to ensure the ditches have sufficient capacity to handle stormwater runoff.

Culverts, rural ditches, and swales shall be designed as per the criteria outlined in section 4.4 and sized for the 1:25 year storm event with prevention of road overtopping in the 1:50 year storm event. The 1:100-year storm event must also be evaluated and designed for to prevent property damage for all developments.

A stormwater management report as detailed within section 4.1.1. must be submitted to BLC for review and approval.

## 4.3 URBAN AREAS

There are several areas within the County that are comprised of urban style cross sections with curb and gutter or a mix of urban and rural.

Proponents shall design for the use of an underground piped system (minor system), capable of handling of the 1:5-year storm event where feasible. Analysis will be required to determine extent of water ponding during 1:50 year and 1:100-year storm events.

Design criteria for the stormwater analysis is contained within section 4.4.





## 4.4 DESIGN STANDARDS

### 4.4.1 Design Criteria

Determination of storm sewer flows entering an underground piped storm sewer system shall be designed in accordance with the Rational Method of analysis using the formula:

$$Q = \frac{CIA}{360} \quad \text{and}$$

and

$$Q = \frac{C1 \, CIA}{360}$$

Frequency Factor C1  
(Return Years)

10 or less	1.0
25	1.1
50	1.2
100	1.25

- The intensity of rainfall shall be based on the five (5) year storm and rainfall curves for the specific area (where data is available).
- Minimum run-off coefficients shall be:
  - Agricultural 0.15
  - Residential 0.40
  - Multi-family 0.50
  - Commercial 0.70
  - Industrial 0.70
- Run-off coefficients must be calculated for site specific conditions where details of ultimate site development are known. The following formula relates the run-off coefficient, "C" with imperviousness.
  - $C = (0.95 \times \text{imp}) + 0.1 (1.0 - \text{imp})$  where imp is % imperviousness

### 4.4.2 Pipe

- Pipe sizing shall be determined utilizing the Manning's Formula where the "n" value is as recommended by the pipe manufacturer.
- Minimum pipe sizes:
  - 300 mm diameter for mains.
  - 250 mm diameter for catch basin leads.
- Minimum and maximum flow velocities in any storm sewer main shall be 0.75 m/s and 3.0 m/s respectively. Designs containing velocities in excess of 3.0 m/s shall require





special provisions to protect against pipe displacement by erosion or impact. Such special provisions are subject to approval by the BLC in writing.

- Pipe material shall be:
  - Reinforced sulphate resistant concrete pipe conforming to ASTM C76.
  - Polyvinyl chloride (PVC) conforming to ASTM F794, minimum Class DR35 or sizes up to 400 mm diameter.
  - Ultra-Rib (PVC) to ASTM F794 and CSA B182.4, minimum Class DR35 for sizes up to 600 mm diameter.
  - Perma-Loc (PVC) for sizes over 600 mm to ASTM F794 and CSA B182.4.
  - Pipe joints shall be rubber ring conforming to ASTM C443 for concrete pipe and ASTM 03212 for PVC pipe.
  - All pipe installations shall comply with the manufacturer's recommendations.

#### 4.4.3 Manholes

- Manholes shall be precast reinforced concrete sections conforming to ASTM C478, latest version thereof.
- All manholes shall be 1,200 mm inside diameter in the main portion of the structure unless otherwise required by the size of the incoming and outgoing pipes.
- Manhole frames and covers shall be cast iron conforming to Class 20 ASTM A48. Manhole frames and covers capable of withstanding H-20 loading shall be type NF-80 in paved areas; type F-39 for gravel roads and type NF-39 frames and cover may be used in landscaped or natural areas.
- Each manhole cover shall minimally have the words "STORM SEWER" embossed on it.
- Manholes rungs shall be standard safety extruded aluminum.
- Manholes bases should be pre-benched, precast slabs. Cast in place bases are acceptable provided the benching is constructed in the bottom of the manhole.
- Manholes shall be provided at the end of each line and at all changes in pipe size, grade, and alignment.
- Maximum spacing between manholes shall not exceed 150 m.
- Safety platforms at intermediate levels are required for manholes greater than 5.0 m depth.

#### 4.4.4 Catch Basins

- Surface water shall not be permitted to run a distance greater than 180 m without provision for interception, which shall be via catch basins of sufficient number and inlet capacity to receive the design stormwater flow. Dead end runs may extend to 300 m provided the hydraulic calculations support this.
- All catch basin structures shall be minimum 600 mm inside diameter precast sulphate resistant concrete sections conforming to ASTM C478.
- All catch basin structures shall be constructed to provide a minimum 500 mm deep sump.
- Minimum size catch basin lead shall be 250 mm with a minimum slope of 1.0% and a maximum length of 30 m.





- Where catch basin leads exceed the 30 m length, catch basin manholes consisting of 1200 mm diameter barrels shall be provided.
- Catch basin frames and cover shall minimally be cast-iron (ductile iron is an alternate).
- Refer to Figure 4.2: Catch Basin Detail.
- Refer to Figure 4.3: Catch Basin Manhole Detail.

#### 4.4.5 Storm Sewer Main Installation

- Mains shall be installed to provide a minimum depth of cover to top of pipe of 1.85 m below design finished grade.
- Unless approved otherwise, all mains shall be installed within the roadway right-of-way.
- All pipes shall be installed on compacted granular bedding. Class B granular bedding material shall be placed and compacted around the pipe to at least 300 mm above the top of pipe. The granular bedding shall be a material approved by the BLC in writing.
- Refer to Figure 5.1: Classes of Pipe Bedding

#### 4.4.6 Curved Storm Sewers

In general, curved storm sewer installations will only be allowed where the difficulty of avoiding other utilities necessitates such applications; however, the following restrictions shall apply:

- The sewer shall be laid as a simple curve with a radius equal or greater than 90 m or the manufacturer's minimum recommended radius, whichever is larger.
- Manholes shall be located at the beginning and the end of the curve with the maximum internal between manholes no greater than 90 m along the curve.
- The curve shall run parallel to the road right-of-way, wherever possible.
- The minimum grade for sewers laid on a curve shall be 50% greater than the minimum grade required for straight runs of sewers.
- The maximum deflection at each joint shall be no greater than the maximum deflection recommended by the pipe manufacturer.

#### 4.4.7 Trenching and Backfill

- All trenching and backfilling operations shall be carried out in accordance with the Occupational Health and Safety Guidelines.
- Widths of trenches shall be such that pipes can be laid and jointed properly and the backfill placed and compacted properly.
  - Maximum width for single pipe:
 

=	750 mm diameter or less	=	O.D. of pipe plus 450 mm
=	pipe larger than 750 mm	=	O.D. of pipe plus 600 mm

\* Refer to Figure 5.12: Trench Excavation and Backfill

- Trench wall shall be vertical to 300 mm above the top of pipe and the width at this location shall not exceed the maximum.
- If it is not possible during construction to maintain the allowable trench width presumed by design, the structural design of the pipe shall be re-evaluated to ensure earth loads





will not exceed design load carrying capacity or that deflection of flexible pipe will not exceed performance criteria.

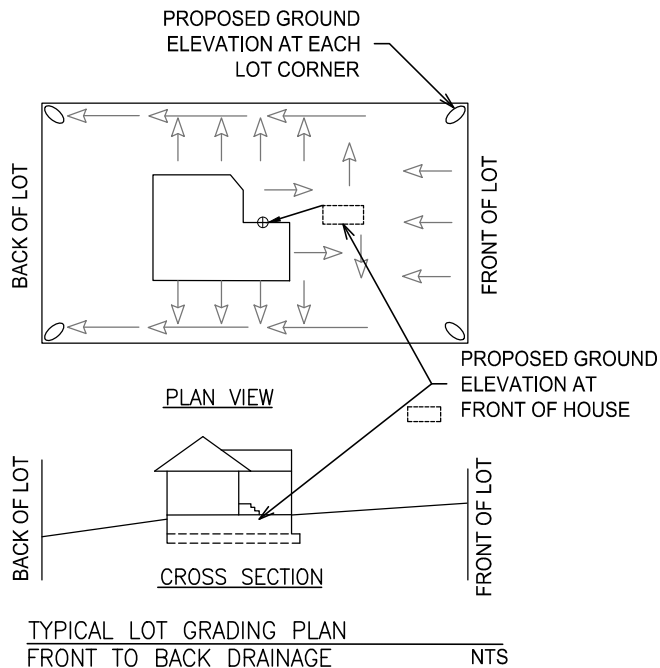
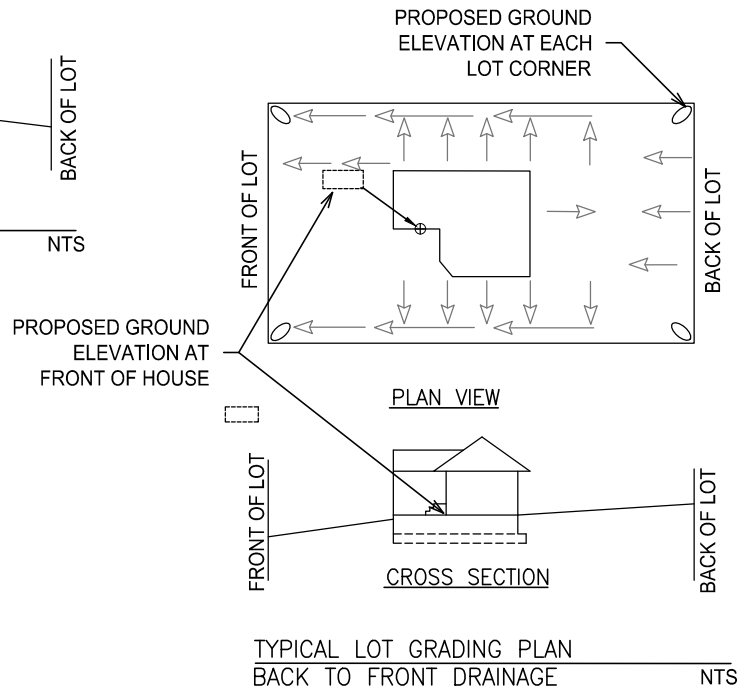
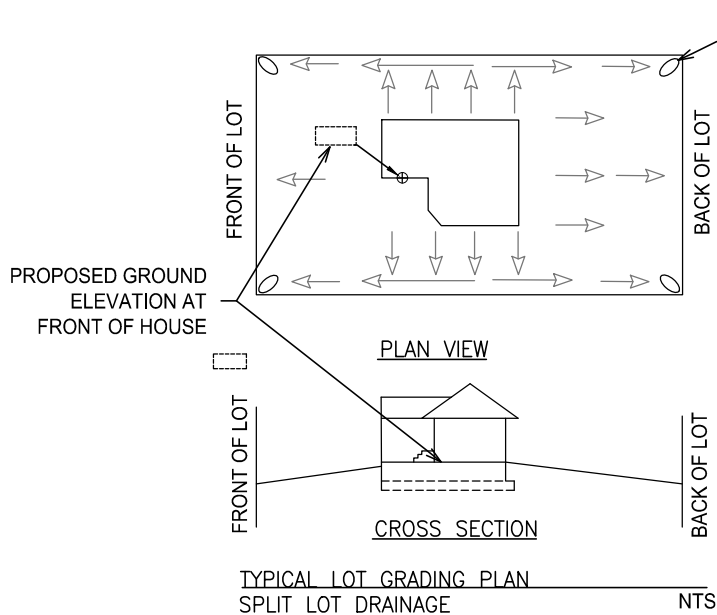
- Backfilling under or within 2 m of existing or proposed roadways, alleys, walkways, streetlights, or similar structures shall be compacted in lifts not exceeding 300 mm to 98% of Standard Proctor Density from the designated subgrade elevations or existing ground level, whichever is lower, to 1.5 m below and to 95% of standard proctor density for areas more than 1.5 m below.
- Backfilling within areas that are in landscaped or non-travelled surfaces shall be compacted in lifts not exceeding 300 mm to 95% of Standard Proctor Density.
- Backfill around manholes and catch basins shall be placed in 150 mm layers and compacted with mechanical tampers to a minimum of 98% of Standard Proctor Density.
- Culvert installation; Refer to section 3.3.6 – Culverts and Drainage

#### 4.4.8 Inspection

- All excavating, laying, and joining of pipes, backfilling, compaction and completion of all works shall be subject to inspection by authorized representative of BLC. Unsatisfactory conditions shall be remedied immediately upon notification at the Developer's expense.
- Following construction, all storm sewer mains, manholes, catch basins, and catch basin leads and culverts shall be thoroughly cleaned and flushed of any earth, gravel, and other debris. Such material shall be collected and removed to a disposal site approved by the BLC.
- All sections of the storm sewer system up to and including a 900 mm size shall be inspected with closed circuit television camera equipment. An inspection report, photos, and digital video recording shall be submitted to the BLC for BLC records and approval prior to issuance of a Construction Completion Certificate.
- All sections of a storm sewer system larger than 900 mm in size shall be visually inspected.







MINIMUM SLOPES:  
 TRANSVERSE (DIRECTED TO SIDE SWALES)  
 = 7.5% FOR 2.0m AWAY FROM HOUSE FOUNDATION  
 = 1.5% AWAY FROM PARCEL CENTRES LONGITUDINAL  
 SIDE SWALES

N.T.S.



# LOT GRADING GUIDELINES

## MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

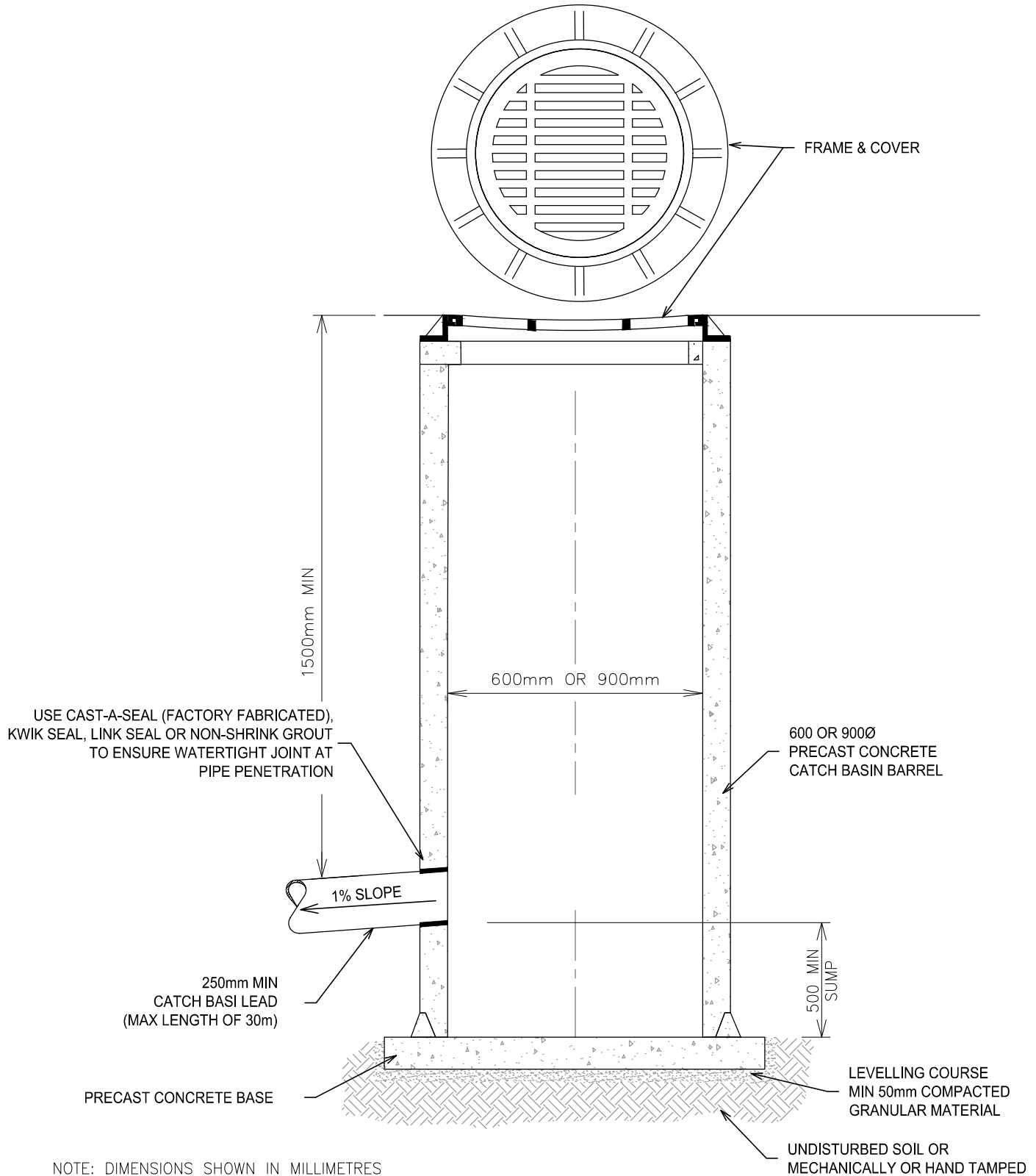
SEPT. 2023

REVISED:

DRAWING NO:

4.1





N.T.S.



# CATCH BASIN DETAIL MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

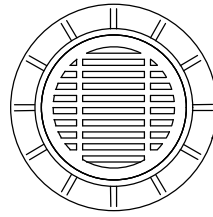
SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	-
DRAWING NO:	4.2



The diagram shows a mechanical assembly with several parts indicated by arrows and reference numerals:

- 75**: Points to two angled plates at the top left.
- 50**: Points to a horizontal plate on the right side.
- 300**: Points to a vertical plate on the far left.
- 300**: Points to a diagonal support or bracket at the bottom center.

150mm OR 100mm GRADE  
RINGS AS REQUIRED  
(MAX 3)



### ECCENTRIC CONICAL TOP

WATERPROOF  
WITH TORCH ON  
TAR APPLICATION AT  
ALL JOINTS

O-RING GASKET JOINT  
FOR WATERTIGHT SEAL  
(TYPICAL)

## STEPS

## PRECAST REINFORCED CONCRETE BARRELS

PRECAST CONCRETE BASE

LEVELLING COURSE  
- MIN 50mm COMPACTED  
GRANULAR MATERIAL

1200mm CATCH BASIN MANHOLE

UNDISTURBED SOIL OR  
MECHANICALLY OR HAND TAMPED

N.T.S.



# CATCHBASIN MANHOLE DETAIL

## MUNICIPAL SERVICING STANDARDS

### BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

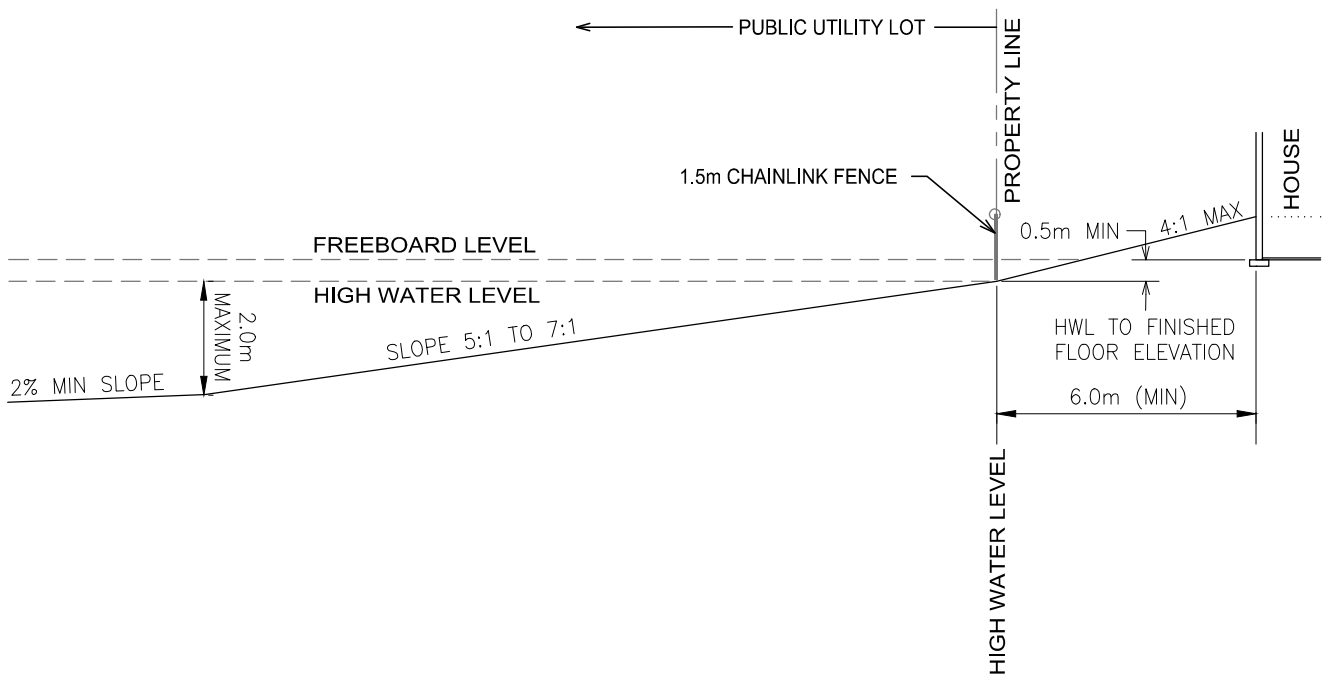
SEPT. 2023

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DRAWING NO:

## 4.3





NOTES:

1. FOR FURTHER DETAILS, REFER TO THE LATEST EDITION OF ALBERTA ENVIRONMENT'S ENGINEERING STANDARDS & GUIDELINES.

N.T.S.



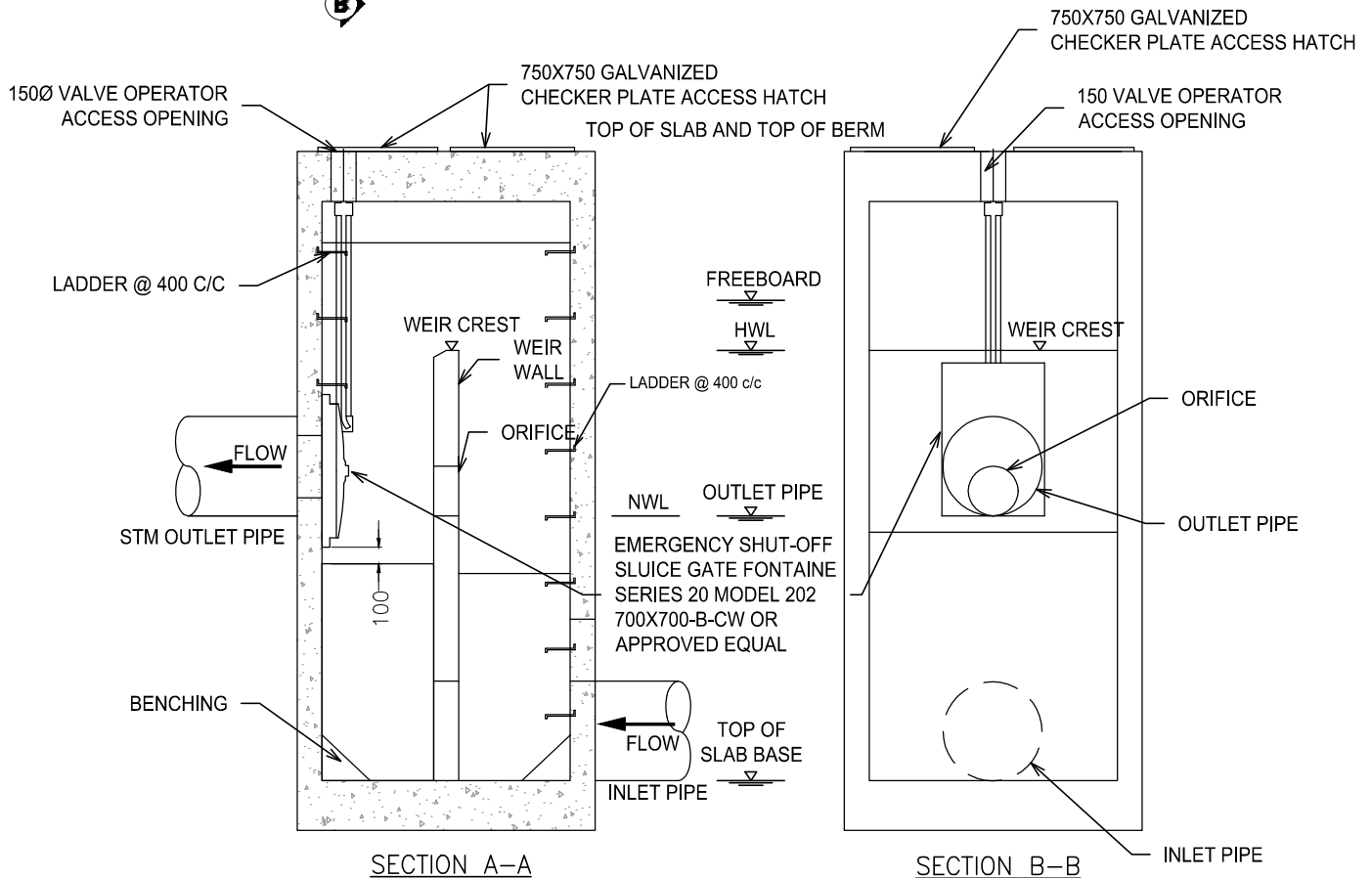
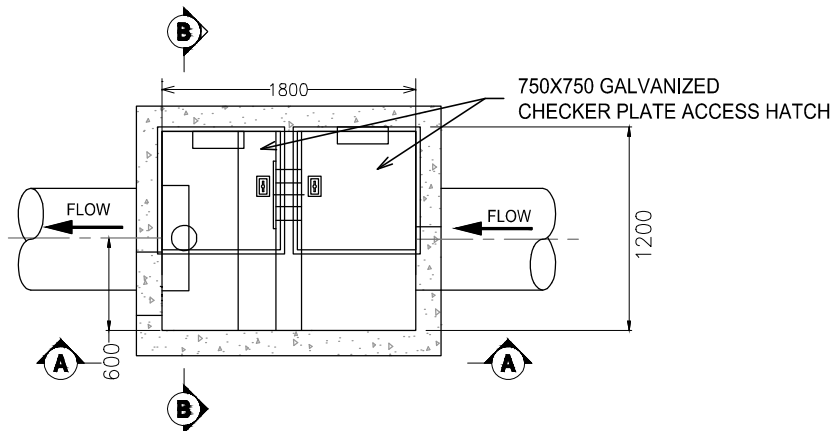
# STORMWATER MANAGEMENT DRY POND SECTION MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	-
DRAWING NO:	4.4



# STORMWATER MANAGEMENT WET POND SECTION MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY





NOTES:

1. SLUICE GATE SHALL BE FONTAINE SERIES 20 c/w NON-RISING STEM AND REMOVABLE KEY OR APPROVED EQUAL.
2. ALL DIMENSIONS ARE IN MILLIMETERS AND ELEVATIONS ARE IN METERS
3. WHERE APPLICABLE, A STORMWATER TREATMENT CONTROL STRUCTURE (EX/ STORMCEPTOR) SHALL BE USED IN EXCHANGE FOR THIS STYLE.

N.T.S.



# STORM POND RELEASE CONTROL MANHOLE MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

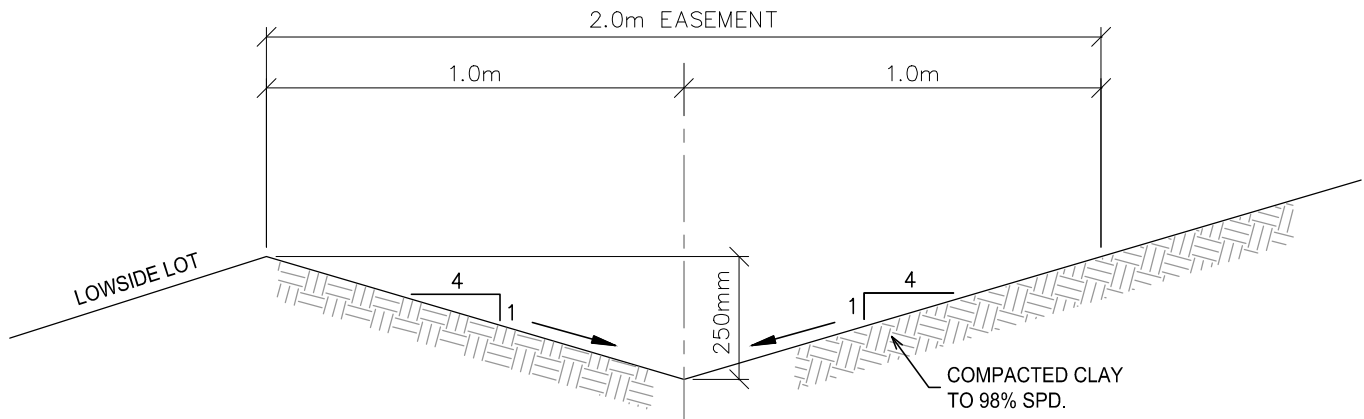
SEPT. 2023

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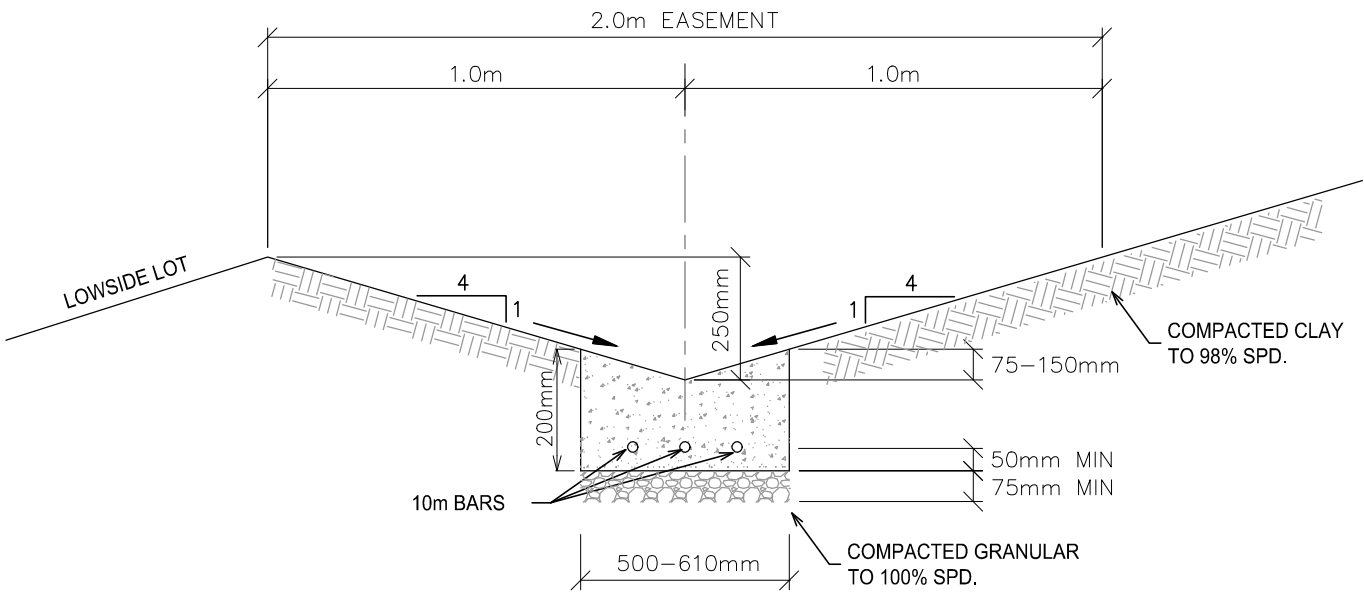
DRAWING NO:

4.6





TYPICAL GRASS SWALE SECTION



TYPICAL GRASS SWALE SECTION  
WITH CONCRETE GUTTER

N.T.S.



# DRAINAGE SWALES

## MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	-
DRAWING NO:	4.7



## 5 WATER DISTRIBUTION SYSTEMS

### 5.1 GENERAL

- This section outlines the minimum standards or requirements for water distribution systems required to be provided in a development. Refer to Section 6.0 for Individual Water Service Connections.
- The standards outlined herein are intended to be the minimum requirements. It is the Developer's responsibility to meet or exceed the standards in accordance with good engineering practices, specific site conditions, and/or as may be required by the BLC and all Statutory and Regulatory Approval Agencies.
- All materials used in the development shall be new and in compliance with the most recent standards of AWWA (American Water Works Association), ASTM (American Society for Testing and Materials), CSA (Canadian Standards Association), NSF (National Sanitation Foundation) or ULC (Underwriter's Laboratories of Canada).

#### 5.1.1 DESIGN CRITERIA

- The water distribution system shall be designed in accordance with recommended standards and the design manual of the American Water Works Association (AWWA) and Alberta Environment and Parks requirements and/or guidelines and any previous higher standards approved by these agencies will supersede BLC's Engineering, Development & Construction Standards.
- The system shall be designed as part of the overall or ultimate distribution system to meet maximum day consumption plus fire flows or peak hour flows, whichever is the greater. A design report shall be submitted to the BLC outlining the calculations for pipe sizing, hydrant flows and pressures including flow and pressure criteria when sprinkler systems are required.
- Design shall be based on the following per capita consumption:
  - Average daily demand (ADD) 350 litres/ capita / day.
  - Peak daily demand 2.0 x average daily demand
  - Peak hourly demand 4.0 x average daily demand
- The design population shall be for the area under consideration.
- Commercial and industrial areas shall be based on equivalent population subject to the peak daily demand and peak hourly demand multipliers.
  - Average daily demand (ADD) 6,000 litres / Ha / day.
  - Peak daily demand 2.0 x average daily demand
  - Peak hourly demand 3.0 x average daily demand
- Fire flow requirements shall be in accordance with the Fire Underwriter's guidelines latest version thereof. Generally, these are:
  - Single family residential 60 litres /second
  - Multi-family residential 90 litres /second





- Walk-up Apartments 115 litres /second
- Institutional 90 litres /second
- Commercial 190 litres /second
- Light Industrial 230 litres /second
- The minimum size of pipe in a distribution system shall be as follows:
  - For residential 150 mm diameter
  - For commercial 250 mm diameter
  - For industrial 300 mm diameter
- The minimum ground elevation residual pressure in the system shall be 310 kPa (45 psi) except at the hydrant used to fight a fire where the residual pressure shall be a minimum of 140 kPa (20 psi) at the minimum required fire flow at the locale.
- A pressure sustaining valve will be required for any development that would have their own fire pump to ensure the Municipal system is not drawn below 150 kPa (22 psi).
- Distribution mains shall be continuous (looped) whenever possible. Where a dead-end main is approved, the maximum number of single-family services shall not exceed twenty (20) and a flush point assembly or hydrant shall be installed.
- Wherever there is a requirement that the watermain cannot be interrupted, a hot tap shall be placed on the water main.
- Automatic sprinkler systems may be required by BLC to be installed in single family dwellings within specific subdivisions within BLC where acreage lot sizes are less than 0.40 Ha (1 acre) and where a municipal water system is a requirement of the subdivision approval. Where automatic sprinkler systems are a requirement of a subdivision approval, the sprinkler system shall be installed in accordance with BLC's "Residential Sprinkler Systems" in Section 3.12.
- The minimum pressure to be maintained in a residential distribution system, where automatic sprinklers are a requirement is 350 kPa (51 psi).
- A design report shall be provided to the BLC outlining the minimum service pipe sizing and design pressure required at each lot to meet the Residential Sprinkler Standard.

### 5.1.2 WATERMAIN PIPE MATERIAL

- Pipe shall be Polyvinyl Chloride (PVC) pressure pipe AWWA C900 with a minimum 1035 kPa (150 psi) working pressure unless otherwise designed with specific working pressures by the Consulting Engineer.
- Fittings (tees, elbows, crosses) up to and including 200 mm diameter shall be molded Polyvinyl Chloride (PVC) to CSA B137.2 (Class 150) unless approved otherwise in writing by the BLC.
- Alternate piping shall be High Density Polyethylene (HDPE), AWWA C906, with a minimum 1104 kPa (160 psi) working pressure (DR11) unless otherwise designed with specific working pressure by the Consulting Engineer.
- Fittings (tees, elbows, crosses, couplers, reducers) shall be 1104 kPa (160 psi) to ASTM D3350.
- Piping and fittings shall be joined by fusion / electrofusion.





### 5.1.3 WATERMAIN INSTALLATION CRITERIA

- All mains shall be installed to a minimum depth of 3.0 m to top of pipe below finished design grade. Alternative methods may include appropriate insulating techniques only as approved by the BLC. Refer to Figure 7.8.
- All pipes shall be installed on compacted granular bedding. Class B granular bedding material shall be placed and compacted around the pipe to at least 300 mm above the top of pipe. The granular bedding shall be a material approved by the BLC and shall typically consist of:
  - Gravel or sand consisting of hard durable particles free from clay lumps, cementation, organic matter, frozen material, or other deleterious material.
  - Gradations to be within limits specified when tested to ASTM C136 and ASTM C117 and to have a smooth curve without sharp breaks when plotted on semi-log charts.

Sieve Designation (µm)	% Passing
10,000	100
5,000	95-100
2,500	80-100
1,250	50-85
630	30-65
315	10-30
160	2-10

Refer to Figure 5.1: Classes of Piping Bedding.

- All pipe installations shall follow the manufacturer's recommendations, including vertical and horizontal allowable deflections.
- Unless approved otherwise, all water mains shall be installed within the road Right-of-way.
- A minimum of 3.0m horizontal separation shall be maintained between a watermain and any sewer (wastewater or storm).
- A minimum distance of 3.0 m horizontal separation shall be maintained between any watermain or water main fixtures and any power line including streetlights, gas line, telephone/television cable, or any duct line or pipeline, subject to further approval by the shallow utility and/or pipeline company and the BLC in writing.
- Unusual conditions including excessive rock, dewatering problems, or congestion with other utilities may prevent the normal required separation of 3.0 m. Under these conditions, BLC may approve a lesser separation distance. Under no circumstances shall the horizontal distance be less than 1.0 m.
- Unless approved otherwise, watermains shall cross above sewers with sufficient vertical separation to allow for proper bedding and structural support of the water and sewer mains. If a watermain is to be constructed underneath a sewer main, a minimum 0.5 m vertical separation is required, and adequate structural support be provided.





- Thrust blocking shall be type 50.0 sulphate resistant concrete having a minimum compressive strength of 20.0 Mpa quick set or employ mechanical thrust blocks. Do not hydrostatic test before concrete cures for 5 days.
  - Refer to Figure 5.2: Horizontal Thrust Block Detail.
  - Refer to Figure 5.3: Vertical Bend and Offset Thrust Block Detail.
  - Pipe Restraint Devices shall be used separately or in conjunction with thrust blocks, where identified as being required, and shall be installed in accordance with the manufacturer's recommendations. Restraint Devices for Mechanical Joint or Push-On fittings shall be Uni-Flange Block Buster 1300 or approved equal. Refer to Figure 5.4.
- Timber blocking shall be pressure treated hemlock or fir.
- Piping may be installed utilizing Horizontal Directional Drilling method as per section 7.5 and as shown on design drawings.
- Tracer wire to be installed on all waterline piping.

#### 5.1.4 WATER VALVES

- Watermain valves shall be the same size as the diameter of the main.
- Valves on the distribution mains shall be installed:
  - In a cluster at the intersection of the lines or
  - At the projection of property lines at intersections and at mid-block.
- Valves on the distribution mains shall be located such that during a shutdown:
  - No more than three (3) valves are required to affect the shutdown with two (2) valves at a tee and three (3) at a cross.
  - No more than one (1) hydrant is taken out of service.
  - No more than twenty (20) single family services are taken out of service.
- For watermains with a diameter up to and including 400 mm, gate valves conforming to AWWA C509, latest revision thereof, shall be used and shall include the following supplementary requirements:
  - Resilient seated
  - Non-rising spindle
  - To open by turning counterclockwise direction
  - Minimum operating pressure 1200 kPa (175 psi)
  - Exterior shall be epoxy coated.
  - All bolts and nuts to be stainless steel coated at installation with Denso Mastic and wrapped with Denso Tape





- For watermains with a diameter greater than 400 mm, butterfly valves conforming to AWWA C504, latest revision thereof, shall be used and shall include the following supplementary requirements:
  - Tight-closing, rubber seated tape
  - Seat material shall be EPDM (ethylene propylene diene monomer (M-class) rubber), field replaceable.
  - Disc material shall be ductile iron with 316 SS edge to ASTM A-536
  - Shafts shall be solid stainless steel 18-8, Type 304
  - Minimum bubble tight differential at 1050 kPa (152 psi)
  - Exterior shall be epoxy coated.
  - All bolts and nuts to be stainless steel coated at installation with Denso Mastic and wrapped with Denso Tape.
- Butterfly valves greater than 400 mm shall be installed with appropriate bypass capabilities and shall be installed in a chamber or vault.
- Valve boxes complete with operation stem and rock disk are required on all valves. Valve boxes shall be a two (2) section, bituminous coated, Type A (slide) or B (screw), cast iron adjustable type with a cast iron lid. The rock disk shall be no more than 0.3 m below finished surface grade. Valve boxes shall be sufficient length to provide for adjustments of 300 mm in up and down directions. PVC Bottoms for type A will be permitted. Refer to Figure 5.5.
- Flush Point – where a water main is not looped, provision shall be made to permit flushing of the main by installing a flush point assembly at the terminus of the main.
- Gate valves for HDPE pipe have ductile iron bodies up to 300 mm diameter, to AWWA C509 or AWWA C515, cold-rolled, stainless-steel stems, 304 stainless steel bonnet bolts, certified to NSF 61, fusible to HDPE pipe as per manufacturer's recommendation.
- Each valve box shall be marked by a vertical, nominal size 50 x 100 timber, set 1.0 m into the ground adjacent to the valve box and extending 1.0 m above the top of the surrounding ground. The top 0.3 m of the exposed portion of this marker post shall be painted blue.
- Refer to Figure 5.11: Gate Valve Installation Detail
- Refer to Figure 5.7: Butterfly Valve Installation Detail
- Refer to Figure 5.8: Air Relief Valve Installation Detail
- Record drawings shall be provided by the Consulting Engineer illustrating the exact locations of all valves complete with their model and make.

### 5.1.5 HYDRANTS

- Hydrants shall be the makes and models as approved by BLC.
- Hydrants shall be “dry barrel” type conforming to AWWA C502, latest revision thereof, and shall include the following supplementary requirements:
  - Compression shut-off closing with line pressure.
  - Turn to open counterclockwise.





- Minimum 150 mm I.D. riser barrel.
- Design working pressure of 1035 kPa (150 psi)
- 600 mm extension on top with breakaway flange.
- 150 mm diameter gasket push-on type bottom connection.
- Two (2) 65 mm hose outlets, Alberta Mutual Aid Thread.
- One (1) 144 mm NH Thread steamer port connection.
- Bottom connection with drip valve and drain.
- Operating nuts to be 3-sided, with each side having a face of 36.5 mm long.
- All bolts and nuts to be stainless steel type 304 coated with Denso Mastic and wrapped with Denso Tape at time of installation.
- All hydrants to be finished (E.g., color) as designated by BLC.
- A 150 mm gate valve complete with valve box located 1.0 m from the hydrant shall be provided on each hydrant lead.
- All hydrants along roadways shall be located consistent with Figure 5.9: Hydrant and Valve Locations, Figure 5.14: Hydrant Shoulder Widening Layout and Figure 5.10: Hydrant Bollard Placement for Commercial / Industrial Development. Whenever possible, fire hydrants shall be installed at the furthest point of a dead end main for the purposes of flushing; otherwise, a flush point assembly shall be utilized.
- A minimum 0.5 m<sup>3</sup> wash rock drainage sump shall be provided around the hydrant base. Top of sump to be 150 mm above the hydrant drain and covered with 6.0 mm polyethylene to minimize intrusion of silt or clay into the gravel. Refer to Figure 5.11: Hydrant and Valve Detail.
- The maximum allowable spacing between fire hydrants shall generally be consistent with the Fire Underwriter's guidelines and shall not exceed:
  - 150 m for single family residential areas.
  - 120 m for multi-family residential and institutional.
  - 90 m for commercial/industrial.
- Furthermore, hydrants shall be located such that the distance to any commercial/industrial building shall not be greater than 75 m.
- Where the dwellings in a residential area are equipped with sprinkler systems, the hydrant spacing may be increased to 250 m.
- Record drawings shall be provided by the Consulting Engineer illustrating the exact location of all hydrants and hydrant valves relative to the property line and the main water valves.
- Hydrant Markers (Pollard Water Flexi-Flag Hydrant Marker, 1.83 m (68802)) shall be installed at each hydrant.
- Where the water table is located above the fire hydrant drain, the hydrant drain port may require plugging. The hydrant must be clearly identified on the record drawings and color coded yellow on the hydrant with a note that this hydrant must be pumped out after each use.





### 5.1.6 TRENCHING AND BACKFILLING

- All trenching and backfilling operations shall be carried out in accordance with the Occupational Health and Safety standards and as per the Geotechnical Report.
- Prior to trenching and backfilling of watermain installations, the construction area shall be stripped of all topsoil and/or organic materials.
- Widths of trenches shall be such that pipes and fitting can be laid, jointed properly, backfilled, and compacted properly.
- Minimum trench width 2 x O.D. of pipe diameter or 450 mm, whichever is greater. Refer to Figure 5.12: Trench Excavation and Backfill.
- Backfilling under or within 2.0 m of existing or proposed roadways, alleys, walkways, streetlights, or similar structures shall be compacted in lifts not exceeding 300 mm to 98% of Standard Proctor Density from the designated subgrade elevations or existing ground level, whichever is lower, to 1.5 m below and to 95% of standard proctor density for areas more than 1.5 m below.
- Backfilling within areas that are in landscaped or non-travelled surfaces shall be compacted in lifts not exceeding 300 mm to 95% of Standard Proctor Density.
- Backfill around valves, valve boxes, and hydrants shall be placed in 150 mm layers and compacted with mechanical tampers to a minimum of 98% of Standard Proctor Density.
- Prior to backfilling all piping, fittings, valves, backfill material to be inspected by the Consulting Engineer or their representative for compliance with drawings and these standards.

### 5.1.7 THRUST BLOCKING

- Consisting of type 50 sulphate resistant concrete of 20 Mpa shall be provided at all watermain fittings, valves, and hydrants.
- The size and configuration of the thrust blocking shall be designed for each application.

### 5.1.8 CATHODIC PROTECTION

- Cathodic protection shall be required on all metallic main valves, fittings, and hydrants.
- A 2.3 kg zinc sacrificial anode shall be connected to each valve, fitting, and coupling.
- A single 5.5 kg zinc or approved another sacrificial anode shall be connected to a hydrant.
- Refer to Figure 5.13: Hydrant and Valve Anode Detail.

### 5.1.9 TESTING

- Following construction, all watermains shall be flushed, disinfected, and leakage tested. The BLC shall be notified at least forty-eight (48) hours in advance of all proposed tests which shall be carried out in their presence. All water used shall be from an independent water source (E.g.: water truck).





- Watermain installations shall be pressure and leakage tested in accordance with AWWA standards respecting the pipe material, latest revision thereof, and the following additional criteria:
  - Maximum length of distribution main to be tested shall not exceed 400 m.
  - Maximum length of transmission main, defined as 450 mm diameter pipe and larger, to be tested shall not exceed 800 m.
  - Testing shall be carried out only after concrete thrust blocking has cured for a minimum of five (5) days from date of pour unless mechanical restraints are used, then the test may be carried out after backfilling.
  - Apply a minimum hydrostatic and leakage test pressure of 1035 kPa (150 psi) after completing backfill for period of two (2) hours.
  - For flexible pipe (i.e., HDPE), the pipe should be pre-pressurized prior to commencing the test as per the manufacturer's guidelines.
  - Define leakage as amount of water supplied from water storage tank to maintain test pressure for two (2) hours.
- For existing water mains that are repaired, the line must be flushed until chlorine residual and turbidity levels are within normal operating ranges (average turbidity < 2.0 NTU and total chlorine residual > 0.1 mg/l, before putting main back into service. Samples must be collected at the same time to determine bacteriological quality of water. The sample must show the absence of coliform organisms and meet the latest Canadian Drinking Water Standards.
- Water Systems which will not provide watermain flushing velocities of at least 3.0 m/sec shall be flushed using foam swabs prior to disinfecting of the watermains. Two (2) points along the waterline shall be used for testing.
- Disinfection shall be carried out in accordance with standards outlined in AWWA C651, latest revision thereof. Chlorination levels after chlorinating shall be 50 parts per million (max.) and 25 parts per million (min.) after twenty-four (24) hours of exposure in watermain. Chlorine Tablets will not be permitted unless approved in writing by the BLC.
- A bacteriological test sample must show:
  - The absence of coliform organisms.
  - Meet the latest Canadian Drinking Water Standards.
- Following disinfection, the chlorine solution shall be de-chlorinated by mixing with sodium thiosulphate according to the manufacturer's instruction and re-tested prior to discharge to ditches or storm sewers. All watermains shall be thoroughly flushed. Extreme care shall be exercised to ensure that no contamination of any adjacent property or utility occurs. In addition, discharge of water during flushing operations shall be undertaken in such a manner as to minimize erosion of or damage to adjacent property. Hydrants are not permitted to be utilized for testing.
- All testing results shall be documented and submitted to the BLC for approval prior to commissioning of the system and the issuance of a Construction Completion Certificate.





The following leakage allowance is calculated from AWWA Manual No. M23 formula (PVC Pipe – Design and Installation):

$$L = \frac{NDP}{128,300}$$

Where:

L = allowable leakage, litres / hr

N = total number of joints

D = pipe diameter, mm

P = test pressure in kPa

Leakage allowance for new construction of materials other than PVC shall be in accordance with the applicable AWWA standard or as specified by the BLC.

## **5.1.10 RESIDENTIAL SPRINKLER SYSTEMS**

### **5.1.10.1 Introduction**

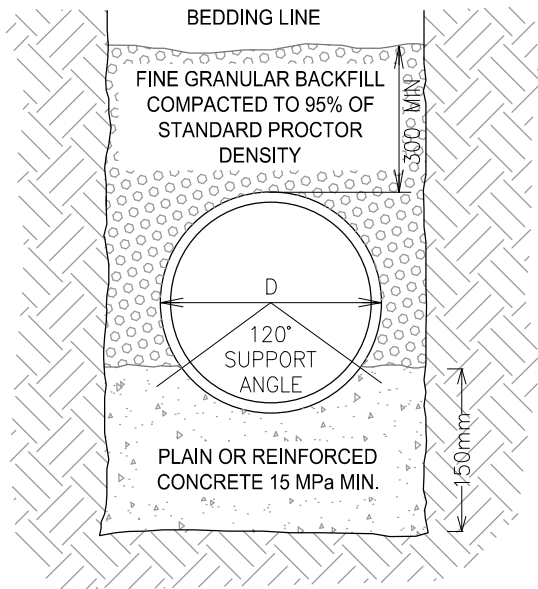
BLC may require automatic sprinkler systems to be installed in single family dwelling within specific subdivisions or areas within BLC where a municipal water system is existing or required as a condition of subdivision approval, Developer's Agreement, or development permit. The homeowners shall be responsible for all aspects and costs of the design, installation, and maintenance of an automatic sprinkler system in accordance with these requirements. All such systems shall be designed and certified by a Professional Engineer registered in the Province of Alberta.

### **5.1.10.2 System Design**

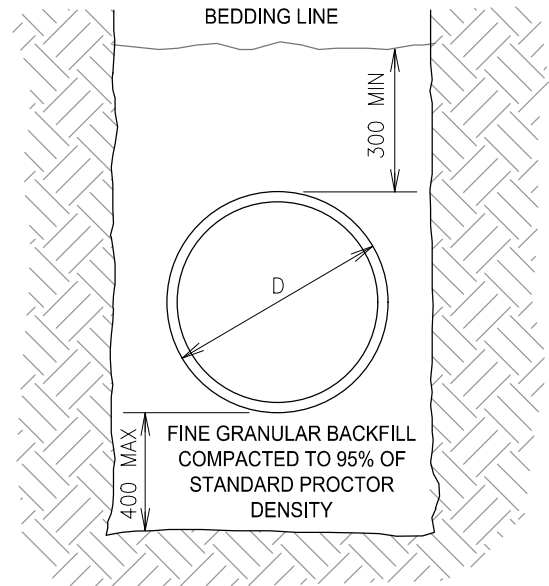
The residential sprinkler system design shall be in accordance with NFPA 13D and all equipment and material used shall be ULC or UL listed.



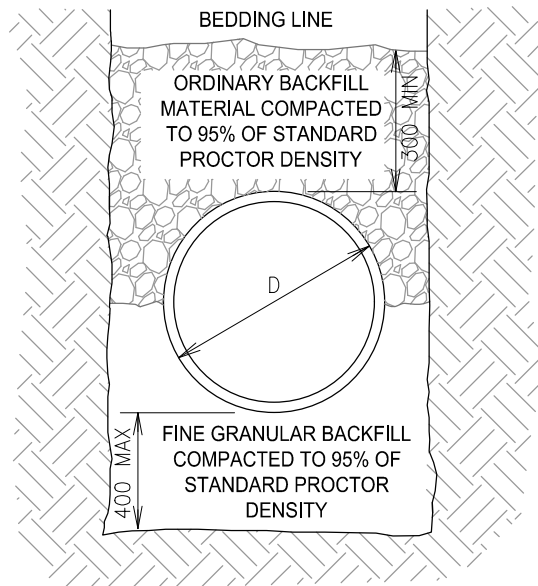




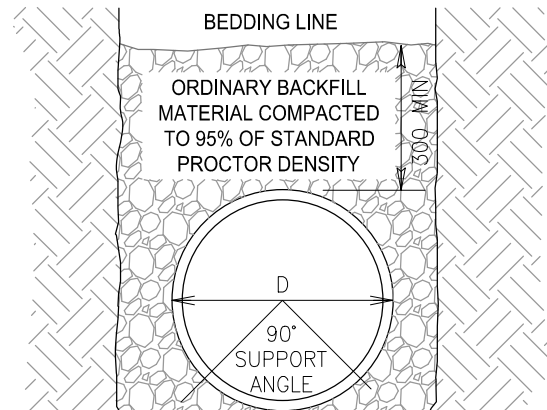
CLASS "A"



CLASS "B"



CLASS "C"



CLASS "D"

ALL DIMENSIONS  
IN MILLIMETERS UNLESS  
OTHERWISE NOTED

NOTES:

1. ALL MATERIAL TO BE BACKFILLED IN 150mm LAYERS.
2. WHERE INSTRUCTED OR AS SHOWN ON DRAWINGS, REPLACE FINE GRANULAR WITH COURSE GRANULAR MATERIAL.
3. FOR DIMENSIONS OF TRENCH SEE DWG. 5.12.
4. "D" IS THE OUTSIDE DIAMETER OF THE PIPE.
5. BACKFILL ABOVE BEDDING LINE TO BE PLACED IN ACCORDANCE WITH THE SPECIFICATION.
6. APPLICABLE ONLY TO SINGLE PIPE INSTALLATIONS IN TRENCHES EXCAVATED IN UNDISTURBED GROUND.

N.T.S.



# CLASSES OF PIPE BEDDING MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

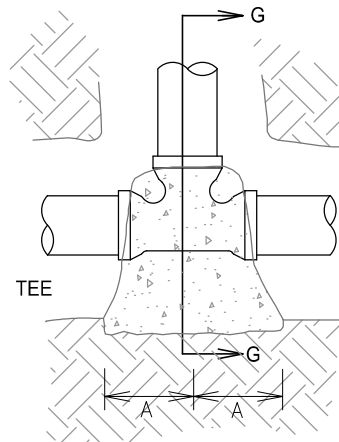
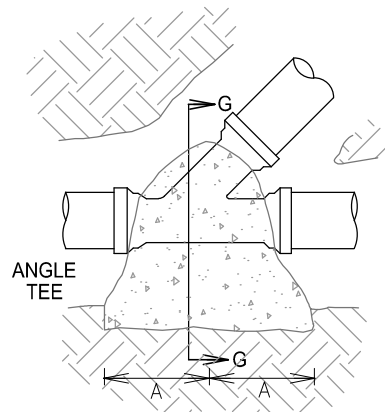
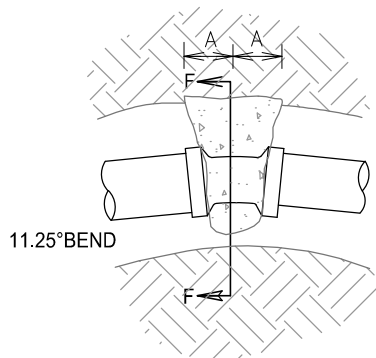
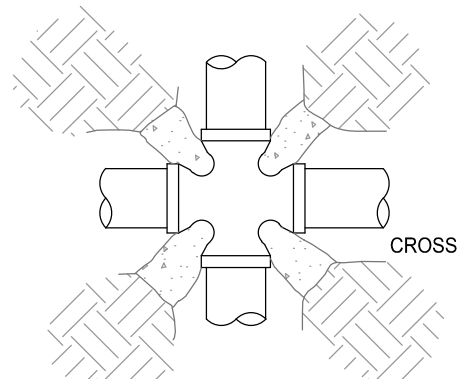
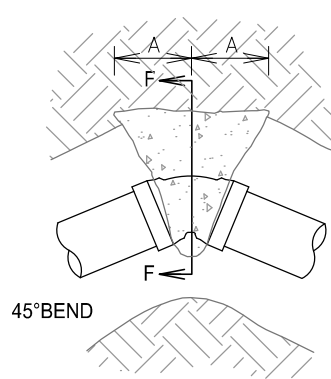
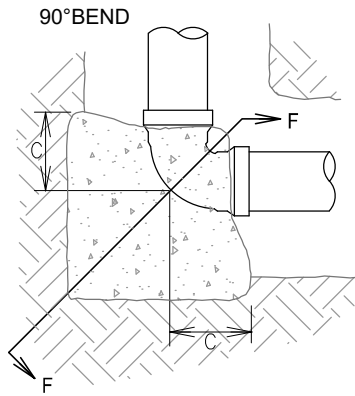
SEPT. 2023

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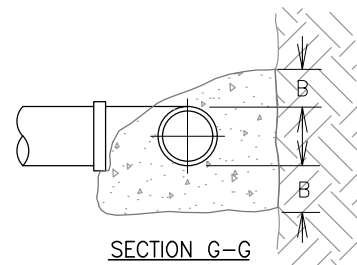
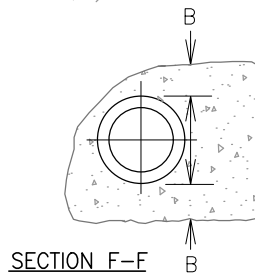
DRAWING NO:

5.1





ALL DIMENSIONS  
IN MILLIMETERS UNLESS  
OTHERWISE NOTED



REQUIRED BEARING AREA																				
	TEE BRANCH & DEAD END					22.5° & 11.25° BENDS					45° BENDS					90° BENDS				
DIA (mm)	300	250	200	150	100	300	250	200	150	100	300	250	200	150	100	300	250	200	150	100
A (mm)	975	775	550	375	250	300	225	200	150	100	550	450	375	300	200	525	350	300	200	150
B (mm)	75	75	75	75	75	150	125	100	75	75	150	125	100	75	75	450	400	350	300	200
C (mm)																450	400	350	300	200
AREA (m <sup>2</sup> )	1.025	0.750	0.475	0.275	0.125	0.500	0.275	0.200	0.150	0.050	0.800	0.550	0.375	0.225	0.100	1.475	1.025	0.700	0.400	0.175

NOTES:

- DESIGN BASIS:
  - HYDRAULIC PRESSURE 1035 kPa
  - SOIL BEARING CAPACITY 72 kPa (MEDIUM SOFT CLAY)
- TEMPORARY BLOCKING MUST BE APPROVED BY THE ENGINEER
- CONCRETE STRENGTH SHALL BE 25 MPa AT 28 DAYS
- CONCRETE TO BE CLEAR OF BELLS AND PIPE UNDER ALL FITTINGS

N.T.S.



# HORIZONTAL THRUST BLOCK

## MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

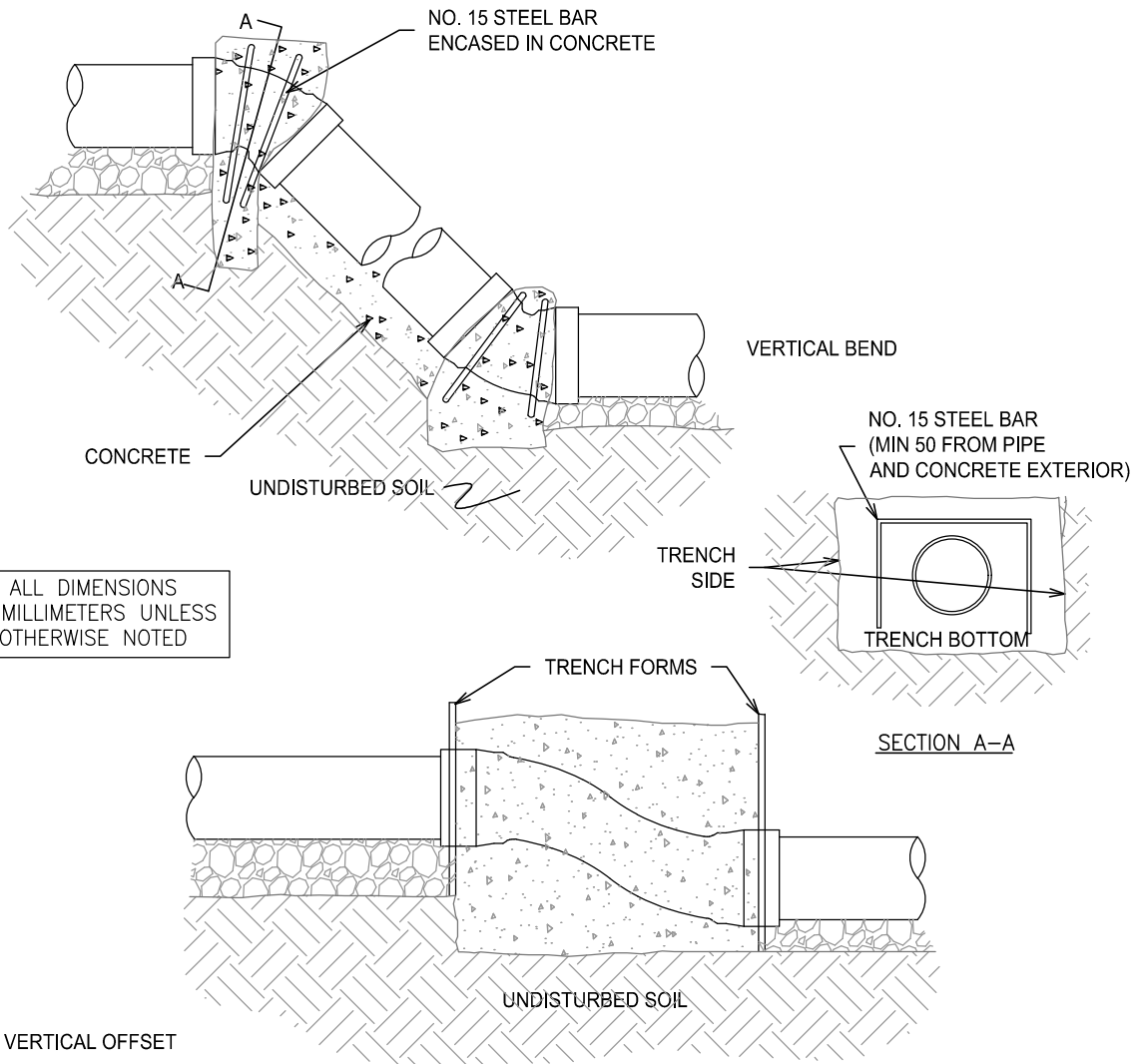
SEPT. 2023

REVISED:

DRAWING NO:

5.2





REQUIRED BEARING AREA										
	22.5° & 11.25° BENDS					45° BENDS				
DIA (mm)	300	250	200	150	100	300	250	200	150	100
AREA (m <sup>2</sup> )	0.425	0.275	0.200	0.150	0.050	0.800	0.550	0.375	0.225	0.100

NOTES:

1. DESIGN BASIS:
  - a. HYDRAULIC PRESSURE 1035 kPa
  - b. SOIL BEARING CAPACITY 72 kPa (MEDIUM SOFT CLAY)
2. CONCRETE MUST NOT ENCASE BELLS OR PIPE
3. CONCRETE STRENGTH SHALL BE 25 MPa AT 28 DAYS
4. CONCRETE TO BE CLEAR OF BELLS AND PIPE UNDER ALL FITTINGS

N.T.S.



# VERTICAL BEND AND OFFSET THRUST BLOCK MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

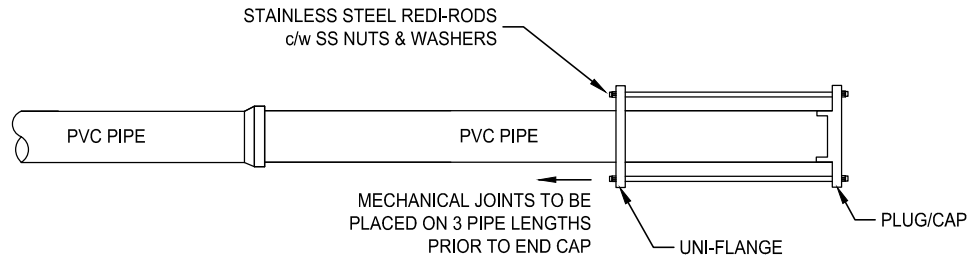
SEPT. 2023

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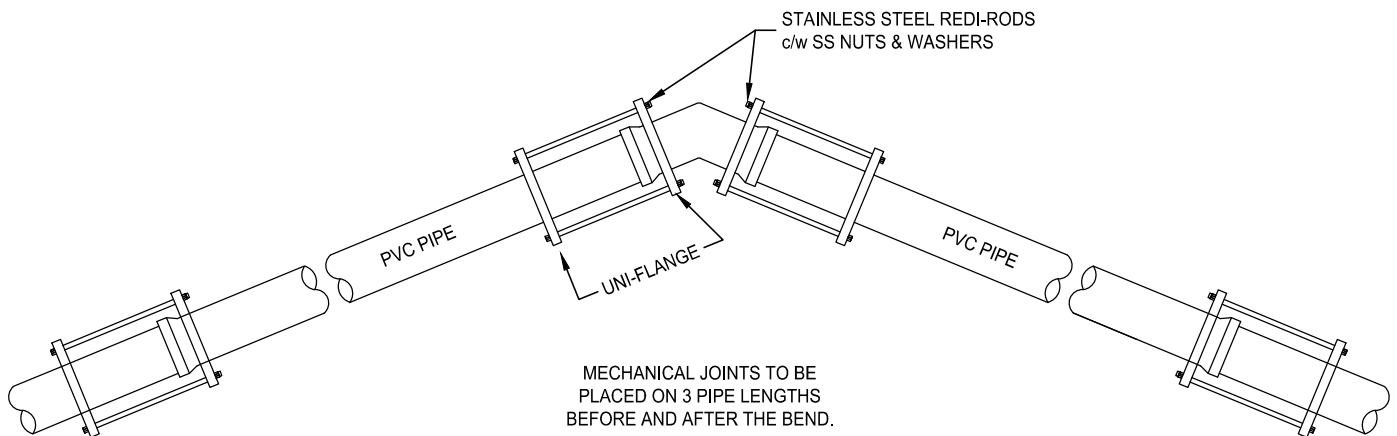
DRAWING NO:

5.3





AT DEAD END



AT BEND

BELL/SPIGOT PVC PIPES

N.T.S.



# TYPICAL MECHANICAL JOINTS MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

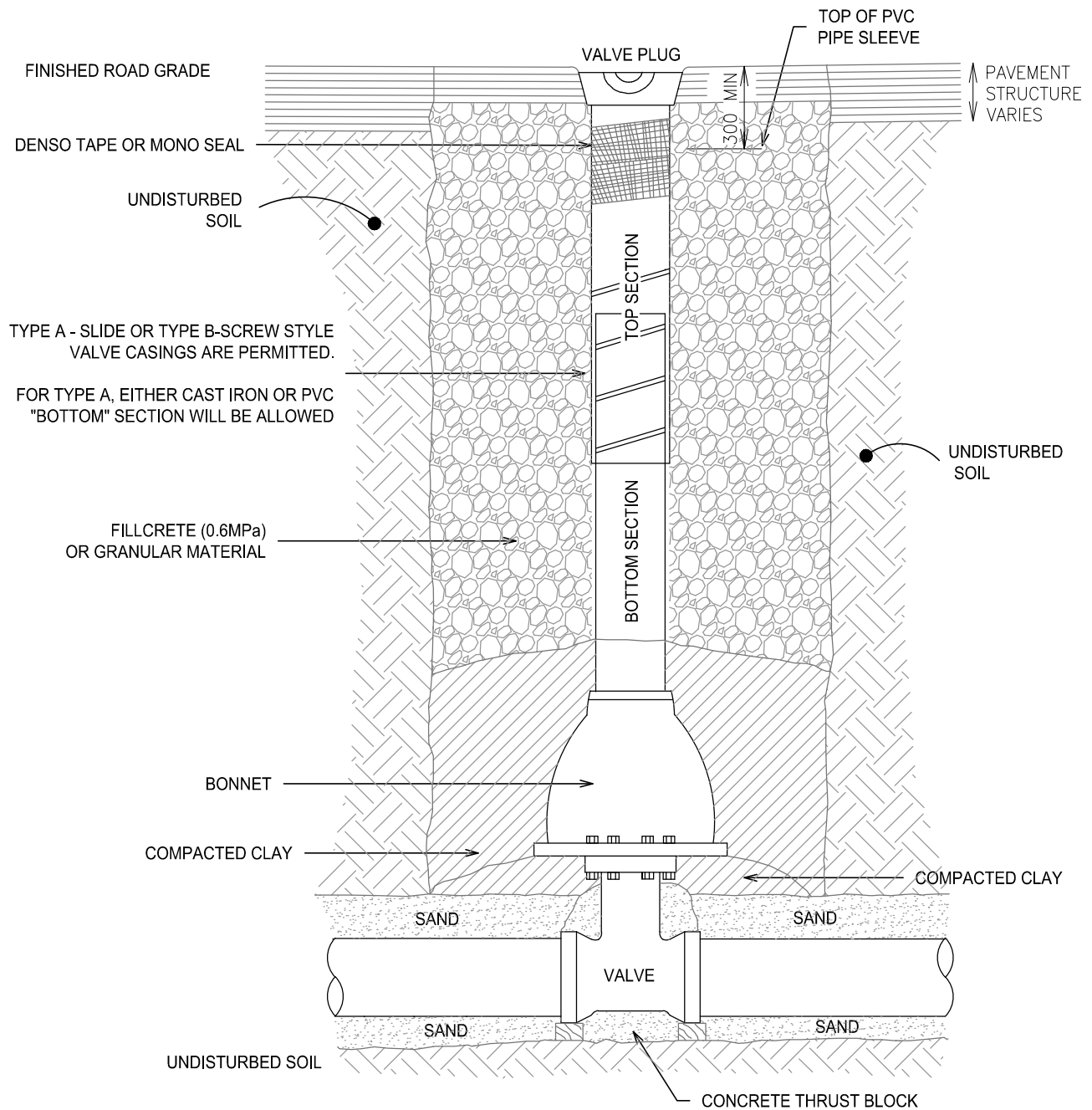
SEPT. 2023

REVISED:

DRAWING NO:

5.4





ALL DIMENSIONS  
IN MILLIMETERS UNLESS  
OTHERWISE NOTED

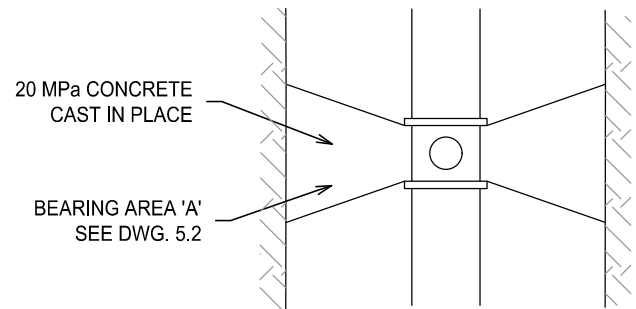
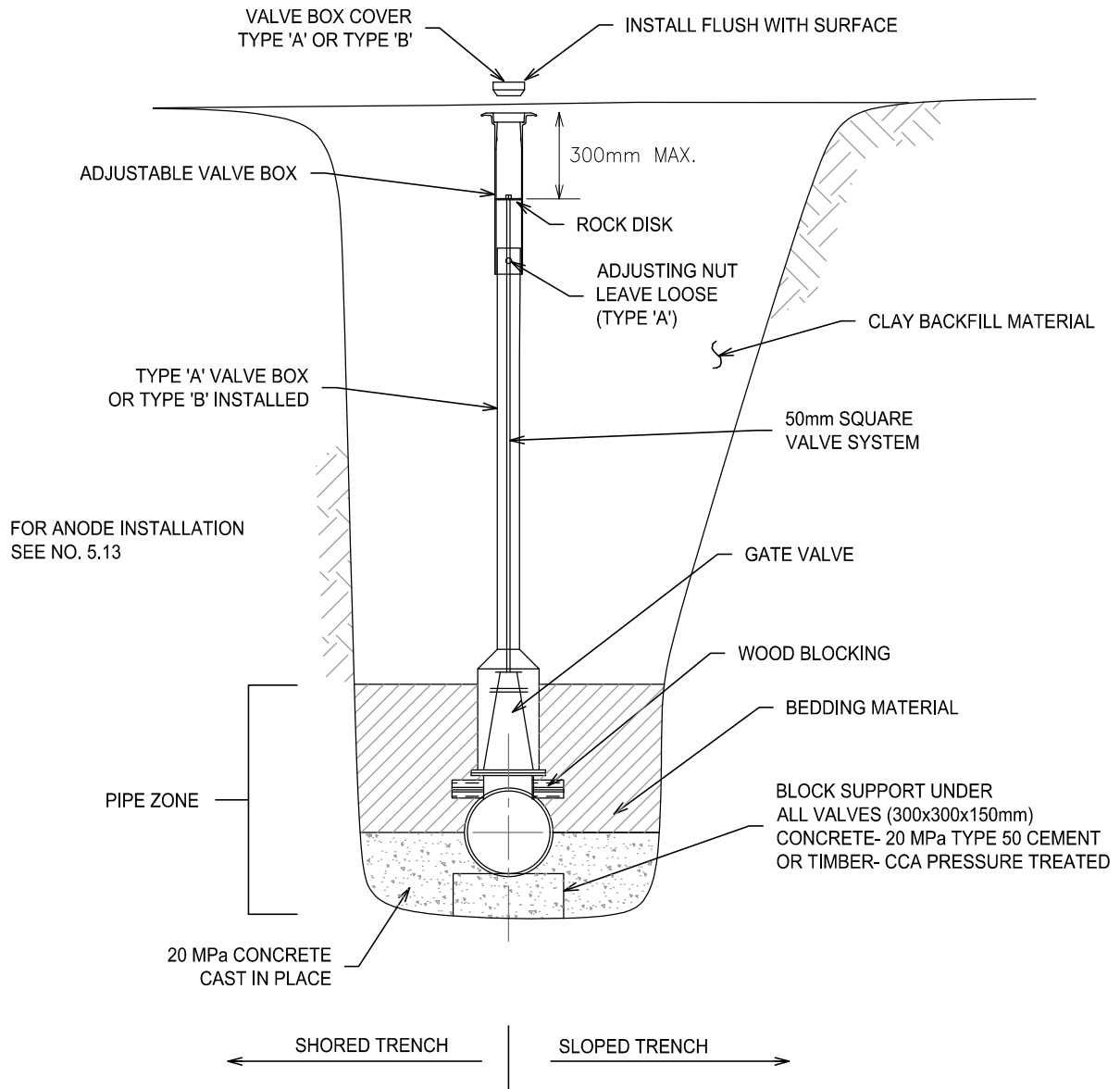
N.T.S.



# VALVE CASING DETAIL FOR FILLCRETE & GRANULAR BACKFILL MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	-
DRAWING NO:	5.5





THRUST BLOCK DETAIL

NOTES:

1. FOR VALVES LESS THAN 400mm USE FLOATING TYPE OR TYPE 'A' VALVE BOX.
2. ALL BOLTS TO BE STAINLESS STEEL WRAPPED WITH DENSO MASTIC AND DENSO TAPE.

N.T.S.



VERTICAL BEND AND  
OFFSET THRUST BLOCK  
MUNICIPAL SERVICING STANDARDS  
BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

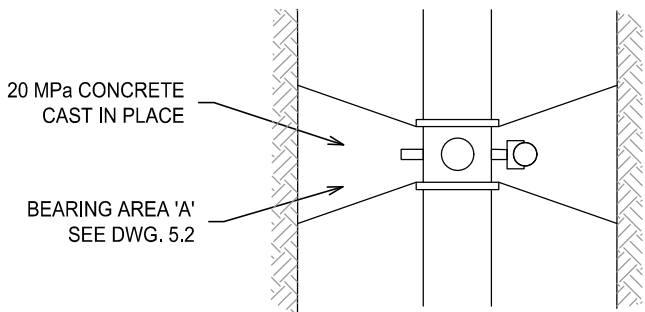
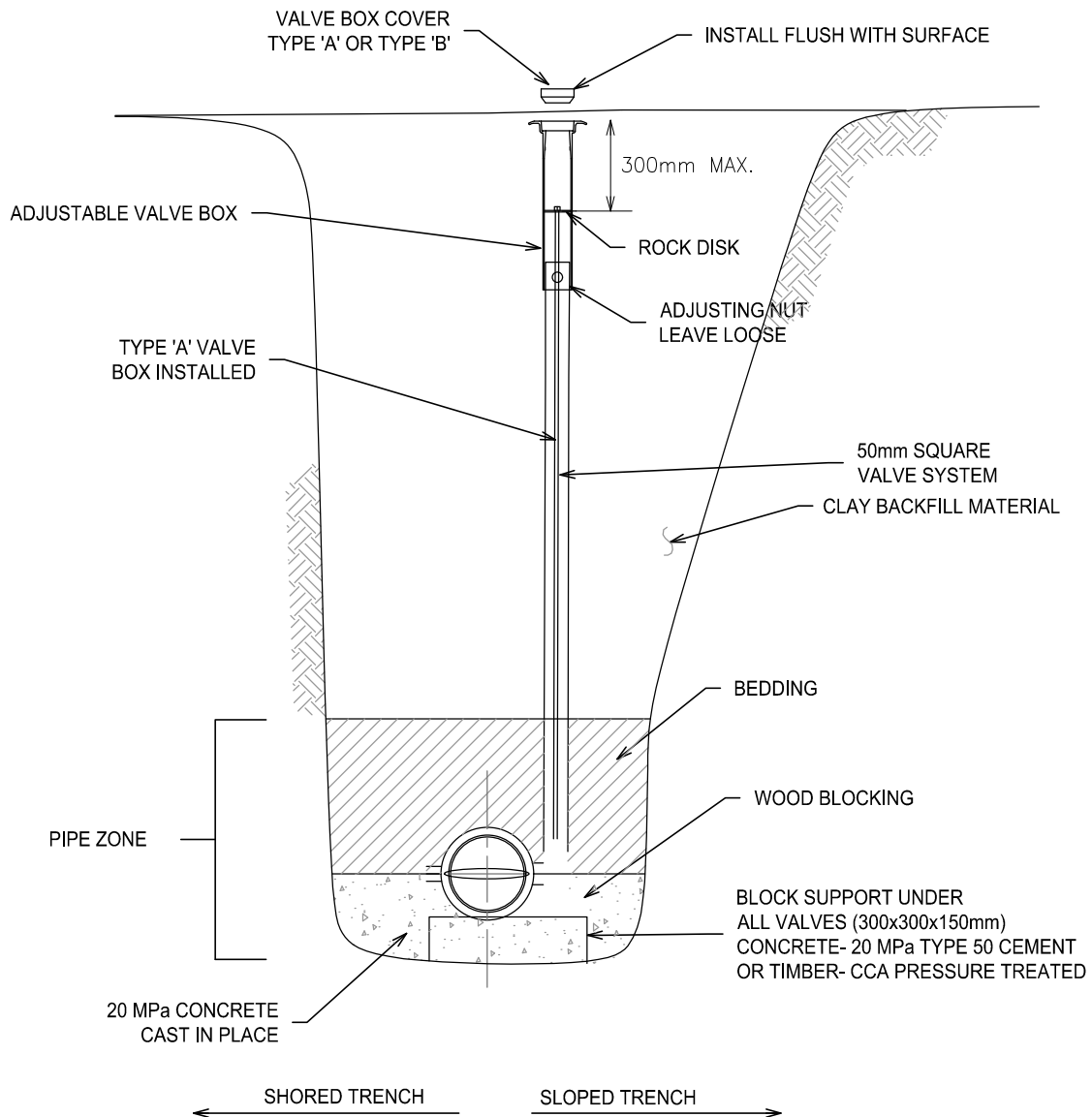
SEPT. 2023

REVISED:

DRAWING NO:

5.6





THRUST BLOCK DETAIL

N.T.S.

NOTES:

1. ALL BOLTS TO BE STAINLESS STEEL WRAPPED WITH DENSO MASTIC AND DENSO TAPE.
2. PAINT TOP OF INTERIOR BOX BRIGHT RED AND STAMP CAP 'BV'.



# BUTTERFLY VALVE INSTALLATION

## MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

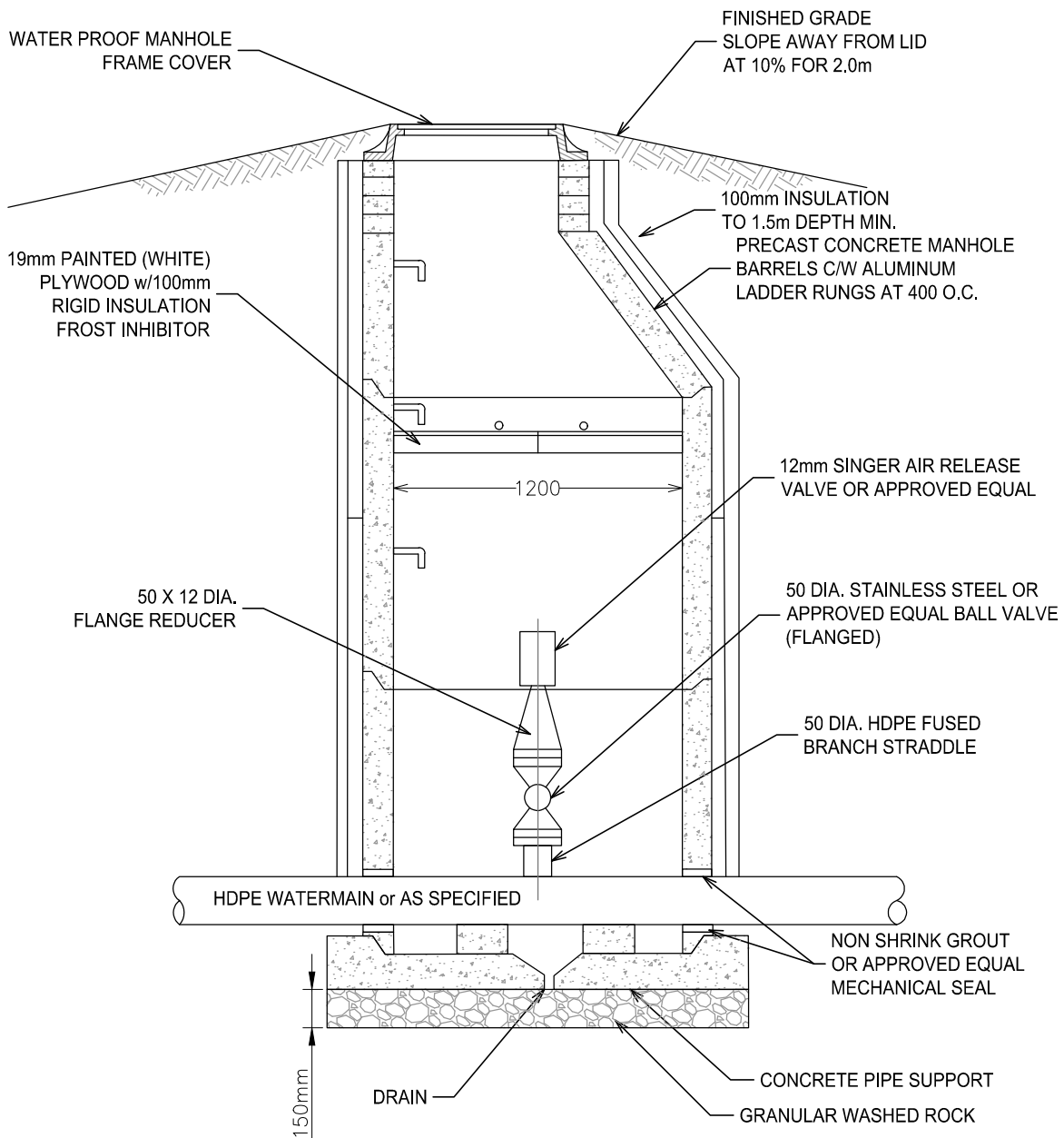
SEPT. 2023

REVISED:

DRAWING NO:

5.7





NOTES:

1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
2. EXTERIOR OF MANHOLE TO BE INSULATED WITH 100mm HIGH LOAD STYROFOAM INSULATION TO AT LEAST 1.5m BELOW GROUND.

N.T.S.



# AIR RELIEF VALVE INSTALLATION

## MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

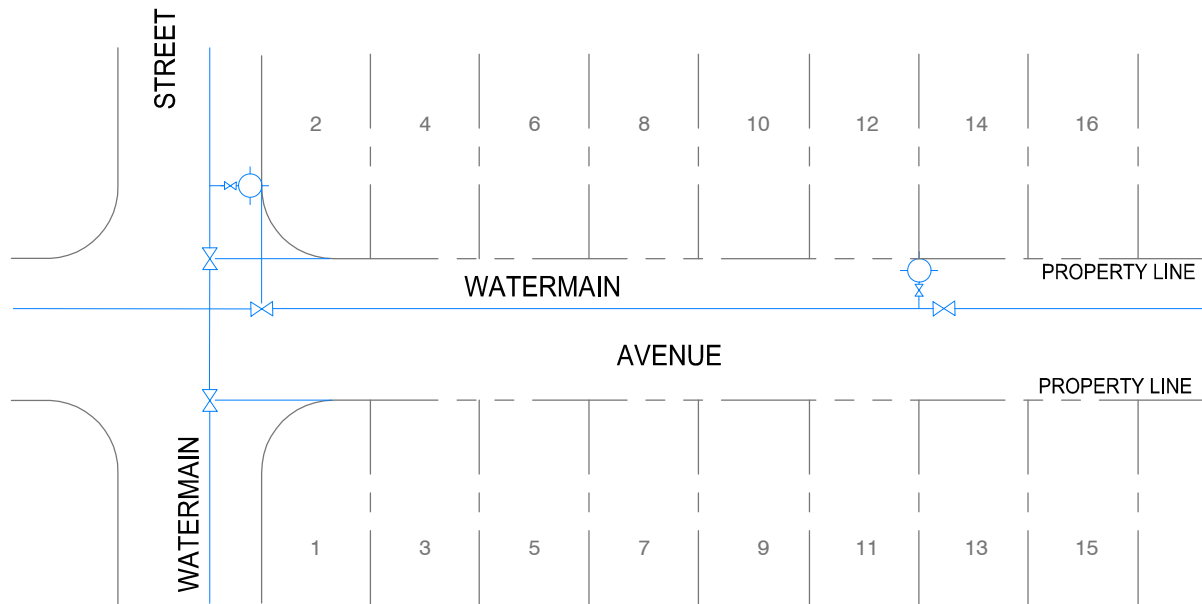
SEPT. 2023

REVISED:

DRAWING NO:

5.8





-  — VALVE  
 — HYDRANT AND VALVE

NOTES:

1. AVOID USE OF EASEMENTS WHERE A STREET OR LANE ALIGNMENT IS AVAILABLE.
2. HYDRANTS TO BE LOCATED NEAR STREET INTERSECTIONS AND SPACED AS PER SPECIFICATION.
3. VALVES TO BE LOCATED OPPOSITE PROPERTY LINES AS ILLUSTRATED.

N.T.S.



# HYDRANT AND VALVE LOCATIONS MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

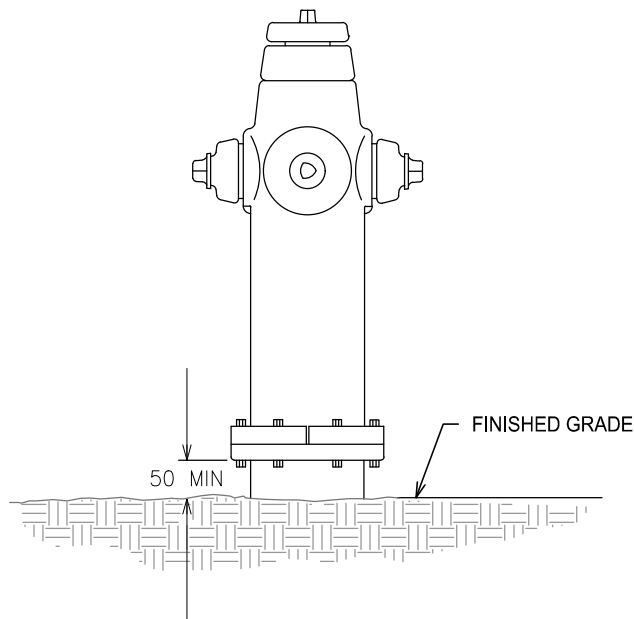
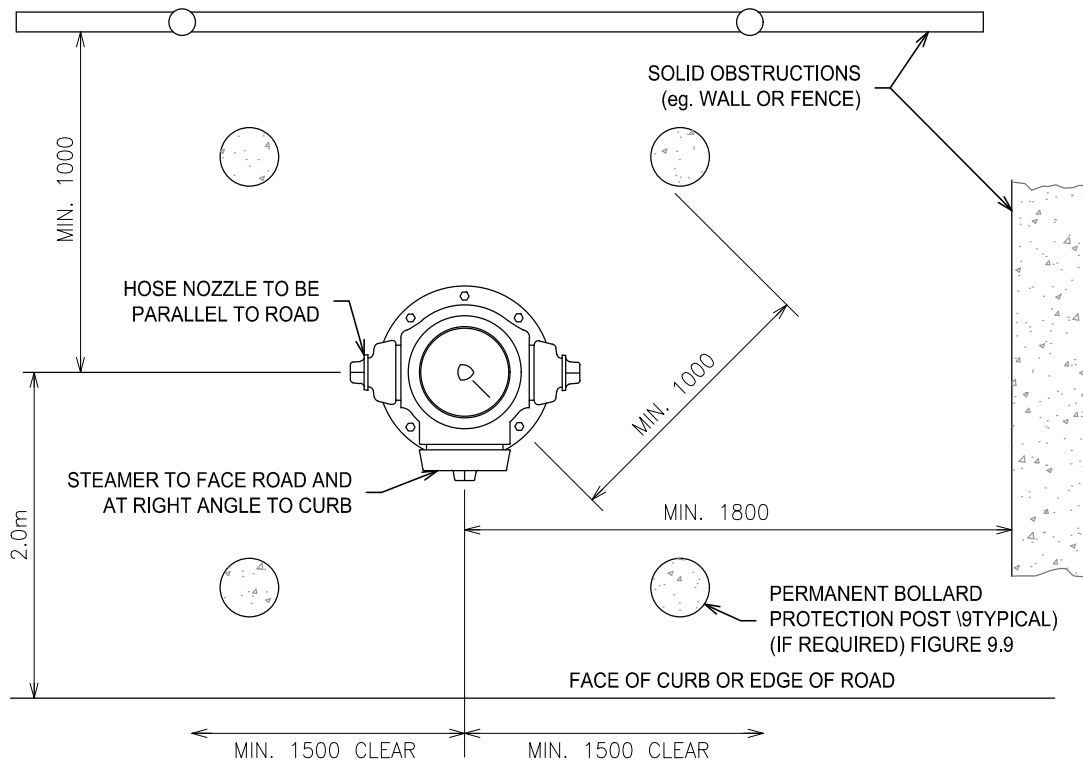
SEPT. 2023

REVISED:

DRAWING NO:

5.9





ALL DIMENSIONS  
IN MILLIMETERS UNLESS  
OTHERWISE NOTED

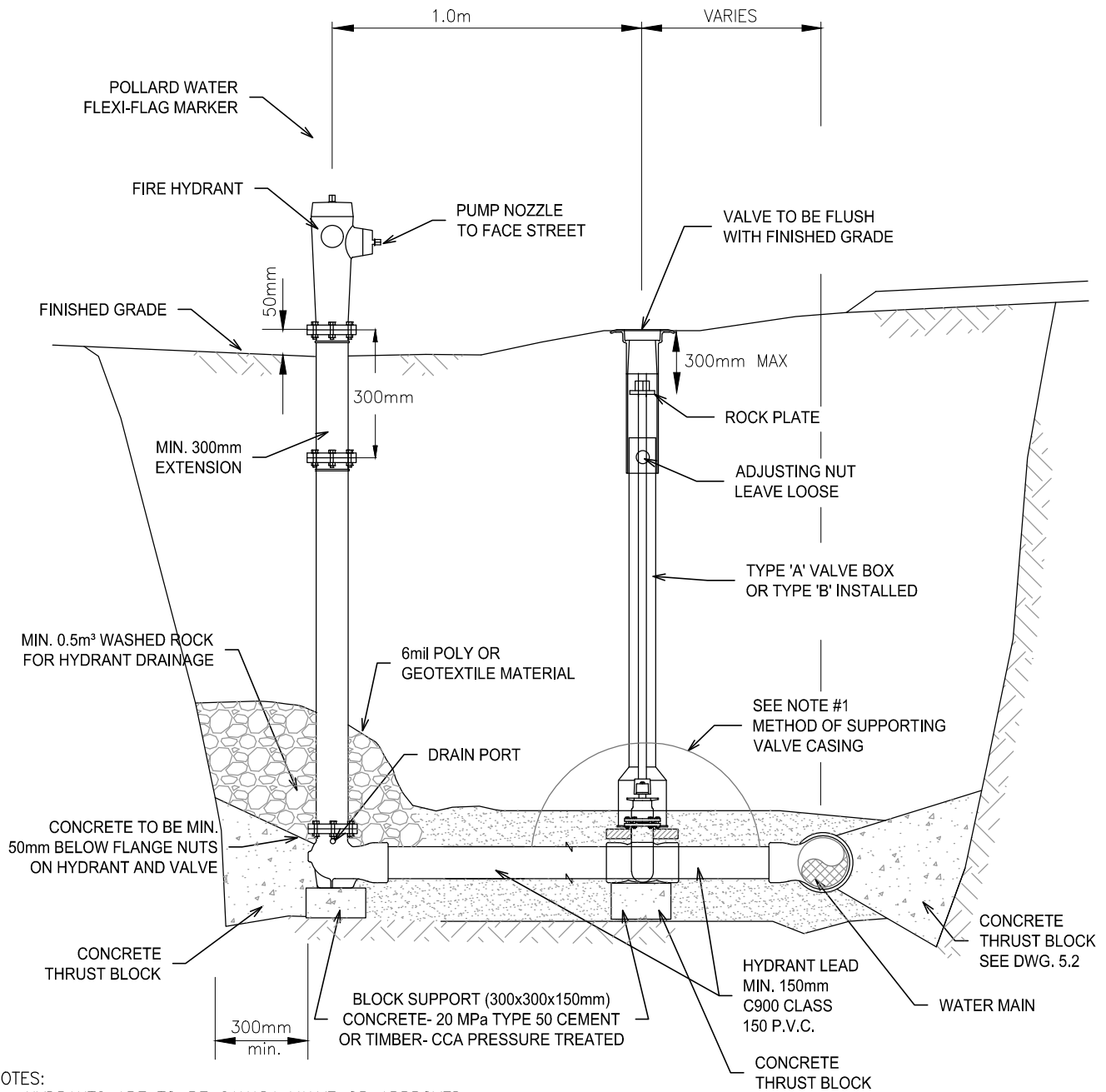
N.T.S.



# HYDRANT BOLLARD PLACEMENT FOR COMMERCIAL/INDUSTRIAL DEVELOPMENT MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	-
DRAWING NO:	5.10





NOTES:

1. HYDRANTS ARE TO BE CANADA VALVE OR APPROVED EQUAL.
2. HYDRANTS TO BE EQUIPPED WITH A STORZ INTERNAL LUG, QUICK CONNECTION NOZZLE OR EQUIVALENT.
3. HYDRANT DRAIN HOLES TO BE PLUGGED IN AREAS OF HIGH GROUND WATER.
4. ALL BOLTS TO BE STAINLESS STEEL WRAPPED WITH DENSO MASTIC AND DENSO TAPE.
5. AFTER INSTALLATION PAINT HYDRANTS TO AN APPROVED COLOUR USING EXTERIOR ENAMEL.

METHOD OF SUPPORTING VALVE CASING:

1. BUILD 600x600mm LEVEL BASE OF COMPACTED CLAY AROUND AND OVER VALVE BONNET.
2. DO NOT BLOCK DRAIN PORT.

N.T.S.



# GATE VALVE INSTALLATION MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

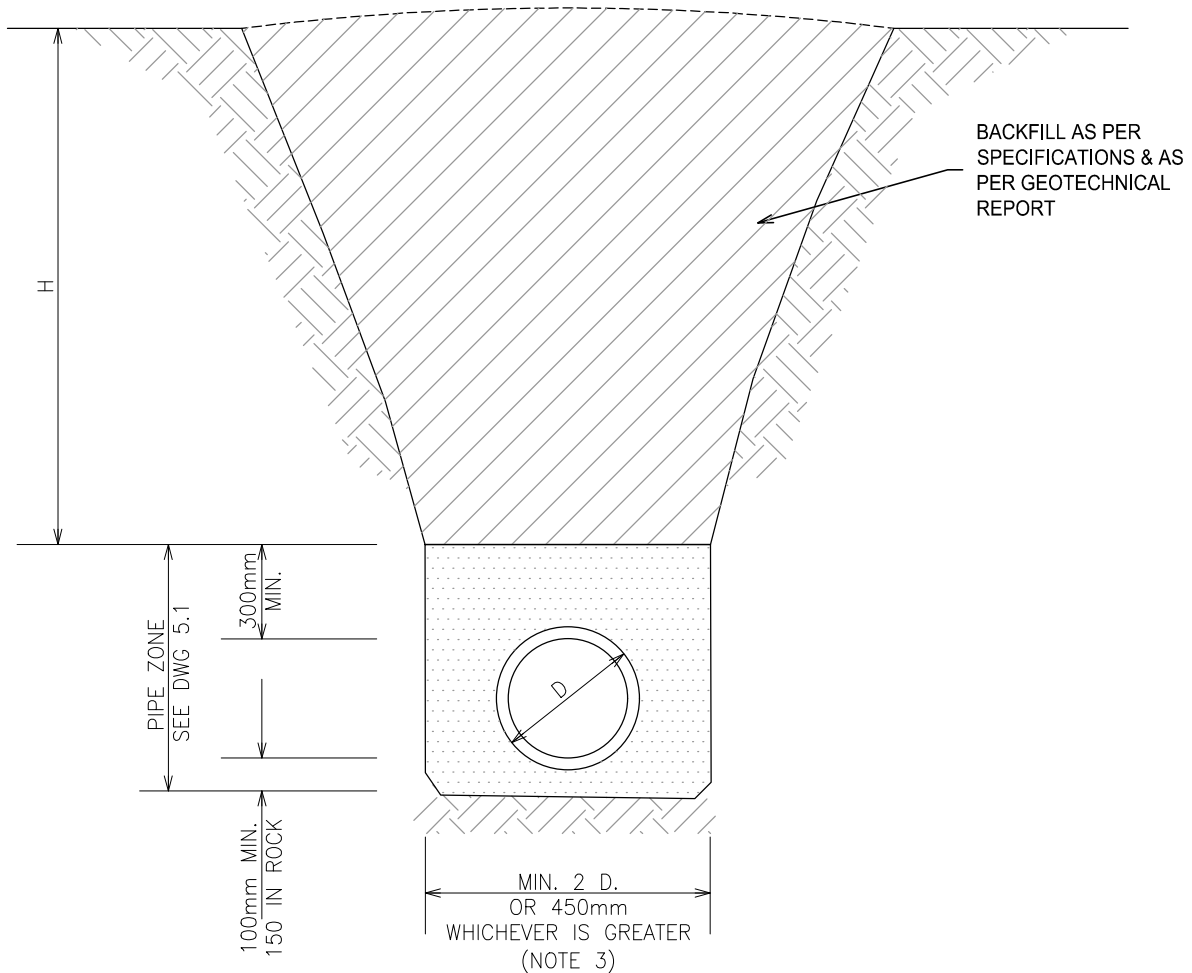
SEPT. 2023

REVISED:

DRAWING NO:

5.11





NOTES:

1. WHEN CUT BACK SLOPES ARE TO BE USED IN LIEU OF CAGES AND SHORING, THESE SLOPES ARE TO MEET REQUIREMENTS OF LOCAL CODES.
2. SEE STANDARDS FOR MINIMUM COVER ABOVE PIPE.
3. MINIMUM PIPE ZONE WIDTH IS SPECIFIED TO ALLOW PROPER PIPE ZONE COMPACTION.
4. D = OUTSIDE PIPE DIAMETER.
5. FOR UNCOMPACTED NATIVE OR IMPORTED BACKFILL, ROACH TRENCH BY  $0.1 \times H$ .

N.T.S.



## TRENCH EXCAVATION & BACKFILL

### MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

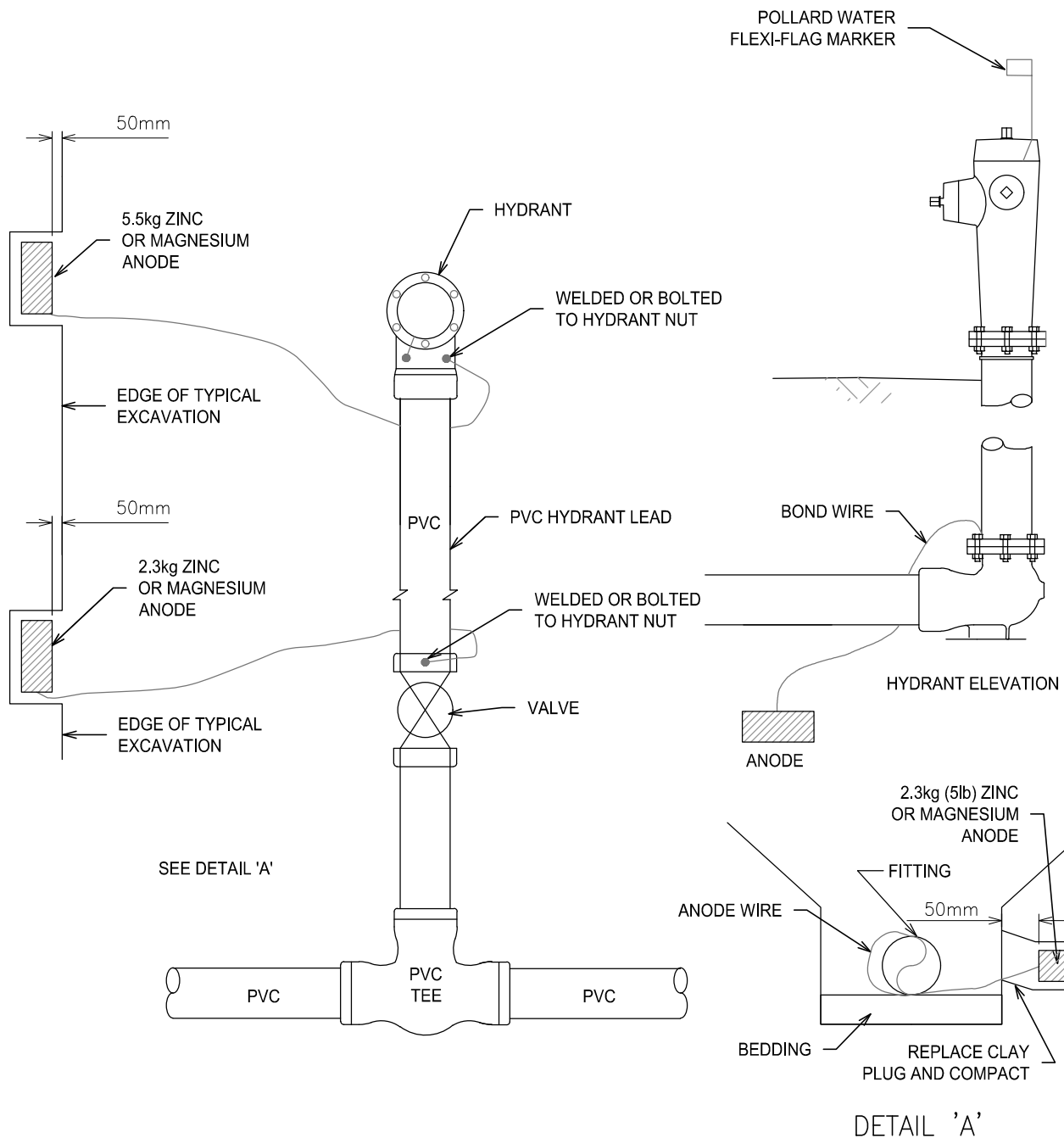
SEPT. 2023

REVISED:

DRAWING NO:

5.12





NOTES:

1. MINIMUM DISTANCE FROM ANODE TO PIPE, FITTING, VALVE, OR HYDRANT IS 150mm.
2. INSTALL ANODE AT APPROX. PIPE DEPTH IN UNDISTURBED SOIL.
3. ZINC OR MAGNESIUM ANODES ARE TO BE EMBEDDED INTO TRENCH WALL TO PROVIDE FOR A MINIMUM OF 50mm OF CLAY COMPLETELY SURROUNDING THE ANODE.
4. ANODES TO BE AT LEAST 300mm CLEAR OF THRUST BLOCK.

N.T.S.



## HYDRANT & VALVE ANODE DETAIL

### MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

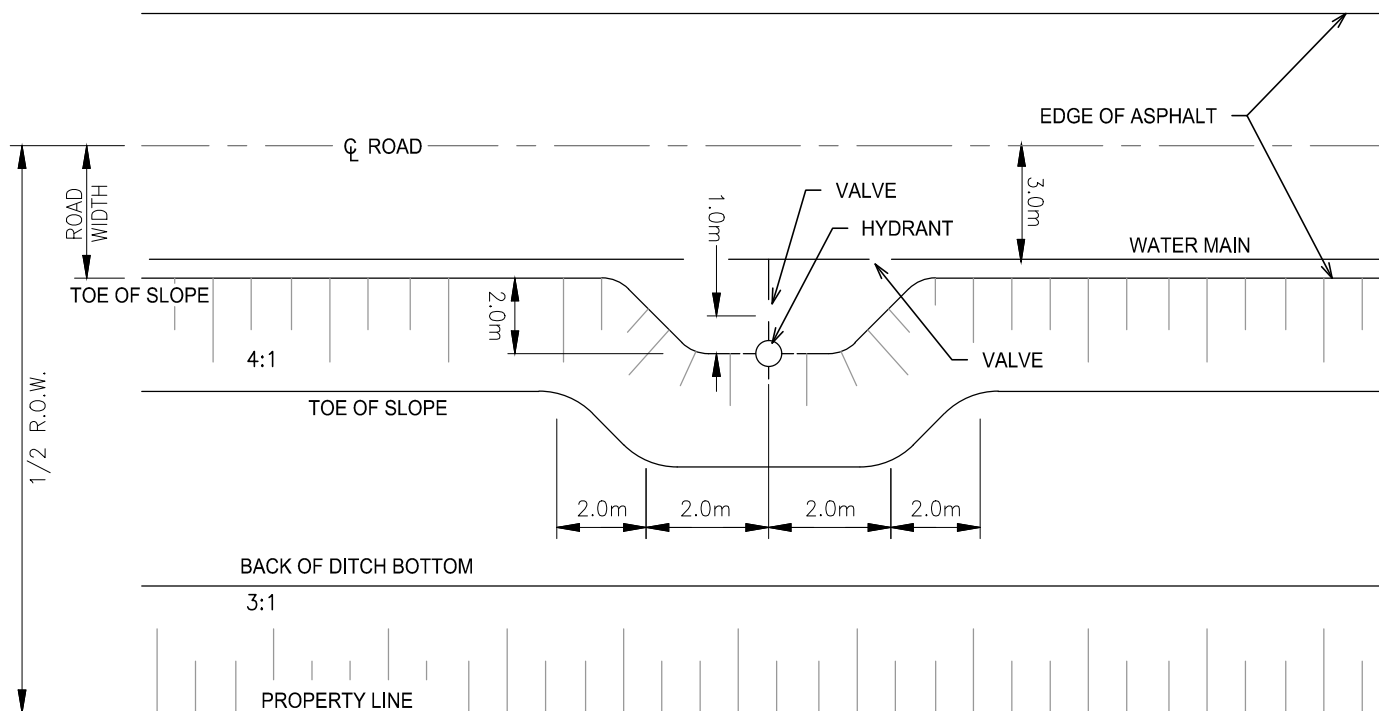
SEPT. 2023

REVISED:

DRAWING NO:

5.13





DIMENSIONS SHOWN ARE IN METERS

NOTES:

1. WATER MAIN AND HYDRANTS MAY BE LOCATED ON EITHER SIDE OF ROAD.
2. STREET LIGHTS TO BE OPPOSITE SIDE TO WATER MAIN.

N.T.S.



# HYDRANT SHOULDER WIDENING LAYOUT MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

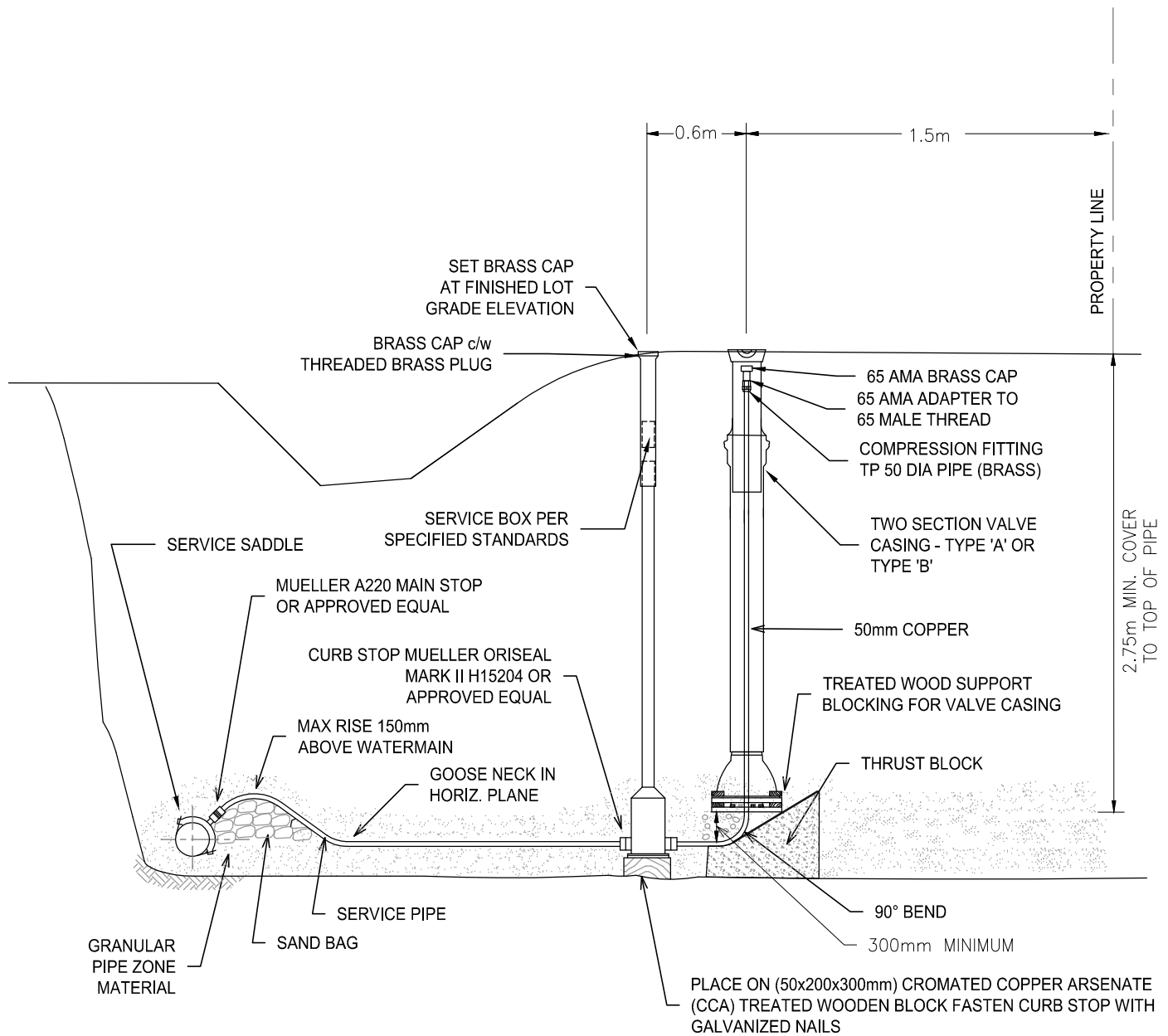
SEPT. 2023

REVISED:

DRAWING NO:

5.14





N.T.S.



# FLUSH POINT ASSEMBLY MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

SEPT. 2023

REVISED:

DRAWING NO:

5.15



## 6 WASTEWATER SEWER SYSTEMS

### 6.1 GENERAL

- This section outlines the minimum standards or requirements for wastewater sewer systems required to be provided in a development. Refer to Section 6.3 for Wastewater Sewer Service Connections.
- The standards outlined herein are intended to be the minimum requirement. It is the Developer's responsibility to meet or exceed the standards in accordance with good engineering practices, specific site condition requirements, and/or as may be required by the BLC and any or all Statutory and Regulatory Approval Agencies.
- All materials used in the development shall be new and in compliance with the most recent standards of AWWA, ASTM, CSA, ULC and NSF.

### 6.2 DESIGN CRITERIA

The sewer main capacity shall be designed to carry the peak dry weather flows plus an allowance for inflow and infiltration (I/I). The following flow factors shall be used as minimum requirements:

#### 6.2.1 Residential Contribution

- Population estimated utilizing an average of 3.5 people / residence.
- Minimum average contribution of 350 litres / capita / day.
- Peak hourly flow for each contributing area calculated at an average flow multiplied by a peaking factor.

$$\text{Peak Factor} = \frac{1 + 14}{(4 + p^{1/2})}$$

Where:  $p$  = equivalent population in 1,000's  
\* minimum peak factor shall be 2.5 \*

#### 6.2.2 Commercial / Industrial Contributions

- Industrial flows – Due to the varying sewage generation rates dependent upon the type of development, each project must be considered on an individual basis.
- Minimum average contribution for industrial flows shall be 20 m<sup>3</sup> / Ha / day excluding Inflow and Infiltration.
- Commercial flows – Due to the varying sewage generation rates dependent upon the type of development, each project must be considered on an individual basis.
- Minimum average contribution for commercial flows shall be 20 m<sup>3</sup> / Ha / day excluding Inflow and Infiltration.
- Peak hourly flow for each contributing area calculated at average flow multiplied by a peaking factor of three (3.0), minimum.





### 6.2.3 Infiltration

- The wastewater sewer shall be designed and installed to be watertight to minimize the amount of infiltration into the system. An infiltration allowance of 0.28 L/s/Ha will be calculated for normal installations.
- Any manholes located in road sag vertical curves are subject to an additional allowance of 0.4 L/s per manhole.
- Foundation weeping tile and roof leaders shall not be connected for discharge into the wastewater sewer. Where applicable and only with the approval of the BLC in writing, roof leaders may be tied into an underground piped storm sewer system.

### 6.2.4 Design Report

A design report shall be submitted to the BLC outlining the pipe sizes and capacities, contributing area, inflow and infiltration and all other relevant information.

### 6.2.5 Pipe

- Pipe sizing shall be determined by utilizing Manning's Formula with an "n" value as recommended by the pipe manufacturer and as approved by the BLC.
- Minimum pipe sizes shall be:
  - 200 mm diameter for residential areas.
  - 250 mm diameter for commercial / industrial areas.
- Minimum pipe slopes shall be in accordance with Alberta Environment and Parks recommendations. All wastewater sewers shall be designed and constructed to achieve mean velocities when flowing full of not less than 0.75 m/s. The maximum slopes for wastewater sewers will be based on limiting the velocity to 3.0 m/s. The minimum slope of the first upstream leg shall not be less than 1.0%.
- All wastewater sewers to be designed to carry the design flow at a flow depth no more than 80% of the sewer's diameter.
- Required full flow capacity = estimate total design peak flow rate / 0.86.
- Pipe material shall be PVC Pipe:
  - ASTM D3034 DR35.
  - Concrete Pipe: ASTM C76 OR E632 sulphate resistant for pipe size over 900 mm sizes
- All pipe installations shall comply with the manufacturer's recommendations.

### 6.2.6 MANHOLES

- Manholes shall be precast reinforced concrete sections conforming to ASTM C478, latest version thereof.
- Concrete for manholes and appurtenances shall utilize type 50 sulphate resistant cement with a 28-day strength of 28 MPa. The maximum allowable slump shall be 75 mm.
- All manholes shall be 1,200 mm inside diameter in the main portion of the structure unless otherwise required by the diameter of the incoming and outgoing pipes. Manholes, frames, and covers shall be cast iron conforming to Class 20 ASTM A48.





- Manholes frames and covers shall be NF-80 in paved areas, type NF-90 gasketed in sags, all capable of withstanding H-20 loading. Type F-39 to be used in gravel roads and type NF-39 frames and covers may be used in landscaped or natural areas.
- Each cover shall have the words “BLC WASTEWATER SEWER” embossed on it.
- Manhole rungs shall be standard safety type extruded aluminum.
- Manhole bases should be pre-benched precast slabs. Cast in place bases are acceptable provided the benching is constructed in the bottom of the manhole.
- Inverts at manholes at changes in direction shall have at least a 50 mm fall across the manhole.
- To maintain continuous energy gradient through manholes, the obvert elevation of the lowest upstream pipe shall be equal to, or higher than, the obvert of the downstream pipe.
- An interior drop manhole shall be utilized where the vertical drop between inlet and outlet inverts exceeds 1,000 mm.
- All connections to existing manholes shall be cored at the proper elevation with a link seal (Kor-n-seal or approved equal).
- All joints shall be watertight using carefully installed rubber gaskets and installation of Con Seal joint Wrap.
- Manholes shall be provided at the end of each line and at all changes in pipe size, grade, and alignment.
- The maximum spacing between manholes shall not exceed 120 m for pipe sizes up to 600 mm diameter, and 150 m for pipe sizes between 675 mm to 1200 mm.

#### 6.2.7 SEWER MAIN INSTALLATION

- Mains shall be installed to provide a minimum depth of cover of 3.0 m to invert below finished grade. Alternative methods may include appropriate insulating techniques only as approved by the BLC in writing. Refer to Figure 6.8.
- Mains shall be installed to provide adequate sewer service connection depth at the property line.
- Unless approved otherwise, all mains shall be installed within the roadway right-of-way.
- A minimum distance of a 3.0 m horizontal separation between sewer and water lines must be maintained. Separation to other features and utilities are subject to further approval by a shallow utility owner/operator, pipeline Company and the BLC.
- All pipes shall be installed on bedding as stipulated on the design drawings or specifications. The bedding shall be a material approved by the BLC. The bedding would normally consist of Class B type and typically comprise of:
  - Crushed or screened stone, gravel or sand consisting of hard durable particles free from clay lumps, cementation, organic material, frozen material, or other deleterious material.
  - Gradations to be within limits specified when tested to ASTM C136 and ASTM C117 and to have a smooth curve without sharp breaks when plotted on semi-log charts.





Sieve Designation ( $\mu\text{m}$ )	%Passing
10,000	100
5,000	95-100
2,500	80-100
1,250	50-85
630	30-65
315	10-30
160	2-10

Refer to Standard Drawing Figure 5.1: Classes of Piping Bedding

### 6.3 CURVED SEWERS

In general, curved sewer installations will only be allowed where the difficulty of avoiding other utilities necessitates such applications; however, the following restrictions shall apply:

- The sewer shall be laid as a simple curve with a radius equal or greater than 90.0 m or the manufacturer's minimum recommended radius, whichever is larger.
- Manholes shall be located at the beginning and end of the curve with the maximum interval between manholes no greater than 90.0 m along the curve.
- The curve shall run parallel to the right-of-way, wherever possible.
- The minimum grade for sewers laid on a curve shall be 50% greater than the minimum grade required for straight runs of sewers.
- The maximum deflection at each joint shall be no greater than the maximum deflection recommended by the pipe manufacturer.

### 6.4 TRENCHING AND BACKFILL

- All trenching and backfilling operations shall be carried out in accordance with the Occupational Health and Safety Standards and the Geotechnical Report recommendations.
- Prior to trenching and backfilling of wastewater sewer installations, the construction area shall be stripped of all topsoil and/or organic materials.
- Width of trenches shall be such that pipes can be laid and jointed properly and the backfill placed and compacted properly (Refer to Standard Detail Figure 3.12: Trench Excavation & Backfill).
  - Maximum width – single pipe: 750 mm diameter or less: O.D. of pipe plus 450 mm.
  - Maximum width - pipe larger than 750 mm diameter: O.D. of pipe plus 600 mm.





- Trench walls shall be vertical to a minimum of 300 mm above the top of the pipe and the widths at this location shall not exceed the maximum as per Figure 5.12. OHS guidelines shall always govern.
- If it is not possible during construction to maintain the allowable trench width assumed by design, the structural design of the pipe shall be re-evaluated to ensure earth loads will not exceed design load carrying capacity or that deflecting flexible pipe will not exceed performance criteria.
- Backfilling under or within 2 m of existing or proposed roadways, alleys, walkways, streetlights, or similar structures shall be compacted in lifts not exceeding 300 mm to 98% of standard proctor density from the designated subgrade elevations or existing ground level, whichever is lower, to 1.5 m below and to 95% of standard proctor density for areas more than 1.5 m below.
- Backfilling within areas that are in landscaped or non-travelled surfaces shall be compacted in lifts not exceeding 300 mm to 95% of standard proctor density.
- Backfill around manholes shall be placed in 150 mm layers and compacted with mechanical tampers to a minimum 98% Standards Proctor Density.
- All testing shall be carried out and recorded by a qualified Geotechnical Engineer licensed to practice in the Province of Alberta.

## 6.5 TESTING OF SEWERS

Following the construction, all sewer mains shall be thoroughly cleaned and flushed of any earth, gravel, and other debris. Special care shall be taken to capture and remove all the deleterious material and prevent it from entering the existing system.

All tests shall be performed in the presence of a representative from BLC. BLC must be given at least 48-hour notice before commencing any tests.

### 6.5.1 Water leakage Test:

- In areas where the ground water table rises to the sewer pipe invert or higher, each section of sewer main and service connection shall be tested for water tightness by an infiltration test. In all other situations, an exfiltration test shall be conducted.
- Maximum allowable leakage for an exfiltration/infiltration test of a sewer pipe while subjected to a minimum 1.0 m hydrostatic head of water is as follows:
  - Concrete pipe: 10 L/day/mm of diameter/km
  - PVC pipe: To ASTM D3212
- Tests shall be undertaken on each section of sewer main, and the results recorded. Allowable leakage for pipe other than rubber gasket concrete pipe shall be in accordance with the type of joint and the manufacturer's recommendations.

### 6.5.2 Close Circuit Television (CCTV) Inspection:

- Prior to issuance of a Construction Completion Certificate (CCC), and Final Acceptance Certificate (FAC), all sewer lines shall be thoroughly flushed.
- All sections of wastewater sewer must be inspected with Closed Circuit Television Camera Equipment (CCTV). The CCTV operator should be certified through NAAPI (North





American Association of Pipeline Inspectors). An inspection report, photos, and digital recording shall be submitted to the BLC for BLC records prior to issuance of a Substantial Completion Certificate (SCC) and Construction Completion Certificate.

- All photos and videos shall be of a high-quality showing detail of the pipe in a clear and unobstructed view. Where, in the opinion of the BLC, the picture quality is not clear and deemed unsatisfactory, the CCTV inspection shall be redone at the Developer's expense.
- Prior to the issuance of a Substantial Completion Certificate (SCC) and Final Acceptance Certificate (FAC), the sewer line shall be thoroughly flushed, and a CCTV inspection is required. Such inspection report including the digital video recording shall be submitted to the BLC for review, approval, and permanent record files.

### 6.5.3 Mandrel Testing

- At the discretion of BCL and upon review of the CCTV videos, a mandrel test as per CSA B182.11 may be performed by the developer prior to the issuance of a (CCC) or (FAC)

## 6.6 LOW PRESSURE SEWER SYSTEM

### 6.6.1 General

This section outlines the requirements for a low-pressure sewer system. A low-pressure sewer system has two major components: the onsite pressurized facility and the pressurized sewer main. The pressurized facility may consist of a grinder pump system or a septic tank and effluent pumping system.

### 6.6.2 Design Criteria

- Septic tank – two compartments, 13, 500 litres total volume minimum for a single-family dwelling, concrete, or fibreglass construction.
- Sewage pumps – submersible pump installed in the second (liquid) chamber, or a centrifugal pump installed in the basement with controls and a suction line.
- Maximum head for economical operations is 24 meters or 240 Kpa (35 psi) or if higher discharge is required a detailed engineering assessment will be required.
- Minimum motor size shall be ½ horsepower.
- A sewage generation rate of 275 L/capita/day for a low-pressure sewer system with no infiltration rate shall be used, unless otherwise determined by BLC. The disposal rate will be dependent upon the disposal system capacity.
- In determining residential flows, a minimum of 3.5 persons per household shall be used unless otherwise determined by BLC.
- A report from the Consulting Engineer must be prepared to ensure that pipe sizing is calculated in consideration of the topography and the population projections of the service area.





### 6.6.3 Fittings

- All pump connections to have a double check valve and a gate valve downstream of the pump discharge. All fittings should be plastic, brass, or stainless steel.
- Service connections to the mains to be either inline tees or service saddles. Service saddle to be either brass or stainless steel.

### 6.6.4 Pipe

- Low pressure wastewater pipe shall be a minimum DR 11 HDPE for mains 100 mm and smaller, and a minimum DR 17 HDPE for mains larger than 100 mm.
- Minimum depth of cover shall be 2.75 m from finished grade over top of pipe.

### 6.6.5 Curb Stop

- A curb stop and service box to be installed on the property line to allow isolation of the service for maintenance.

### 6.6.6 Collector Sewer

- The collector sewer should be a minimum of DR21, series 60 or larger if the run and elevation are greater.

### 6.6.7 Standards

- The requirements outlined herein are intended to be minimum standards. It is the developer's responsibility to meet or exceed the standards in accordance with good engineering practices, specific site conditions, and/or as may be required by the BLC and any or all Statutory and Regulatory Approval Agencies.
- All materials shall be new and in compliance with the most recent standards of ASTM, CSA, and NSF.



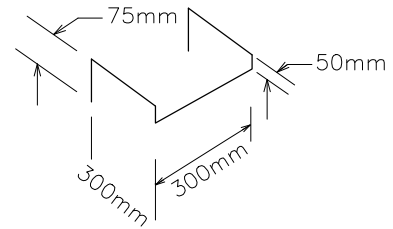
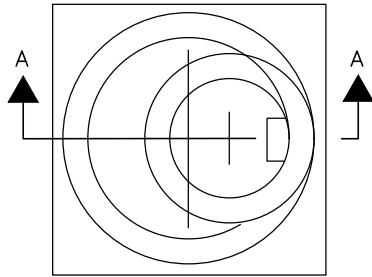


## 6.7 BURIED PIPE STORM SEWER SYSTEMS

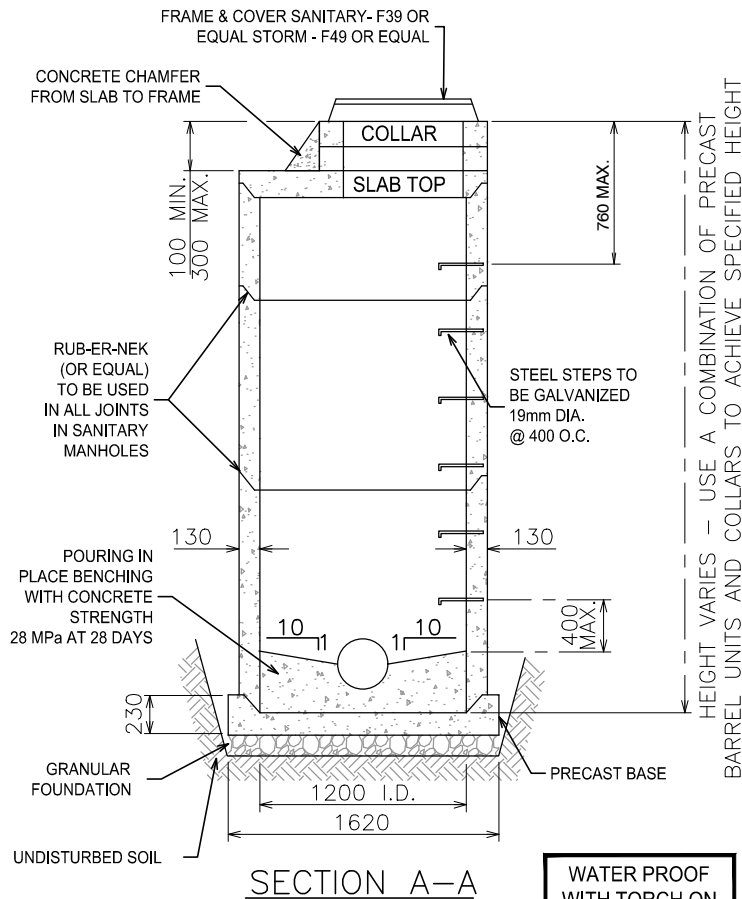
- Where the storm drainage system is comprised of a buried pipe system, the minimum standards outlined herein shall apply.
- All materials used in the development shall be new and in compliance with the most recent standards of AWWA, ASTM or CSA.







20 DIA. ALUMINUM  
MANHOLE SAFETY STEP



WATER PROOF  
WITH TORCH ON  
TAR APPLICATION  
AT ALL JOINTS

#### NOTES:

1. PRECAST CONCRETE COMPONENTS TO MEET CURRENT A.S.T.M. C478 STANDARDS.
2. CAST IN PLACE CONCRETE TO BE 25 MPa AT 28 DAYS.
3. ALL JOINTS TO BE SET WITH RUBBER GASKET AND FINISHED WITH NON-SHRINK GROUT INSIDE AND OUTSIDE FOR FULL CIRCUMFERENCE.
4. CHANNELING AND BENCHING TO BE FINISHED TO TROWEL SMOOTHNESS.
5. COMPACT BACKFILL AROUND MANHOLES TO A MINIMUM OF 98% STANDARD PROCTOR DENSITY. CHANNELING AND BENCHING TO BE FINISHED TO TROWEL SMOOTHNESS.
6. PRE-BENCHED MANHOLE BASES MUST BE USED WHEREVER POSSIBLE WITH PROCTORED CONNECTION HOLES AND WATER TIGHT DURBARS OR BLOC JOINTS OR APPROVED EQUAL.
7. IF PRECAST CONCRETE BASES ARE UNAVOIDABLE THICKNESS AND REINFORCEMENT MUST BE DESIGNED FOR THE SPECIFIC MANHOLE DEPTH AND SOIL CONDITIONS.
8. JOINTS BETWEEN GRADE RINGS, GRADE RINGS AND CONES, AND BETWEEN RINGS AND FRAMES MUST BE WATERTIGHT. RAM NECK MATERIAL FINISHED WITH NON-SHRINK GROUT MAY BE USED IF WATERTIGHT JOINTS CANNOT BE ACHIEVED.

ALL DIMENSIONS SHOWN IN MILLIMETRES.

N.T.S.



## SLABTOP MANHOLE DETAIL

### MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

SEPT. 2023

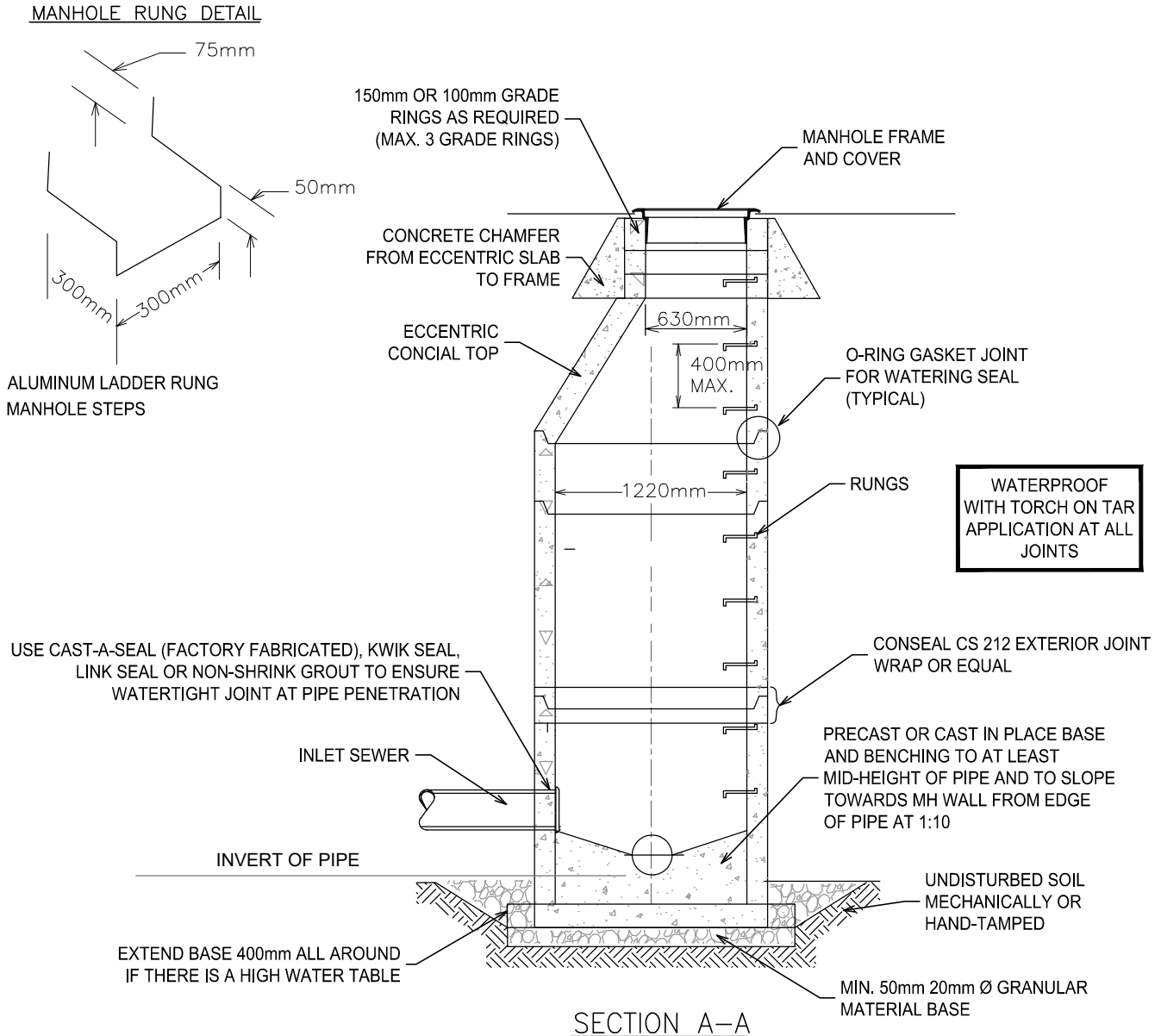
REVISED:

DRAWING NO:

6.1



ALL DIMENSIONS SHOWN IN MILLIMETRES.



**NOTES:**

1. PRECAST RINGS, CONES AND BARRELS TO MEET CURRENT A.S.T.M. C478 STANDARDS.
2. SPECIAL BASE DESIGN REQUIRED FOR DEPTHS OVER 5.0m.
3. CHANNELING AND BENCHING TO BE FINISHED TO TROWEL SMOOTHNESS.
4. FOR PIPES 400mm AND LARGER, CONTINUE MAIN PIPE THROUGH MANHOLE BASE, WHERE POSSIBLE AND CUT TOP SECTION OF PIPE.
5. CONICAL TOP TO BE USED WHERE DISTANCE FROM BENCH TO MH COVER EXCEEDS 2m.
6. VERTICAL SIDE OF CONICAL MH ON UPSTREAM SIDE.
7. INSTALL SAFETY PLATFORMS FOR ALL MH OVER 5m DEEP, LOCATED 2m ABOVE PIPE.
8. FOR PRE-BENCHED MANHOLE BASE SEE DETAIL 6.3.

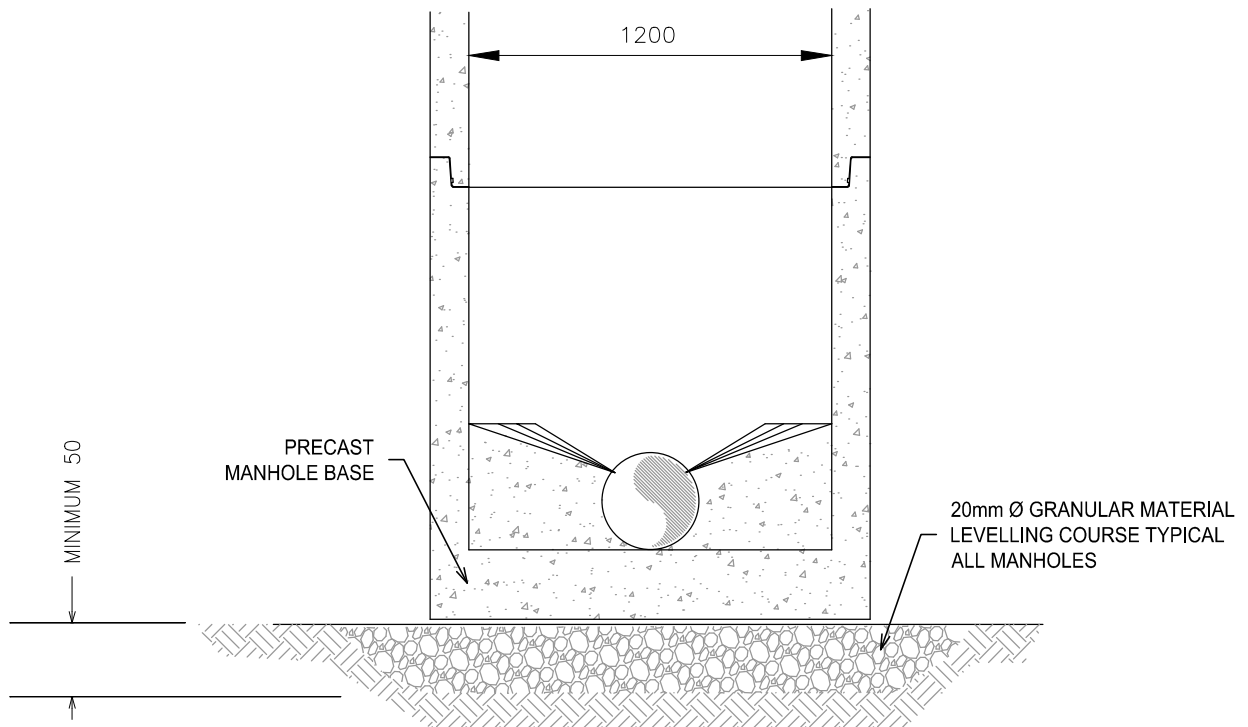
N.T.S.



# STANDARD MANHOLE DETAIL MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

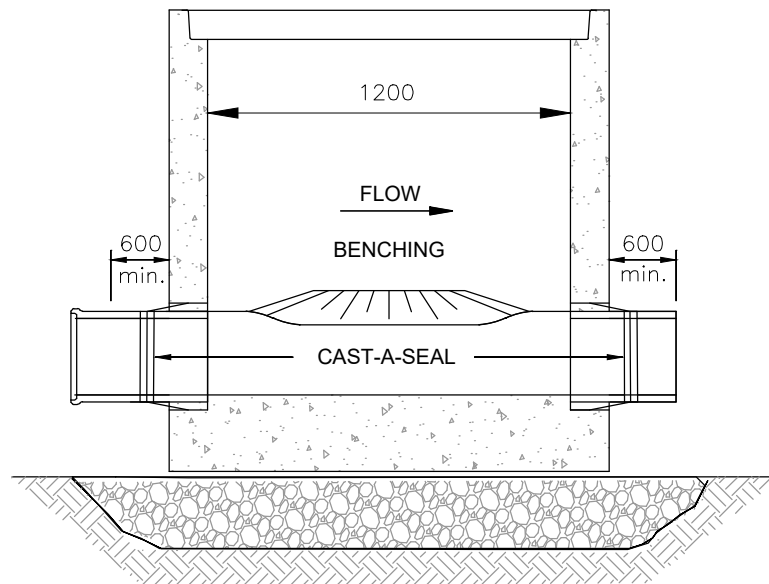
SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	-
DRAWING NO:	6.2





STANDARD MANHOLE  
SECTIONS ABOVE

NOTE:  
PREBENCHED MANHOLE BASES  
AS SUPPLIED BY CONCRETE  
MANUFACTURER. TYPE 50  
SULPHATE RESISTANT CEMENT  
TO BE USED. PIPE  
PENETRATIONS THROUGH  
MANHOLE WALL TO BE MADE  
USING CAST-A-SEAL OR KWIK  
SEAL FOR WATERTIGHT  
CONNECTION OF PIPE.



WATERPROOF WITH  
TORCH ON TAR  
APPLICATION

FOR P.V.C. PIPE

ALL DIMENSIONS SHOWN IN MILLIMETRES.

N.T.S.



# PREBENCHED MANHOLE BASE MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

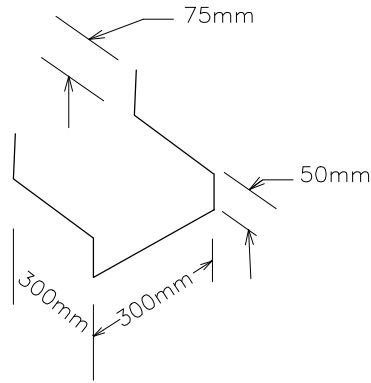
DATE: SEPT. 2023

REVISED: -

DRAWING NO: 6.3



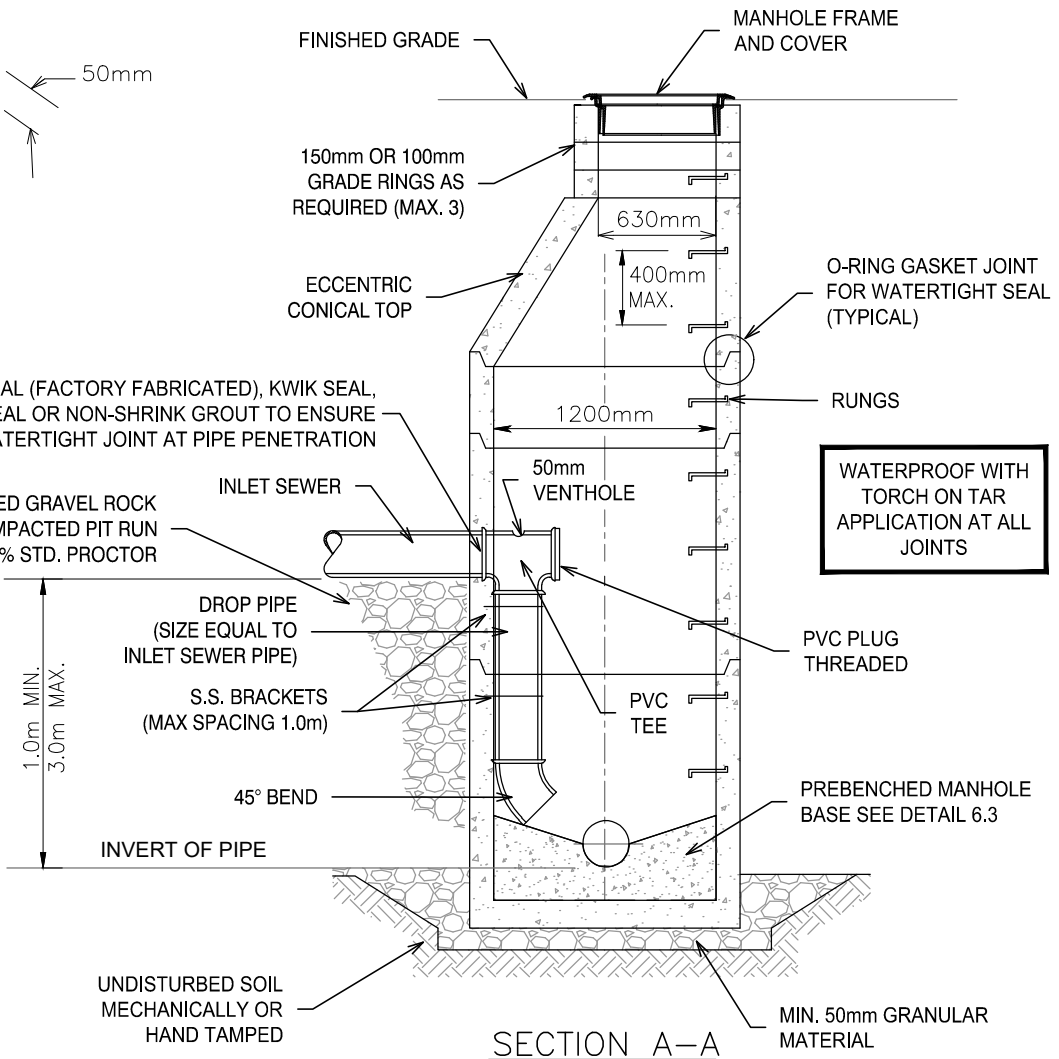
# MANHOLE RUNG DETAIL



No. 20M ALUMINIUM  
MANHOLE RUNGS

USE CAST-A-SEAL (FACTORY FABRICATED), KWIK SEAL,  
LINK SEAL OR NON-SHRINK GROUT TO ENSURE  
WATERTIGHT JOINT AT PIPE PENETRATION

50mm WASHED GRAVEL ROCK  
OR 75mm COMPACTED PIT RUN  
TO 98% STD. PROCTOR



SECTION A-A

ALL DIMENSIONS SHOWN IN MILLIMETRES.

## NOTES:

1. PRECAST RINGS, CONES AND BARRELS TO MEET CURRENT A.S.T.M. C478 STANDARDS.
2. SPECIAL BASE DESIGN REQUIRED FOR DEPTHS OVER 5.0m
3. CHANNELING AND BENCHING TO BE FINISHED TO TROWEL SMOOTHNESS.
4. CONTINUE MAIN PIPE WHERE POSSIBLE THROUGH MH & CUT TOP PART VISUAL INSPECTION.
5. CONICAL TOP TO BE USED WHERE DISTANCE FROM BENCH TO MH COVER EXCEEDS 2m.
6. VERTICAL SIDE OF CONICAL MH ON UPSTREAM SIDE.
7. INSTALL SAFETY PLATFORMS FOR ALL MH OVER 5m DEEP, LOCATED 2m ABOVE PIPE.

N.T.S.



## INTERNAL DROP MANHOLE DETAIL MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

SEPT. 2023

REVISED:

DRAWING NO:

6.4



MANHOLE FRAME AND COVER

A diagram of a stepped plate with the following dimensions and forces:

- Top horizontal segment: 75mm
- Right vertical segment: 50mm
- Bottom horizontal segment: 300mm
- Left vertical segment: 300mm

Forces are applied as follows:

- A downward force of 75mm is applied at the top right corner.
- An upward force of 50mm is applied at the bottom right corner.
- An upward force of 300mm is applied at the bottom left corner.
- An upward force of 300mm is applied at the top left corner.

WATERPROOF  
WITH TORCH ON  
TAR APPLICATION

MANHOLE FRAME  
AND COVER

### ECCENTRIC CONICAL TOP

RUNGS -

B



PVC PLUG  
THREADED

PVC  
TEE

COMPACTED  
BACKFILL  
TO 98% STD.  
PROCTOR

1.0m MIN.  
3.0 MAX.

## 90° PVC BEND

INVERT OF PIPE

COMPACTED 20MM  
GRANULAR MATERIAL

UNDISTURBED SOIL  
MECHANICALLY OR  
HAND TAMPED

ALL DIMENSIONS SHOWN IN MILLIMETRES.

NOTES:

1. PRECAST RINGS, CONES AND BARRELS TO MEET CURRENT A.S.T.M. C478 STANDARDS.
2. SPECIAL BASE DESIGN REQUIRED FOR DEPTHS OVER 5.0m.
3. CHANNELING AND BENCHING TO BE FINISHED TO TROWEL SMOOTHNESS.
4. CONTINUE MAIN PIPE WHERE POSSIBLE.
5. CONICAL TOP TO BE USED WHERE DISTANCE FROM BENCH TO MH COVER EXCEEDS 2m.
6. VERTICAL SIDE OF CONICAL MH ON UPSTREAM SIDE.
7. INSTALL SAFETY PLATFORMS FOR ALL MH OVER 5m DEEP, LOCATED 2m ABOVE PIPE.

N.T.S.



## BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

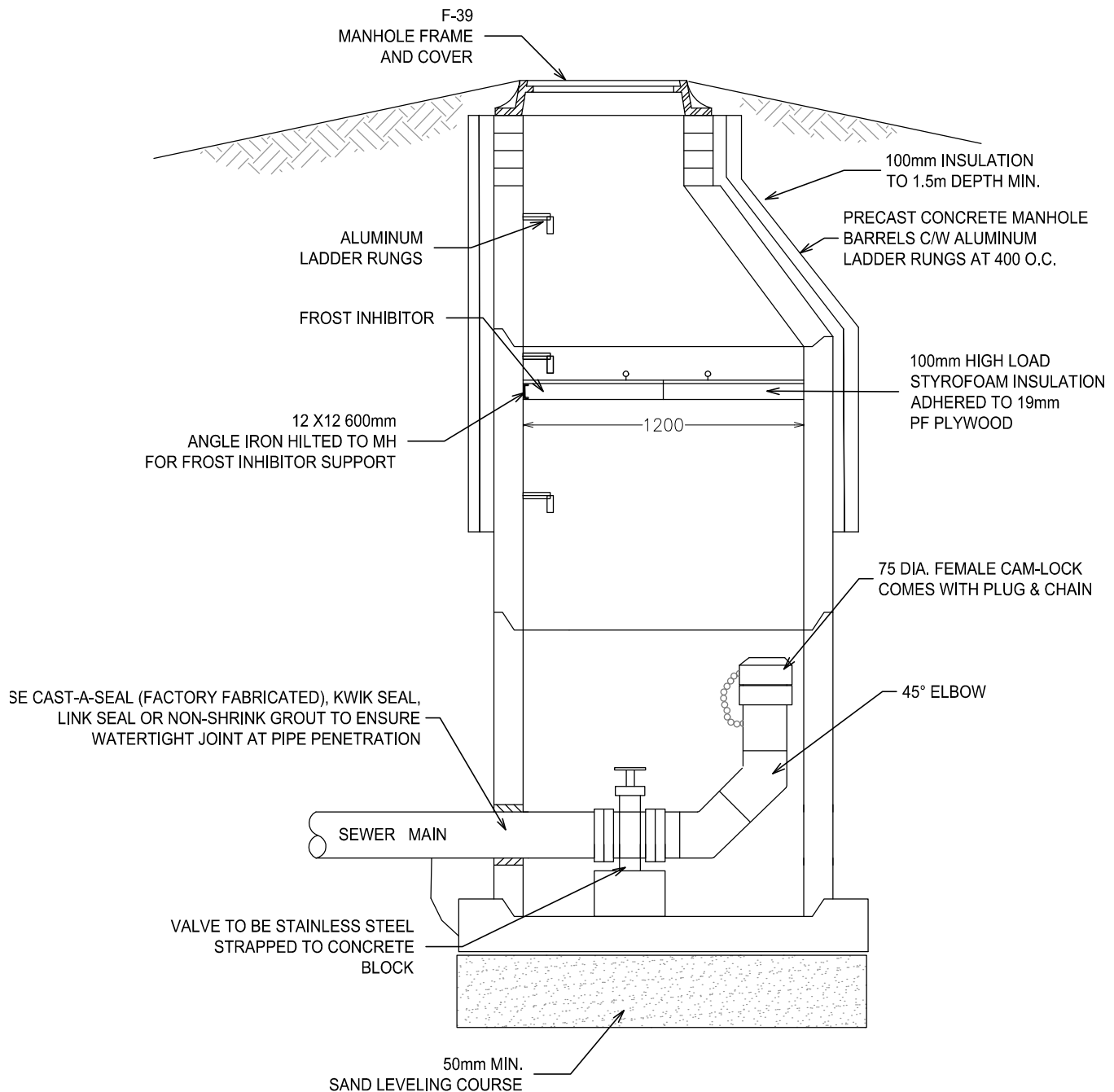
SEPT. 2023

REVISÉ:

DRAWING NO:

## 6.5





NOTES:

1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. EXTERIOR OF MANHOLE TO BE INSULATED WITH 100mm HIGH LOAD STYROFOAM INSULATION TO AT LEAST 1.5m BELOW GROUND.

N.T.S.



# LOW PRESSURE SEWER FLUSHING STATION MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

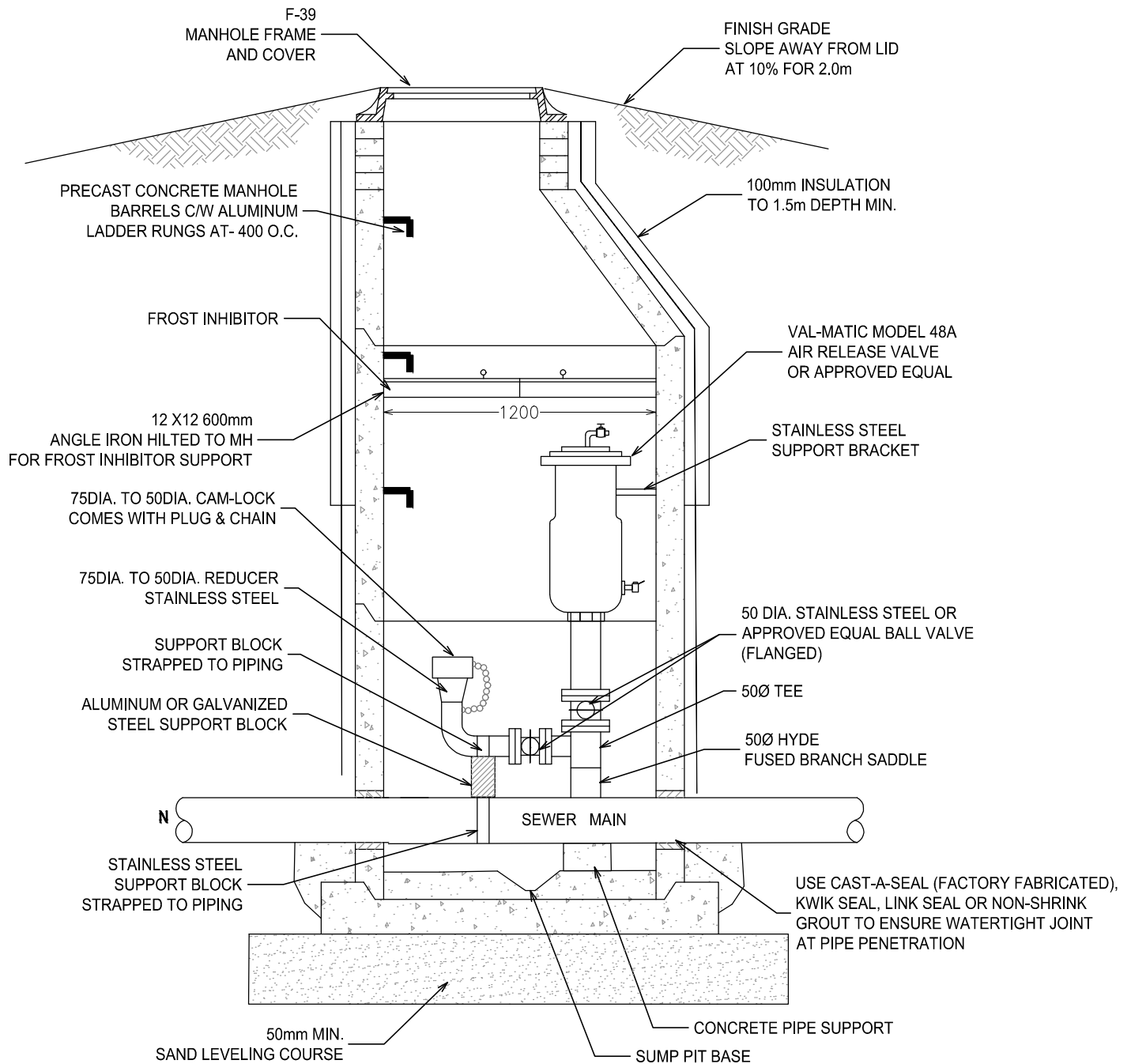
SEPT. 2023

REVISED:

DRAWING NO:

6.6





TES:

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.

EXTERIOR OF MANHOLE TO BE INSULATED WITH 100mm HIGH LOAD STYROFOAM INSULATION TO AT  
LEAST 1.5m BELOW GROUND.

N.T.S.



# LOW PRESSURE SEWER AIR AND VACUUM RELIEF VALVE CHAMBER MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

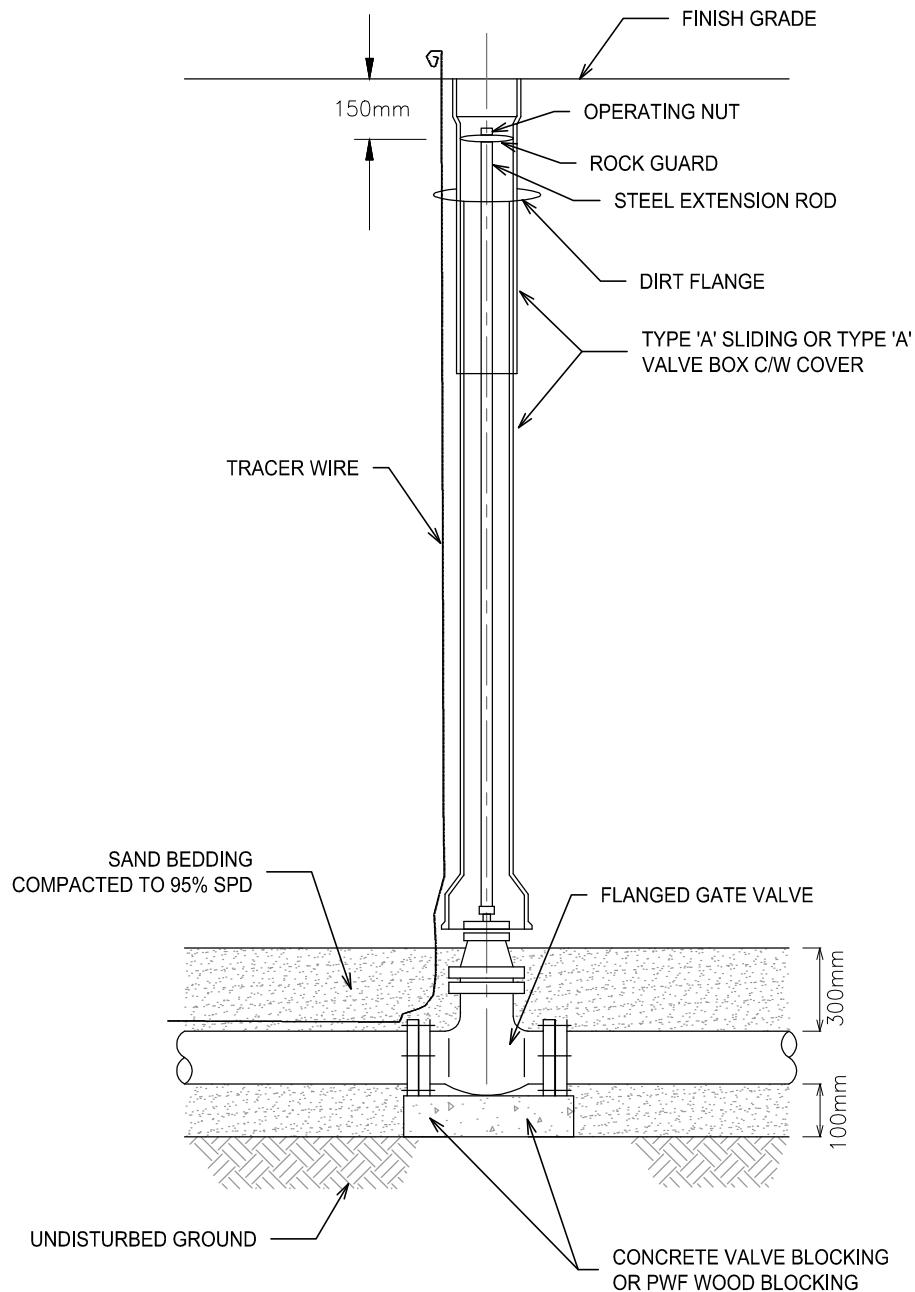
SEPT. 2023

REVISED:

DRAWING NO:

6.7





NOTES:

1. VALVE BOX TOPS TO BE SET FLUSH WITH HARD SURFACES, 300mm ABOVE FINISHED GRADE IN ALL LANDSCAPED AREAS
2. VALVE AND VALVE BOXES SHALL BE EPOXY COATED TO PREVENT CORROSION. ALL TRIM TO BE STAINLESS STEEL.
3. VALVE BOX TOPS MARKED "SEWER".
4. TRACER WIRE TO SURFACE OF EVERY MAINLINE VALVE

N.T.S.



# LOW PRESSURE SEWER VALVE MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

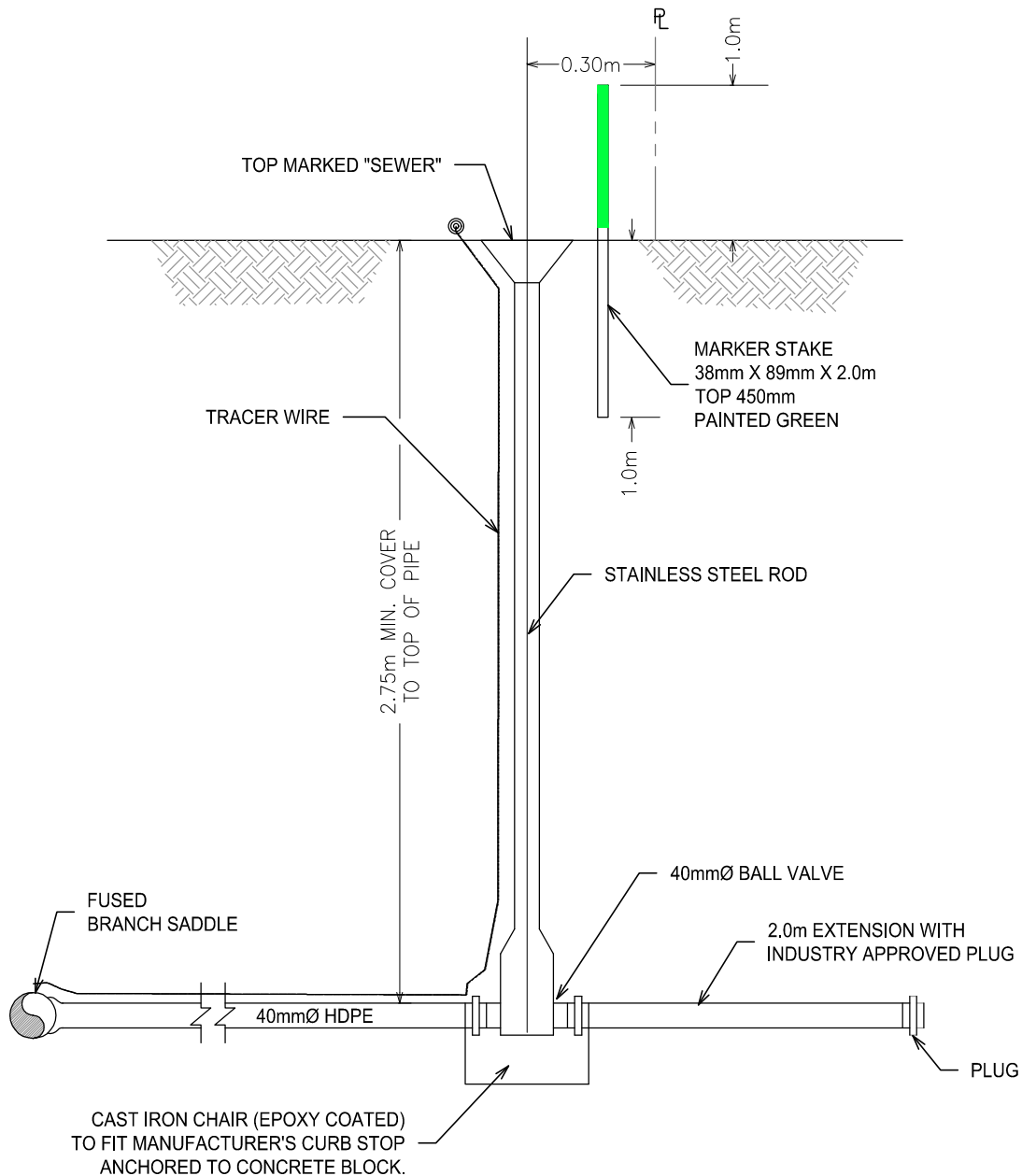
SEPT. 2023

REVISED:

DRAWING NO:

6.8





NOTES:

1. CURB STOP AND BOX TO BE EPOXY COATED TO PREVENT CORROSION. ALL TRIM TO BE STAINLESS STEEL.
2. ALL CURB STOPS TO BE NON-DRAINING.
3. TRACER WIRE TO SURFACE ON SELECTED SERVICE BOXES.
4. SERVICES ARE COPPER PIPE SIZES (CPS)

N.T.S.



**LOW PRESSURE SEWER  
SERVICE CONNECTION**  
**MUNICIPAL SERVICING STANDARDS**  
BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

SEPT. 2023

REVISED:

DRAWING NO:

**6.9**



## 7 COMMON DETAILS & SERVICE CONNECTIONS

### 7.1 GENERAL

The requirements for water and wastewater sewer service connections shall be dependent upon the size and type of development. The sizes and locations of these services shall be subject to the approval of the BLC, and no service installations shall be permitted without approval in writing.

### 7.2 WATER SERVICE CONNECTIONS

- Unless calculated otherwise, the minimum size of water service connection to a single-family dwelling shall be as follows:
  - Water service (un-sprinklered dwelling) 19 mm
  - Water service (sprinklered dwelling) 50 mm
- Water service connections for commercial, industrial, institutional, and multi-family areas, unless otherwise approved by the BLC in writing, shall only be made after the service requirements have been determined and a permit approving the installation is issued.
- Water service connections shall be designed as a single connection from the main to property line at the centre of the lot. Refer to Figure 7.1: Typical Services (Single and Dual). If double servicing is designed, place at property line.
- Where the water service is 50 mm or smaller, the water and wastewater sewer service connections may be installed in a common trench.
- Water service connection material shall be:
  - Muni250 PE Pipe Series for all diameters 50 mm and under; for all diameters greater than 50mm, use watermain piping.
  - Corporation (main) stops required to be provided at the mains shall be Mueller A220, 110 compression types, or approved equal.
  - Curb stops required to be provided with each service connection shall be Mueller, Oriseal Mark 11 H15024/IHI5214 stop and drain, 110 compression type, or approval equal.
  - When using PE or HDPE Pipe, metal inserts shall be utilized at all fittings.
  - Service box shall be epoxy Bullet 5 B coated extension type for maximum extension to 3.5 m c/w stainless steel operating rod, brass clevis, and key.
  - Service saddles shall be double strapped stainless steel.
- For water service size up to 50 mm, the tapping shall be at the 2 to 10 o'clock on the opposite side) position on the distribution main.
- All water service lines shall be installed to provide a minimum depth of 3 m of cover to top of pipe, including the goose neck off the main.
- Service boxes, supported on pressure treated preserved wood timber, shall be installed within 300 mm of property line. Set service box plumb and adjust to grade. Service boxes to be protected by placing a 1.5 m X 100 mm P.V.C. pipe over the service box flush with the finished elevation.





- If there is an easement for shallow utilities adjacent to the road right-of-way, the water service connection shall be extended 1 m beyond the limits of the shallow utility easement.
- The end of the water service connection shall be adequately capped and sealed to prevent the flow of water out of the service.
- Furthermore, the end of the pipe shall be marked by a vertical, nominal size 50 mm x 100 mm (2"x 4") timber, set 0.5 m into the ground and extending 1 m above the top surface of the surrounding ground. Top 300 mm of the exposed portion of the marker shall be painted blue.
- Refer to Figure 7.2: Water Service Connection
- Minimum service connection trench width shall be the pipe diameter plus 600 mm and wide enough so that the pipe(s) can be laid to alignment and at the depth required and compacted properly.
- Trench backfills shall be granular around the pipe(s) and clay above the pipe zone as approved by the BLC in writing. Silt is not an acceptable backfill material.
- Service connection trenches under paved or concrete surfaces or under areas proposed for pavement or concrete surfacing shall be backfilled in 150 mm layers with each layer compacted in a minimum of 98% of Standard Proctor Density.
- Service connection trenches in landscaped or natural areas shall be backfilled in 300 mm layers with each layer compacted to a minimum of 95% of Standard Proctor Density.

### 7.3 WASTEWATER SEWER SERVICE CONNECTIONS

- The minimum size of wastewater sewer service connection to a single-family dwelling shall be 100 mm diameter unless the service length exceeds 30 m, in which case, the minimum diameter shall be 150 mm. An inspection chamber shall be installed on all service connections exceeding 30 m in length.
- Wastewater sewer service connections for commercial, industrial, multi-family, or institutional areas, unless otherwise approved by the BLC, shall only be made after service requirements have been determined and a permit, approving the installation, is issued by the BLC.
- Wastewater sewer service connections shall be designed as a single connection from the main to the property line at the centre of the lot or a double service connection to the lot line.
- All wastewater sewer service connections shall be designed for gravity flow with a minimum grade of 2.0% from main to property line. Refer to Figure 7.3: Gravity Sewer Service Connection
- Wastewater sewer service connection materials shall be:
  - Polyvinyl chloride (PVC) DR28 building service pipe conforming to CSA specification B182.1, latest revision thereof.
- Wastewater sewer service connections from the main to the property line shall be installed to provide a minimum depth of 2.8 m from finished surface grade to invert.
- Risers shall be employed where the service connection at the main is 4 m or deeper. Refer to Figure 7.4: Gravity Riser Detail.
- An inspection chamber or manhole located at 0.5 m inside the road Right-of-way shall be provided on all industrial wastewater sewer service connections. Refer to Figure 7.5: Inspection Chamber Detail.





- If there is an easement for shallow utilities adjacent to the road right-of-way shall be provided on all industrial wastewater sewer service connections.
- The end of the sewer service connection shall be adequately capped or plugged to prevent the entry of earth, water, or other deleterious material into the pipe. Furthermore, the end of the pipe shall be marked by a vertical, nominal size 50 mm x 100 mm (2.0" x 4.0") timber set at the service invert and extending 1 m above the top surface of the surrounding ground. The top 300 mm of the exposed portion of the marker shall be painted green.
- For casing under roads, rivers, railroads, etc., refer to Figure 7.6.
- For trench widths and backfill requirements, refer to clause 6.4 herein.
- For safety platforms in manholes, refer to Figure 7.7.
- For insulation requirements on services, refer to Figure 7.8.

## 7.4 SERVICE CONNECTION REPORTS

The Consulting Engineer shall provide detailed record drawings for all installed service connections that includes information relating to pipe dimension, invert elevations, depth of service lines and location of services relative to property line, manholes and water main valves.

## 7.5 HORIZONTAL DIRECTIONAL DRILLING (HDD)

### 7.5.1 General

The developer must provide regulatory, environmental, geotechnical, risks, economics, engineering, contractual and construction considerations and provide the best practices and recommended procedures for installation of piping systems utilizing the Horizontal Directional Drilling Method.

### 7.5.2 Compliance

All Horizontal Directional Drilling methods must comply with the latest edition of CSA Z662 which contains requirements for the design, material selection, construction, and operation of pipelines.

### 7.5.3 Temporary Workspace

The developer may require a separate temporary workspace other than the easement required for the construction. The temporary workspace may include exit mud containment tanks/pits; cuttings settlement tank/pits; rollers and pipeline handling equipment, side booms, welding equipment and coating and testing equipment. The developer must apply for this right of way prior to construction. All disturbed areas relating to the HDD operations in this right of way shall be restored to the original condition or better.

### 7.5.4 Regulatory Agencies

- Fisheries Act

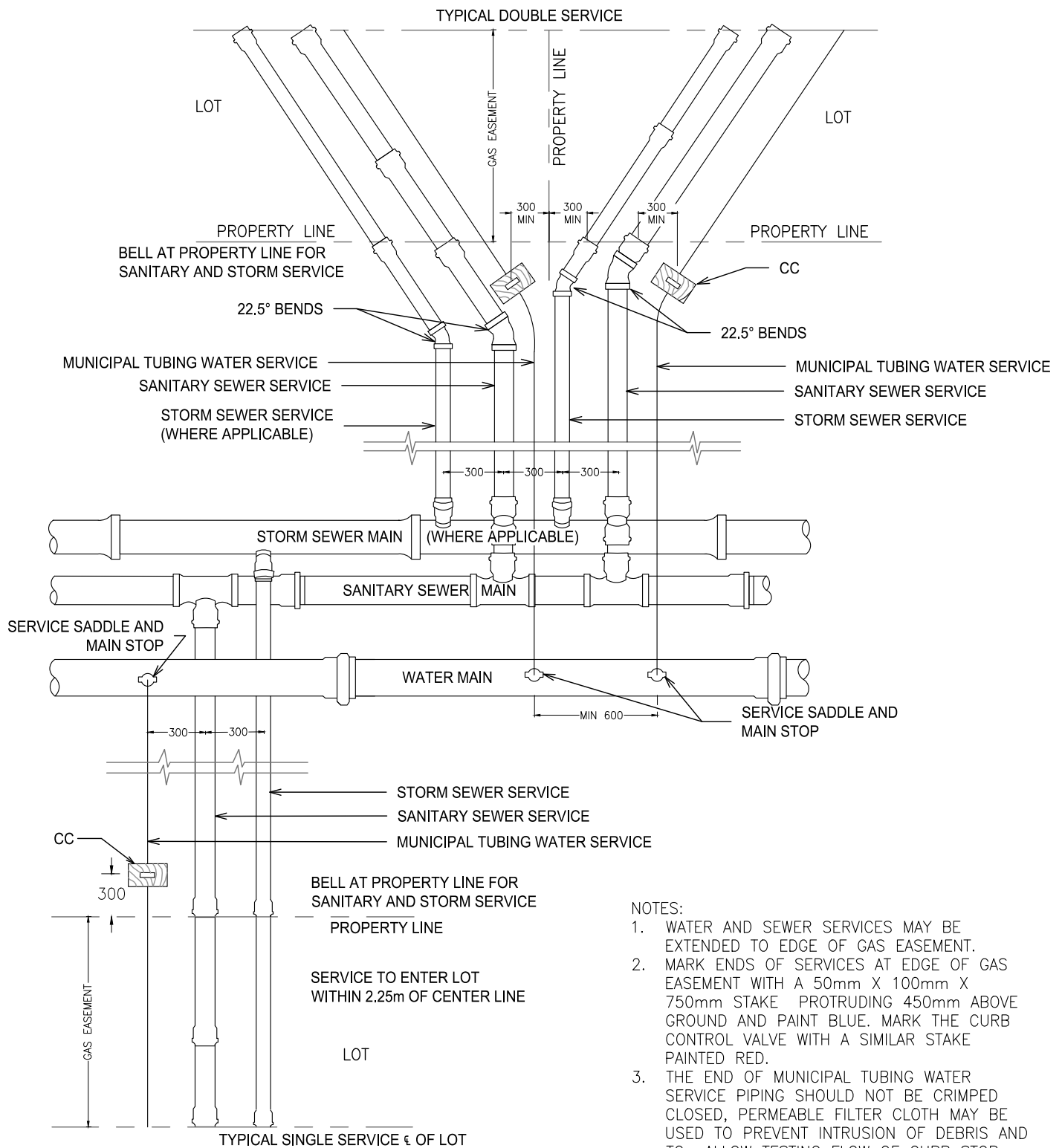




- Navigable Waters Protection Act
- The Canadian Environmental Assessment Act
- Alberta Environment and Parks
- Alberta Transportation
- Big Lakes County
- Others, as required on a project-by-project basis.







**NOTES:**

1. WATER AND SEWER SERVICES MAY BE EXTENDED TO EDGE OF GAS EASEMENT.
2. MARK ENDS OF SERVICES AT EDGE OF GAS EASEMENT WITH A 50mm X 100mm X 750mm STAKE PROTRUDING 450mm ABOVE GROUND AND PAINT BLUE. MARK THE CURB CONTROL VALVE WITH A SIMILAR STAKE PAINTED RED.
3. THE END OF MUNICIPAL TUBING WATER SERVICE PIPING SHOULD NOT BE CRIMPED CLOSED, PERMEABLE FILTER CLOTH MAY BE USED TO PREVENT INTRUSION OF DEBRIS AND TO ALLOW TESTING FLOW OF CURB STOP.

N.T.S.



# **TYPICAL SERVICES SINGLE & DUAL MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY**

SPEC. REFERENCE

DATE:

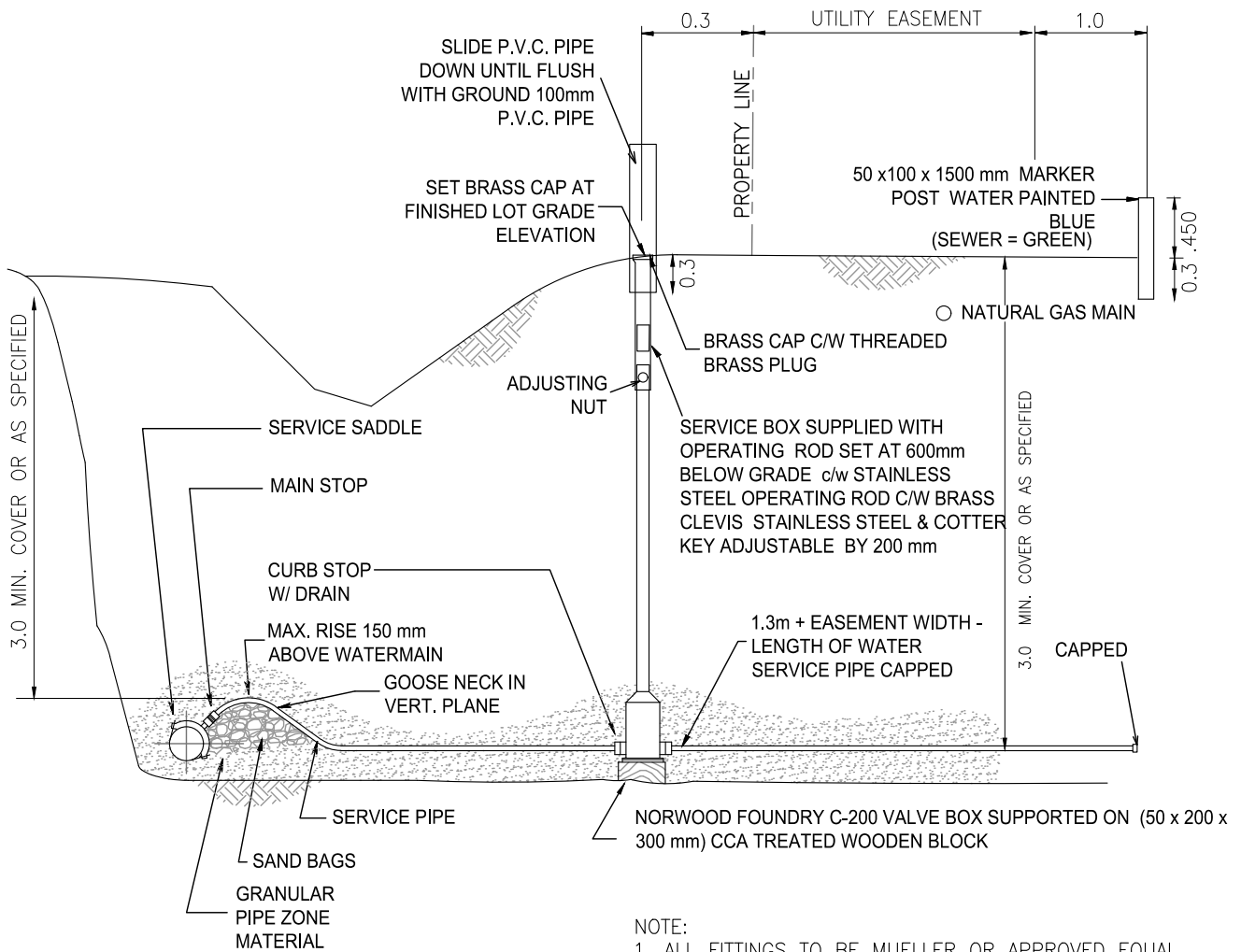
SEPT. 2023

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**7.1**





ALL DIMENSIONS SHOWN IN METRES.

N.T.S.



# WATER SERVICE CONNECTION MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

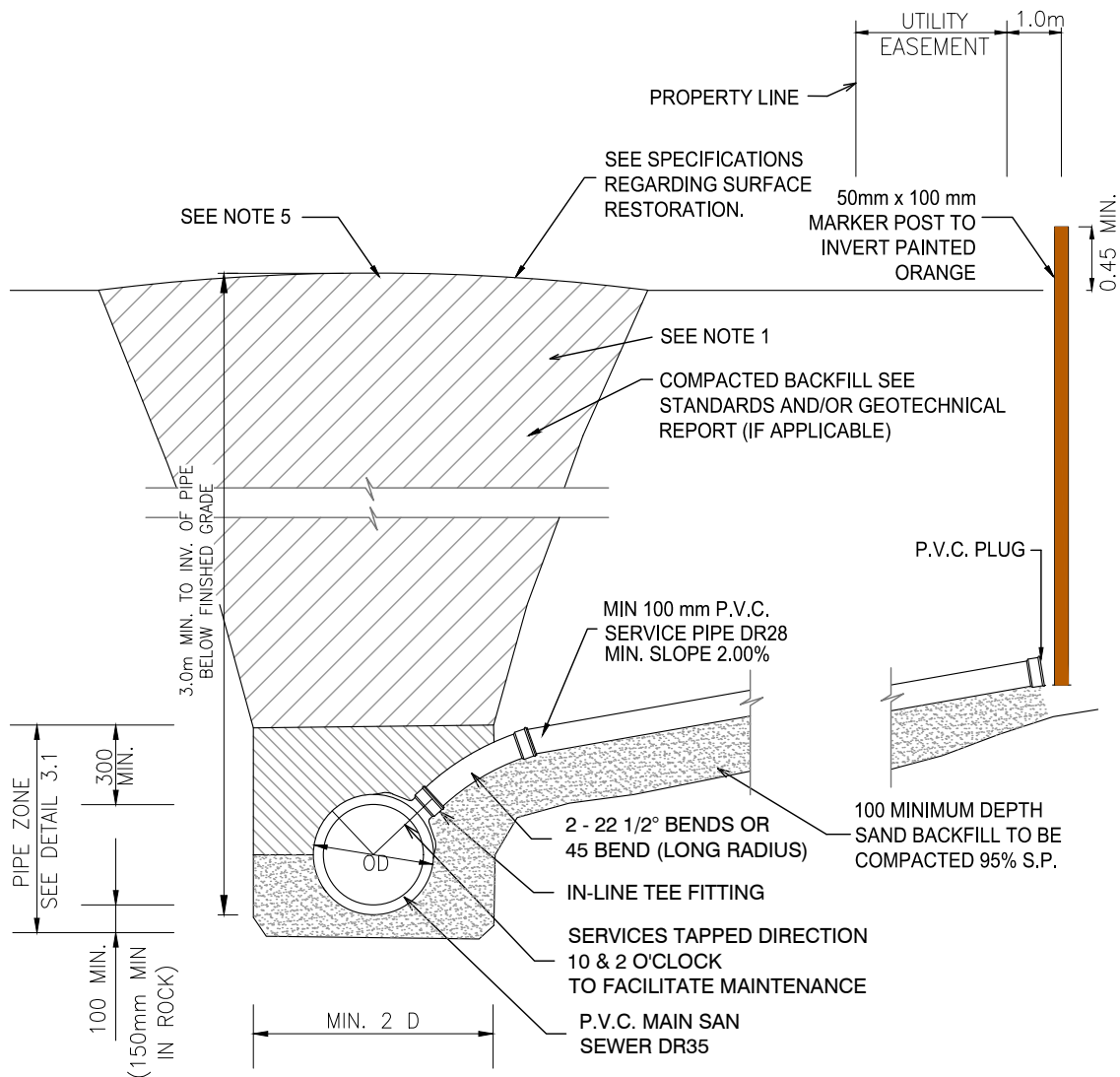
SEPT. 2023

REVISED:

DRAWING NO:

7.2





NOTES:

1. WHEN CUT BACK SLOPES ARE TO BE USED IN LIEU OF CAGES AND SHORING, THESE SLOPES ARE TO MEET REQUIREMENTS OF LOCAL CODES AND OH&S MANUAL.
2. MINIMUM COVER ABOVE PIPE 2.5 m.
3. MIN. PIPE ZONE WIDTH IS SPECIFIED TO ALLOW PROPER PIPE ZONE COMPACTION.
4. OD = OUTSIDE PIPE DIAMETER.
5. FOR UNCOMPACTED BACKFILL, CROWN TRENCH BY  $H \times 0.1$ .
6. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.

N.T.S.



# GRAVITY SEWER SERVICE CONNECTION MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

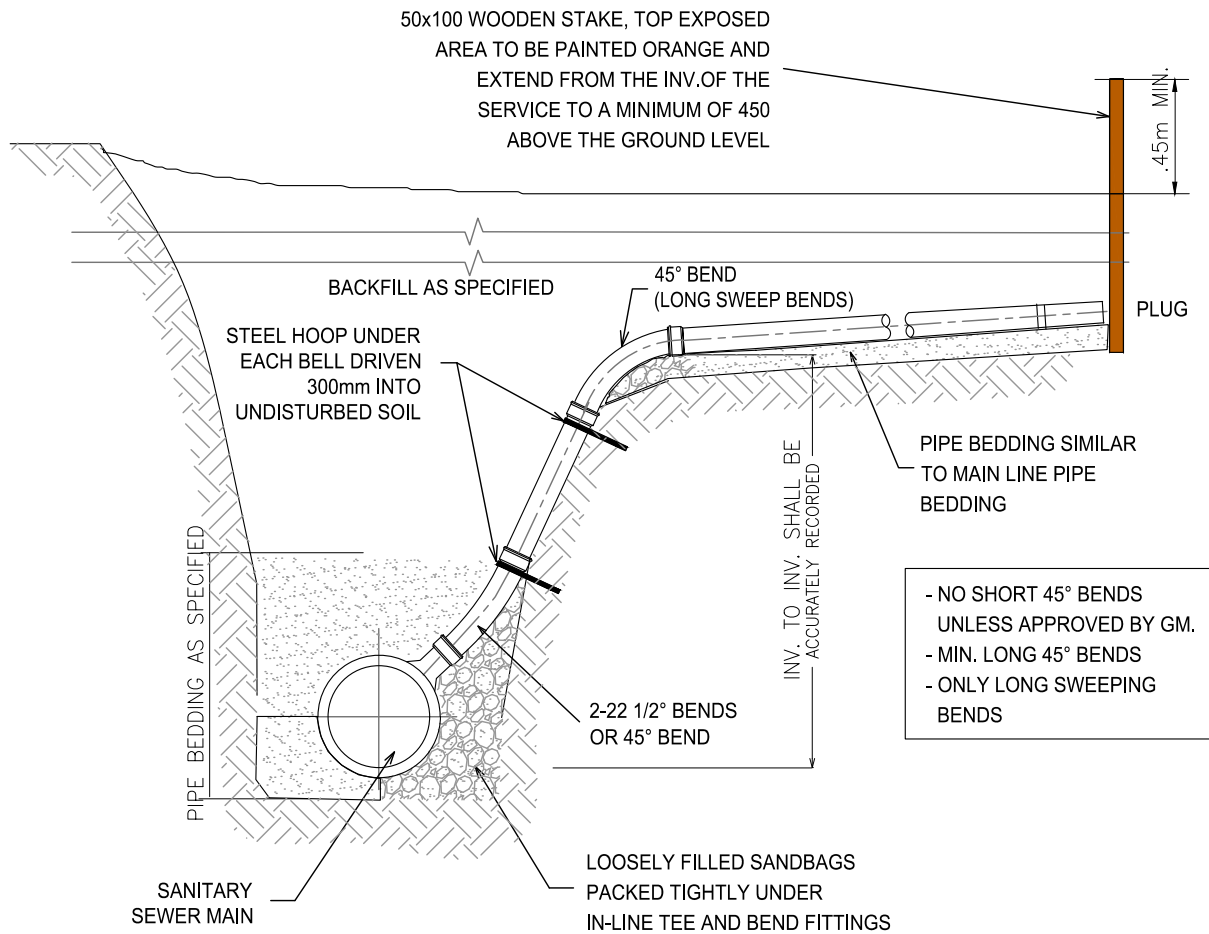
SEPT. 2023

REVISED:

DRAWING NO:

7.3





NOTES:

1. REFER TO 7.3 FOR APPLICABLE NOTES 1 TO 6.

N.T.S.



# GRAVITY RISER DETAIL MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

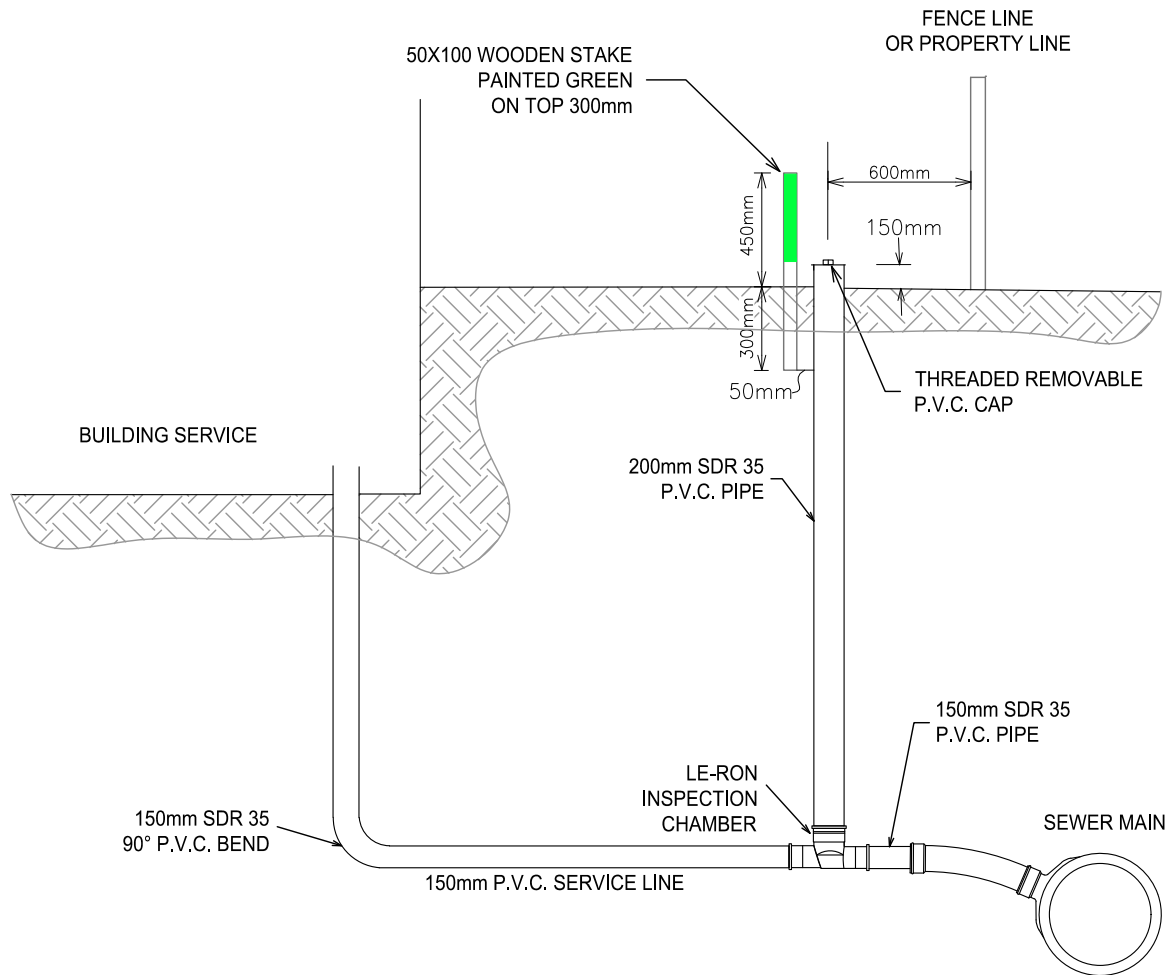
SEPT. 2023

REVISED:

DRAWING NO:

7.4





NOTE:  
INSPECTION CHAMBER TO BE LOCATED IN A NON-TRAFFIC AREA  
AND APPROPRIATELY PROTECTED AND MARKED.

N.T.S.



# INSPECTION CHAMBER DETAIL MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

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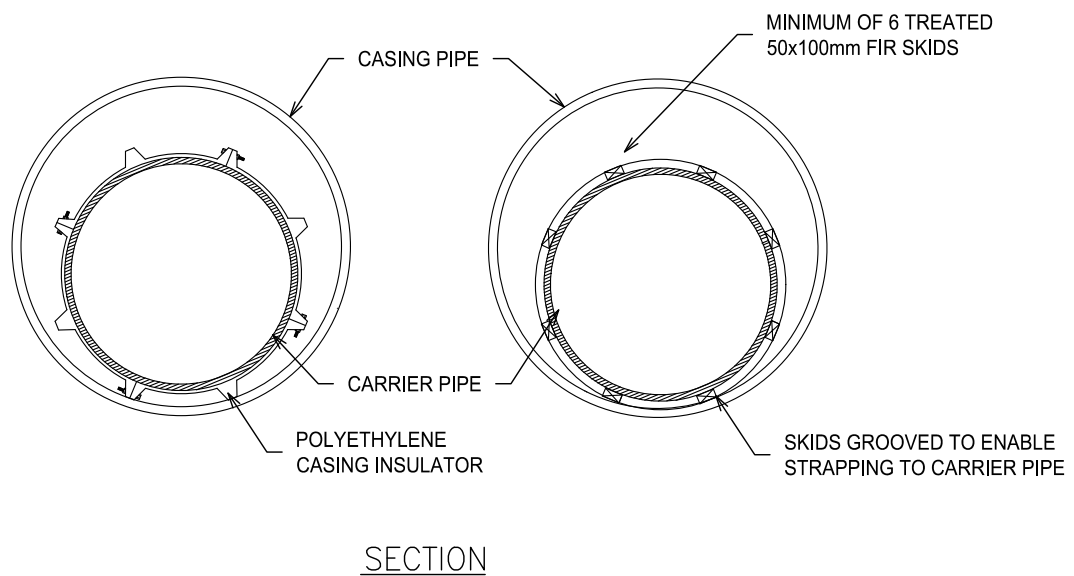
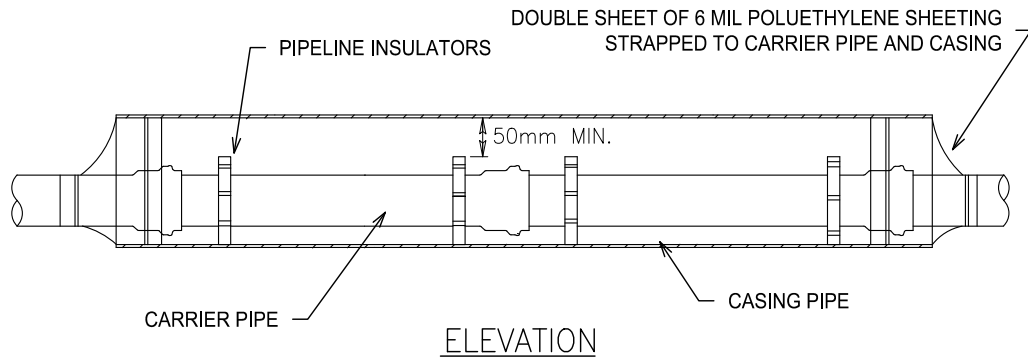
SEPT. 2023

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ALL DIMENSIONS IN  
MILLIMETRES UNLESS  
OTHERWISE NOTED

NOTES:

1. CASING MATERIAL AND THICKNESS TO BE AS SPECIFIED ON CONSTRUCTION DRAWINGS.
2. INSULATOR SPACING TO BE DETERMINED BY THE MATERIAL AND JOINT TYPE OF CARRIER PIPE BEING USED.
3. CASING COATING AND CATHODIC PROTECTION REQUIREMENTS TO BE AS SPECIFIED ON CONSTRUCTION DRAWINGS.

N.T.S.



**CASING PIPE  
WITH INSULATOR**

**MUNICIPAL SERVICING STANDARDS**

BIG LAKES COUNTY

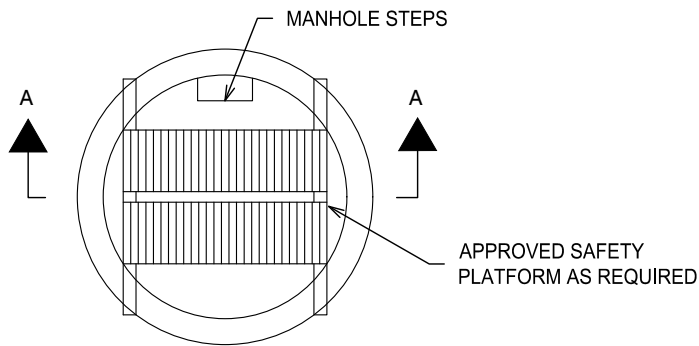
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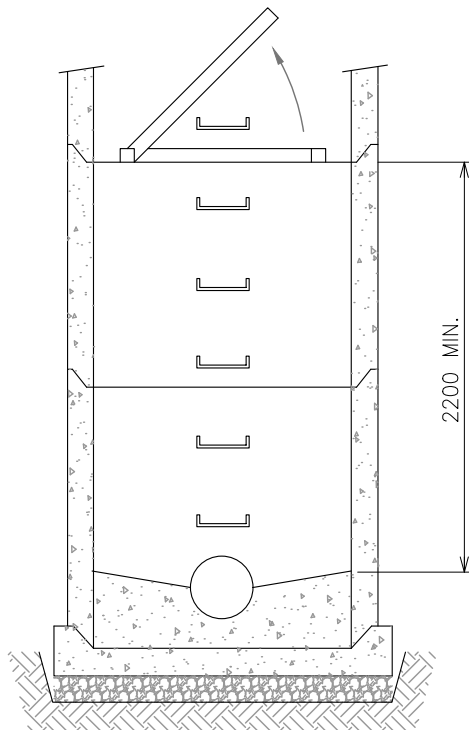
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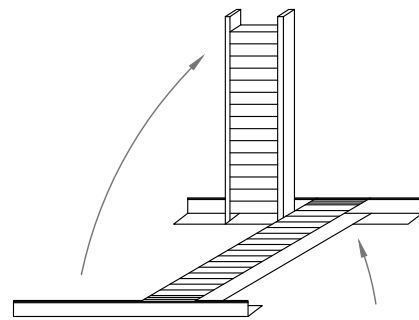




PLAN VIEW



SECTION A-A



NOTES:

1. TO BE INSTALLED ON MANHOLES GREATER THAN 5.0m DEEP
2. TO BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

N.T.S.



**MANHOLE  
SAFETY PLATFORM  
MUNICIPAL SERVICING STANDARDS  
BIG LAKES COUNTY**

SPEC. REFERENCE

DATE:

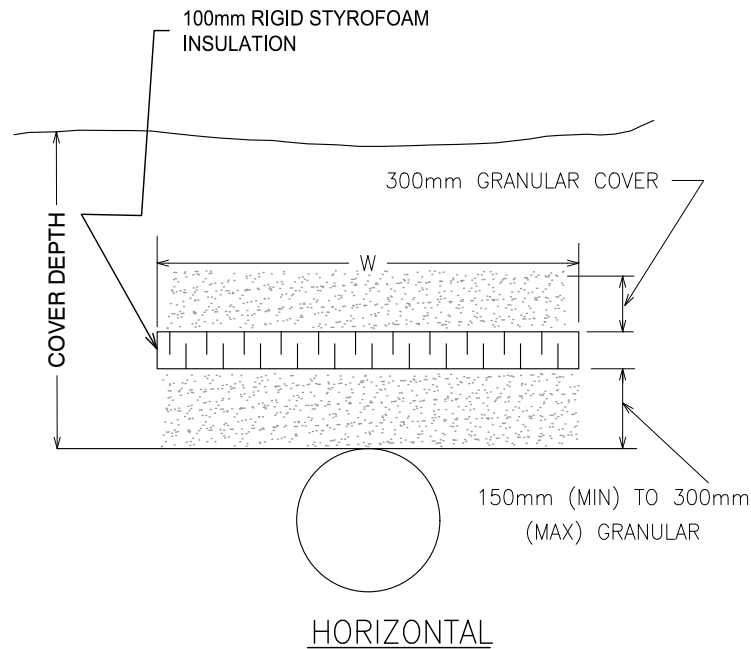
SEPT. 2023

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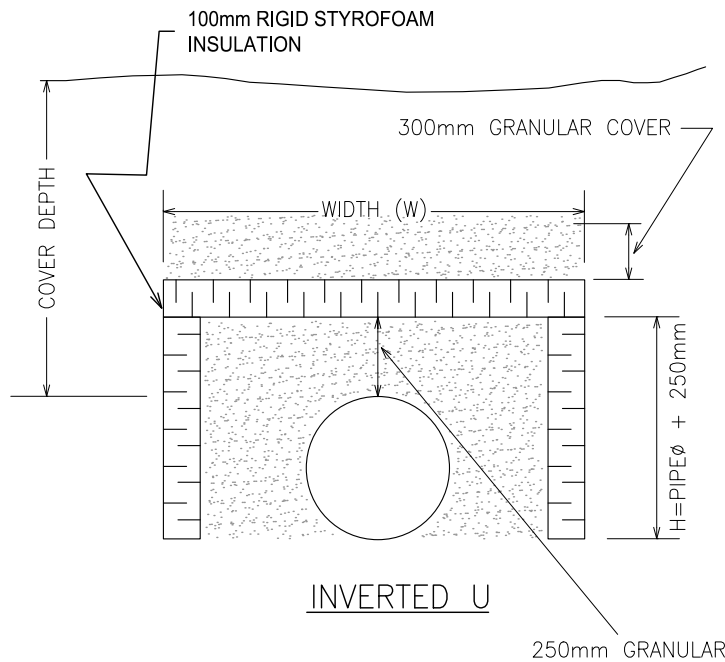
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OR



NOTES:

1. INSULATION OF PIPING TO BE APPLIED WHEN DEPTH OF BURY WILL NOT PREVENT FREEZING OF THE LINE EITHER BY CONSIDERATION OF THE DEPTH OR TYPES OF SOILS
2. MINIMUM WIDTH TO BE CALCULATED BY  $W=\phi+2H$
3. OTHER TECHNOLOGIES SUCH AS "HALF SHELLS" OR "PRE-INSULATED PIPE" SHALL BE CONSIDERED

N.T.S.



**INSULATION REQUIREMENTS  
FOR WATER MAINS & SERVICES**  
**MUNICIPAL SERVICING STANDARDS**  
BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

SEPT. 2023

REVISED:

DRAWING NO:

7.8



## 8 SIGNAGE

### 8.1 MUNICIPAL ADDRESSING SIGNAGE

- The Developer shall supply and erect parcel identification markers in each rural multiple parcel subdivision based on the municipal addressing system in existence within BLC. Three or more lots may be considered as a multi-parcel subdivision unless otherwise approved. They will include the address for the main entrance to the subdivision and the assigned parcel numbers for each of the lots in the subdivision. The municipal address parcel numbers will be the same as the lot numbers shown on the registered subdivision plan.
- The two (2) or three (3) digit parcel identification signs must be in an obvious place next to the driveway at the property line. The sign shall be located on the right side of the driveway, minimum 2.0 m from the approach shoulder, minimum 1.0 m above ground level and at 90° to the driveway.
- Municipal Address Signs shall be constructed and installed in accordance with the following minimum requirements:
  - Size: Two (2) digit 250 mm x 200 mm (min.)  
Three (3) digit 325 mm x 200 mm (min.)
  - Sign Material: 2 mm high tensile flat aluminum
  - Finish: 3 m medium green vinyl with silk screened or die-cut reflectorized white lettering
  - Lettering Size: 150 mm (min.)
  - Posts: 1.5 m angled aluminum post
  - Sign Attachment: The marker sign shall be attached to the post with two (2) stainless steel bolts and nuts.
- Refer to Standard Figure 8.1: Municipal Addressing Sign
- Municipal Address Signs may be purchased from BLC, Public Works Department.

### 8.2 SUBDIVISION SIGNS

- The Developer shall supply and erect a subdivision display sign at the identified main entrance of each multiple lot subdivision with the exact location being approved by the BLC prior to installation. The sign shall show the subdivision name, municipal address of the identified main entrance to the subdivision (sign location) and the subdivision layout with the assigned parcel identification number on each lot in the subdivision including the reserve parcel designations.
- The subdivision sign shall be constructed by a Commercial Sign Manufacturer in exact accordance with the following minimum requirements:





**Wood Option**

## Size:

- Map Sign: 1.2 m x 2.4 m (4' x 8')
- Address Tab: 0.304 m x 2.4 m (12" x 8')
- Material: Minimum 19 mm (3/4") HDO Plywood properly sealed on the on printed side

## Layout:

- Map Sign: Shall indicate the subdivision municipal numbering layout, subdivision name, BLC Logo and north arrow. Subdivision name to be minimum 150 mm (6") lettering and shall include a "You Are Here" arrow and lot numbering to be minimum 50 mm (2") lettering.
- Address Tab: Shall indicate the subdivision municipal address at minimum 150 mm (6") lettering.
- Finish: 3 m white high intensity reflective sheeting with a computer cut lettering. Border strip is to be premium grade vinyl.
- Date Stamp: To be on back of sign indicating date of manufacture.
- Warranty: Manufacturer to provide ten (10) year guarantee against surface deterioration.
- Posts: Shall be commercially available pressure treated, minimum 150 mm x 150 mm x 3.5 m (6" x 6" x 11') wooden posts or approved galvanized telespar type metal posts.
- Sign Attachment: The map sign and the address shall be attached to wood posts with a minimum of four (4) 12 mm x 150 mm (1/2" x 6") stainless bolts and nuts complete with minimum 35 mm stainless flat washers front and back. Wood signs attached to metal posts shall use the same size of bolt and hardware with the length adjusted according to the post dimensions.
- Location: As determined and approved on site by the BLC.

**Aluminum Option**

Shall be identical to the wood option except for the following:

- Material: 2.0 mm high tensile flat aluminum minimum grade 5052-H38. Complete with aluminum bracing to provide a rigid structure.
- Sign Attachment: As per manufacturers attachment design submitted and approved prior to sign installation.

Refer to Figures 8.2 and 8.3 for details on the subdivision signage.





### 8.3 TRAFFIC CONTROL SIGNAGE

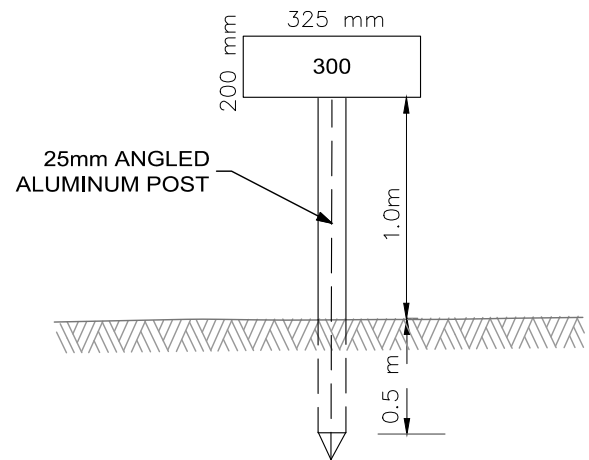
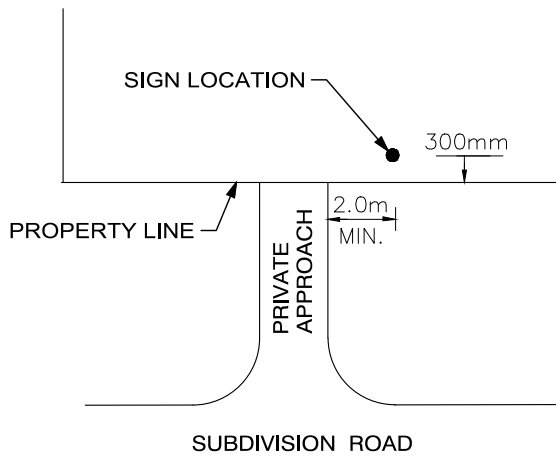
- A traffic control signage plan shall be submitted for review and approval to the BLC as part of the Engineering Design Drawings.
- All traffic control signage erected within subdivision road allowances shall be of high intensity grade signage and shall be in accordance with the standards contained in the latest edition of the Transportation Association of Canada Manual, "Uniform Traffic Control Devices for Canada" or Transportation & Economic Corridors' (formerly referred to as Alberta Transportation) Standards.
- All signposts shall be horizontally located a minimum of 3.0 m from the shoulder of the adjacent road and the bottom of the sign shall be 1.5 m above the shoulder elevation of the road. Refer to Figure 8.4: Traffic Sign Installation Detail and 8.6: Rural Address Sign.
- Stop and yield signs shall be positioned as per sign installation location specifications.

### 8.4 ENVIROMENTAL RESERVE SIGNAGE

1. The Developer shall supply and erect an Environmental Reserve Marker Sign at each property corner within a subdivision where a subdivision lot corner forms a common point with an Environmental Reserve.
2. Environmental Reserve signs shall be constructed by a commercial sign manufacturer and be installed in accordance with the following minimum requirements:
  - Size: 90 mm x 205 mm (3.5"x 8")
  - Sign Material: 2 mm Aluminum
  - Finish: 3 m grey vinyl with silk screened black lettering.
  - Information: As shown on "Environmental Reserve Marker Sign".
  - Posts: Eighteen (18) gauge galvanized steel U channel 87 mm wide x 31 mm deep x 1.8 m long. (3.4" wide x 1.2" deep x 6' long)
  - Sign Attachment: The sign shall be attached to the post with two (2) min. 4 mm stainless steel rivets in predrilled holes.
  - Installation: Shall be installed as shown on "Environmental Reserve Marker Sign" Figure 8.5.







NOTE:

1. DEVELOPER RESPONSIBLE FOR SUPPLY AND INSTALLATION OF ALL SIGNS

DIMENSIONS SHOWN IN METRES OR MILLIMETRES

N.T.S.



# MUNICIPAL ADDRESSING SIGN

## MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

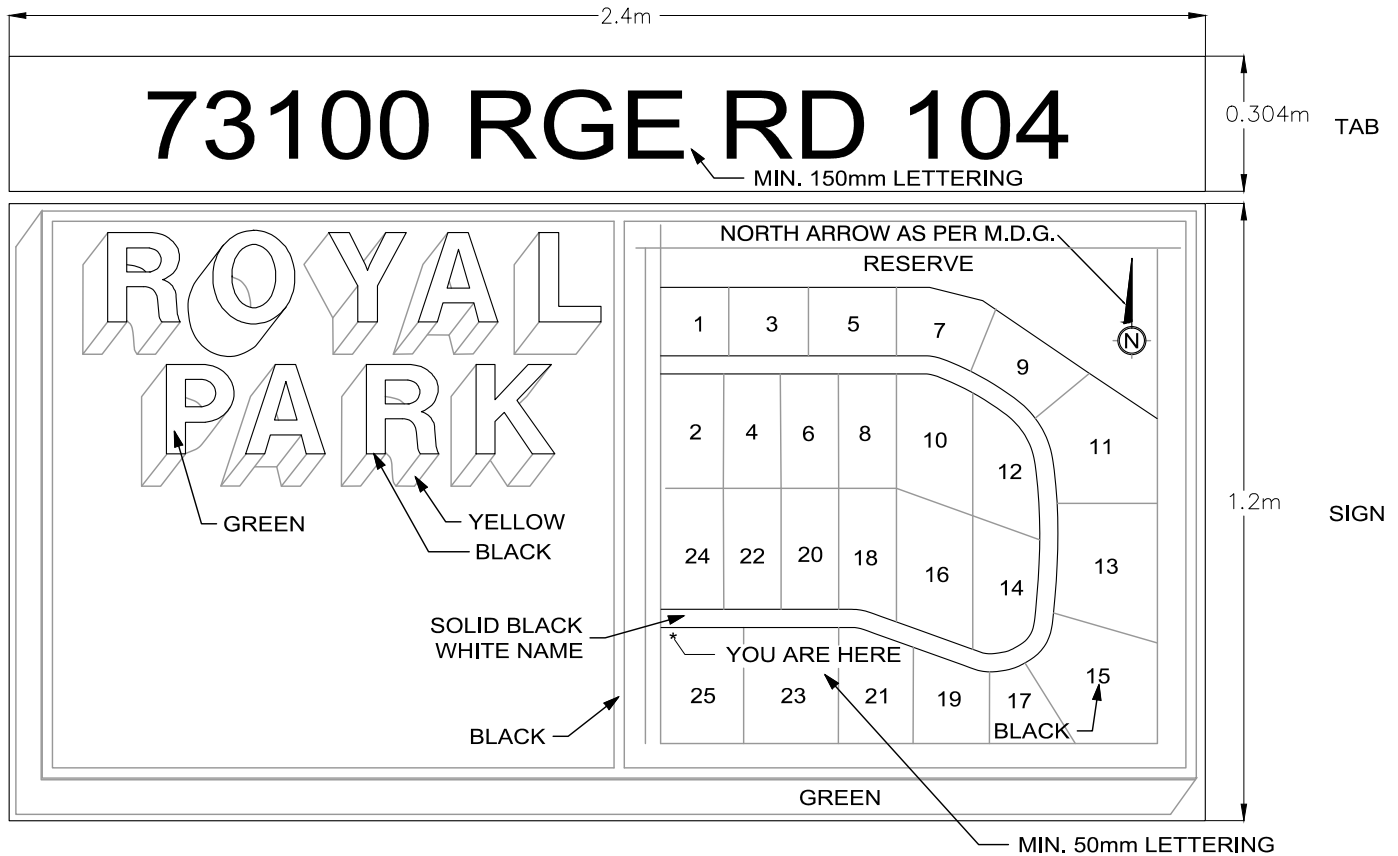
SEPT. 2023

REVISED:

DRAWING NO:

8.1





NOTES:

1. OUTLINE AROUND LOT AREAS IS BLACK
2. PARK RESERVES ARE GREEN
3. WATER IS BLUE
4. ROADS ARE SOLID BLACK WITH WHITE NAMES INSIDE
5. COLORS TO BE RECOMMENDED INKS OR APPROVED EQUIVALENT
6. ADDRESS NUMBERS TO BE PLACED ON MAP WHERE APPLICABLE
7. ANY SUBDIVISION THAT HAS 3 OR MORE LOTS IS CONSIDERED "MULTIPARCEL"
8. DEVELOPER RESPONSIBLE FOR SUPPLY AND INSTALLATION OF ALL SIGNS

DIMENSIONS SHOWN IN METRES

N.T.S.



# SUBDIVISION SIGN

## MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

SEPT. 2023

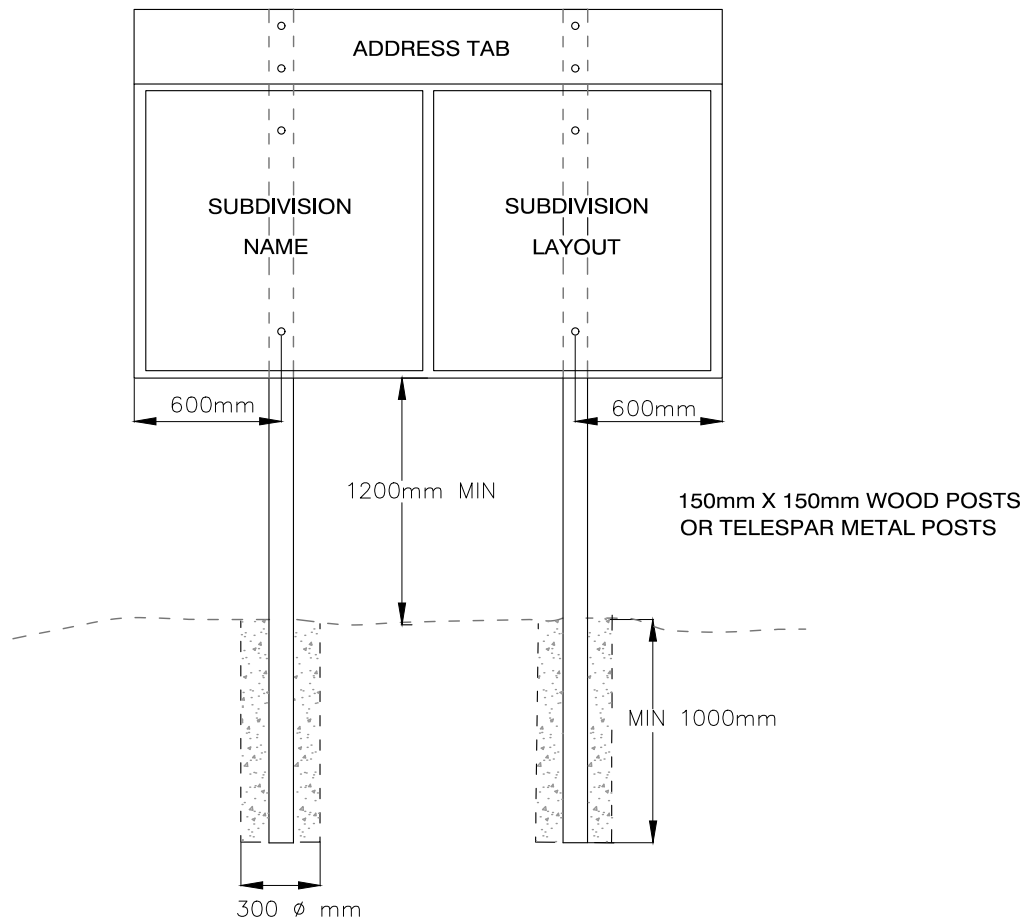
REVISED:

DRAWING NO:

8.2



POSTS TO BE FLUSH  
WITH TOP OF SIGN



NOTE:  
DEVELOPER RESPONSIBLE FOR SUPPLY AND  
INSTALLATION OF ALL SIGNS.

DIMENSIONS SHOWN IN METRES OR MILLIMETRES

N.T.S.



# SUBDIVISION SIGN INSTALLATION

## MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

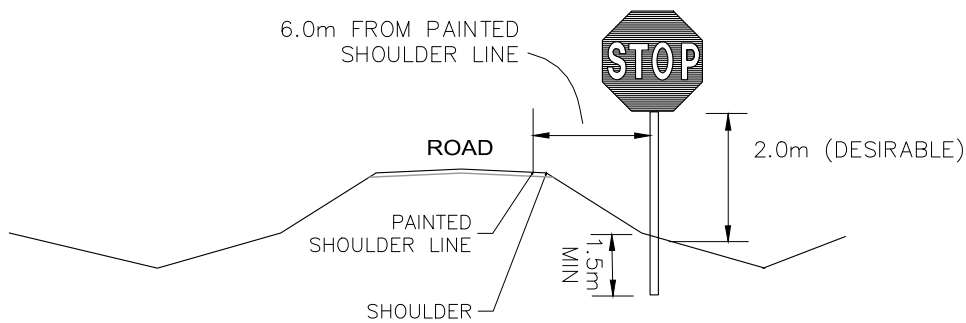
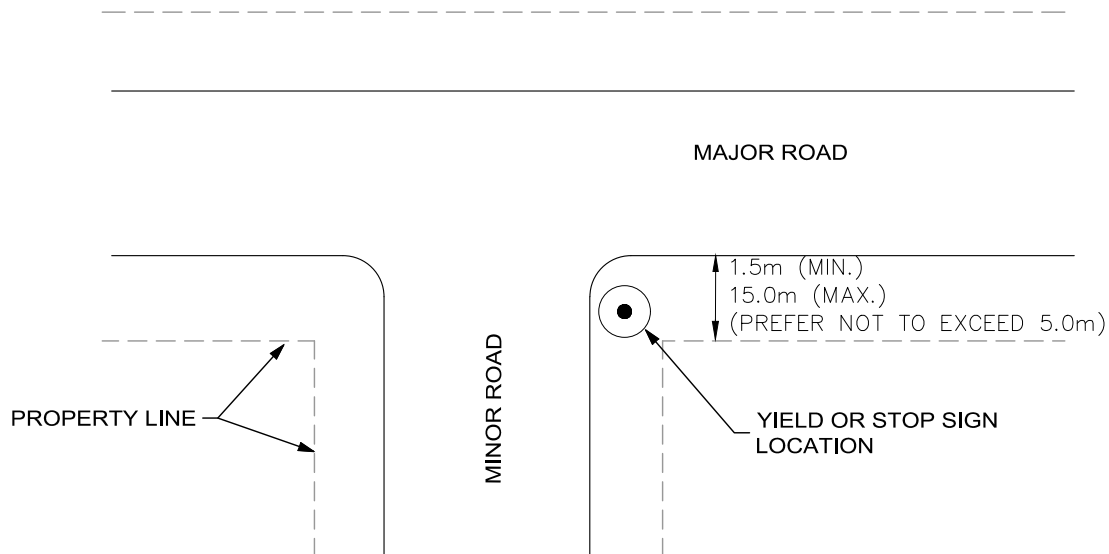
SPEC. REFERENCE

DATE: SEPT. 2023

REVISED: -

DRAWING NO: 8.3





**NOTE:**

1. LOCATION AND HEIGHT IS COMMON FOR ALL SIGNS
2. ALL SIGNS SPECIFICATIONS TO LATEST EDITION OF ALBERTA TRANSPORTATION AND THE TRANSPORTATION ASSOCIATION OF CANADA (TAC) STANDARDS & GUIDELINES
3. ALL STOP SIGNS REQUIRE 75cm RA-1 DIAMOND GRADE SIGN
4. DEVELOPER RESPONSIBLE FOR SUPPLY AND INSTALLATION OF ALL SIGNS.

DIMENSIONS SHOWN IN METRES

N.T.S.



# TRAFFIC SIGN INSTALLATION DETAIL MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

SEPT. 2023

REVISED:

DRAWING NO:

8.4



# ENVIRONMENTAL RESERVE

IN ORDER TO PROTECT THE  
NATURAL ENVIRONMENT,  
THIS LAND WAS DESIGNATED  
AS ENVIRONMENTAL RESERVE

ALTERATION OR DEVELOPMENT  
OF RESERVE PROPERTY  
IS UNLAWFUL.

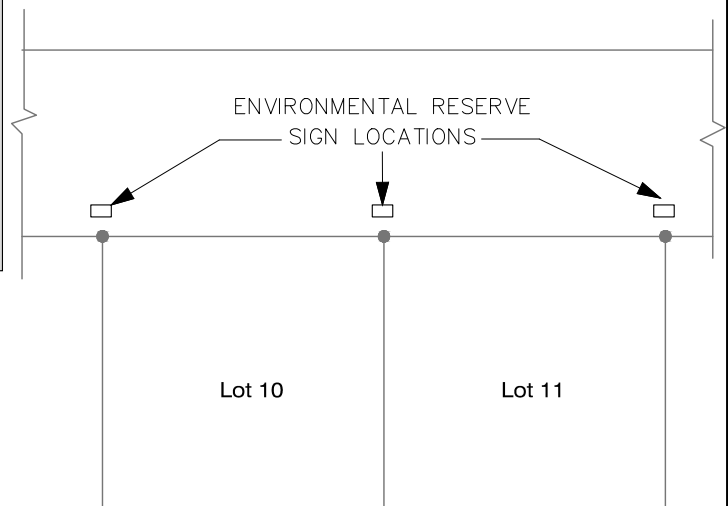
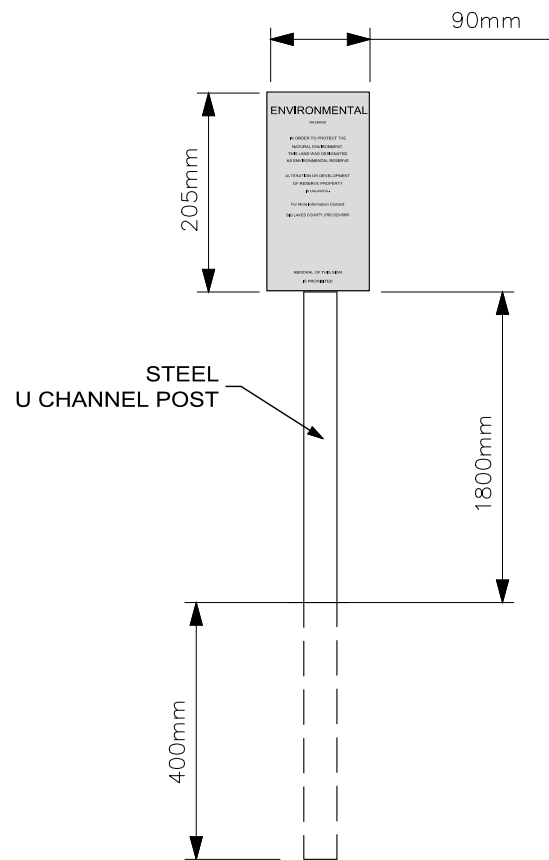
For More Information Contact:  
BIG LAKES COUNTY  
(780) 523-5955

REMOVAL OF THIS SIGN  
IS PROHIBITED

#### NOTES:

1. SIGNS TO BE LOCATED AT EACH COMMON ENVIRONMENTAL RESERVE AND PROPERTY LOT CORNER.
2. SIGNS TO BE 300mm ON RESERVE FACING PRIVATE LOTS.
3. DEVELOPER RESPONSIBLE FOR SUPPLY AND INSTALLATION OF ALL SIGNS.

DIMENSIONS SHOWN IN MILLIMETRES



N.T.S.



ENVIRONMENTAL RESERVE  
MARKER SIGN  
MUNICIPAL SERVICING STANDARDS  
BIG LAKES COUNTY

SPEC. REFERENCE

DATE: SEPT. 2023

REVISED: -

DRAWING NO: 8.5





4" HWY C TEXT

NOTE:

TWO  $\frac{3}{8}$ " HOLES ON EACH END (6" CENTRE, 6" in)  
9-13 CHARACTERS - 40" (100cm)

N.T.S.



## RURAL ADDRESS SIGN

MUNICIPAL SERVICING STANDARDS  
BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

SEPT. 2023

REVISED:

DRAWING NO:

8.6



## 9 **MISCELLANEOUS REQUIREMENTS**

### 9.1 **GENERAL**

This section outlines standards, guidelines, and the requirements for numerous miscellaneous items that are relevant to the development of subdivisions within BLC.

### 9.2 **PROPERTY BOUNDARY MONUMENTS**

The Developer shall, in conjunction with the legal survey of the property cause to be installed, Statutory Iron Survey Posts in accordance with the Surveys Act and in such a manner that the monuments will survive the construction of the roads, utilities and landscaping. BLC will require the Land Surveyor or Survey Firm conducting the legal survey to certify the current existence of all survey monuments shown on the plan as being in the ground at the time of registration of the subdivision at Land Titles. The developer shall install marker posts to identify and protect all legal survey lot corner pins in the subdivision. Care shall be taken as not to disturb the legal survey pin. Any disturbed legal survey pins shall be replaced by a legal surveyor at the developer's cost.

#### 9.2.1 **Survey Control Markers**

Every effort shall be made to protect existing markers. The developers shall provide additional markers as required.

### 9.3 **LANDSCAPING**

- A uniform thickness of topsoil shall be placed on all roadway ditch bottoms, side slopes, back slopes, and open areas disturbed during construction with salvage topsoil and be seeded to grass following preparation of the seed bed.
- The seed bed shall consist of a minimum 75 mm (3") of topsoil capable of supporting good vegetation growth. The topsoil shall be spaced and graded evenly and shall be free of rock, roots, stumps, weeds, and other deleterious material.
- The seed mixture shall be as follows:
  - For low density residential/commercial/industrial development:
    - 40% Creeping Red Fescue
    - 40% Brome Grass
    - 20% Timothy
  - For high density residential:
    - 65% Creeping Red Fescue
    - 35% Kentucky Blue Grass
- All seed shall be certified and verified with a primary and secondary noxious weed free certificate. No sweet clover is permitted.
- If seeding after September 1, add 10kg/Ha of a fall rye to the mix.
- The rate of application of seed shall be 25 kg per hectare by mechanical applicators. An application of 75 kg per hectare of starter fertilizer shall also be applied at the time of grass seeding.
- All seeded areas will be accepted following consistent germination and carrying out of a first cut following 50 mm (2") of growth.





- Trees shall be planted as per Figure 9.10
- Concrete barriers shall be shown in Figure 3.30.
- Hydro-seeding is acceptable for an option as per Alberta Transportation section 02924-Hydro-seeding. To select appropriate hydro-seeding mixtures an evaluation of site conditions shall be performed with respect to:
  - soil conditions
  - site topography
  - season and climate
  - vegetation types
  - maintenance requirement
  - sensitive adjacent areas
  - water availability
  - plans for permanent vegetation.
- Follow up applications shall be made as needed to cover weak spots.
- Application of the slurry should proceed until a uniform cover is achieved. The application should not be directed at one location for too long a period on the applied water will cause erosion.
- Prior to application, roughen embankment and fill areas by rolling with a crimpering or punching type roller on by track walking.
- Hydraulic matrices require 24 hours to dry before rainfall oceans to be effective.
- Hydro-mulched slopes should be inspected periodically for damage due to wind, water, or human disturbance. Repair all damaged areas immediately using hydro-mulching at the original speculations on straw mulch. Supplementary watering may be required.
- Provide hydroseeding in accordance with the latest edition:
  - Canada Seeds Act and Seeds Regulation
  - Fertilizer Act and Fertilizer Regulation
  - Alberta-Weed Control Act and Weed Regulation
- Provide the following for submittal:
  - Certificate of Analysis for each seed supplied with tests showing germination rate and purity.
  - Seed mix composition.

## 9.4 PROTECTION AND/OR COORDINATION OF UTILITIES

- The Developer shall be responsible for the identification, location and protection of all utilities which may exist within or adjacent to the proposed subdivision. Utilities commonly encountered on lands within BLC may include, but not be limited to:
  - Telephone, Cablevision, and Cables.
  - Fibre optics.
  - Power cables.
  - Natural gas distribution lines.
  - Oil and gas distribution lines.
- The Developer shall be responsible for contacting all utility agencies and for arrangements, coordination, protection, and/or modifications to the utilities during the development of the subdivision, at their cost, or as agreed upon with the specific utility company.





## 9.5 ELECTRICAL POWER SERVICE

- The Developer shall plan with the appropriate Franchise Utility Operator for the installation of above ground or underground Electrical Power within a subdivision.
- Where underground power is proposed within a subdivision the Developer shall be required to hire an Engineering Consultant, approved by the Franchise Operator to design the Electrical System in accordance with statutory and operator's requirements. The Developer shall be required to hire an Electrical Contractor to install the Electrical System in accordance with the approved electrical system design and the franchise operator. The alignment and location of all electrical facilities within a subdivision shall be subject to the approval of BLC. Acceptance of the electrical system within the subdivision shall be subject to the approval of the Franchise Operator and BLC. Where underground power is being installed, the Developer shall plan for the common installation of telecommunication cables within the underground trench.

## 9.6 NATURAL GAS SERVICE

- The Developer shall plan with the Gas Franchise Company in the area for the installation of Natural Gas in a subdivision.
- The alignment and location of all natural gas facilities within a subdivision shall be subject to the approval of the BLC and the appropriate Provincial authorities.

## 9.7 STREET LIGHTING

- Street lighting will be required in subdivisions at the Developer's cost.
- In Low Density and High-Density Country Residential subdivisions of four (4) lots or greater are based upon and may be required on all other developments, the Developer shall pay streetlight energy costs until at least 50% of the lots are occupied. Following 50% occupancy, BLC will assume streetlight energy costs and recover the energy costs from the lot owners through a Special Tax Levy Assessment.
- In Industrial/Commercial subdivisions, BLC will assume street lighting energy costs following the installation of streetlight infrastructure by the Developer and subdivision plan registration.

## 9.8 MAILBOX PULLOUTS

The Developer shall construct, when identified as being required, a mailbox pullout at the entrance to or within the subdivision in accordance with the "Mailbox Pullout Locations" refer to Figure 3.39.





## 9.9 OFFSITE ROAD CONSTRUCTION

### 9.9.1 General

- A subdivision or development approval may require that the Developer reconstruct an existing road or construct a road within an undeveloped road allowance. This section outlines the Developer's responsibility relative to such a requirement. Standards shall be as per the current Municipal Rural Roads Standards (2001 Rural Road Study) or AT/TAC specifications.
- The Developer in the construction or reconstruction of a road shall ensure and be responsible for the safety of the traveling public and access to adjacent landowners.

### 9.9.2 Coordination of Existing Utilities

#### 9.9.2.1 General

The Developer shall be responsible for contacting all affected utility agencies and for arranging and co-ordination of all protection and/or modifications necessitated by the construction or reconstruction of a BLC road. This section outlines the arrangements applicable to the utility agencies commonly involved as well as the responsibilities relating to costs. The information provided is based upon conditions normally encountered and may not be applicable where unusual site-specific circumstances are involved. The Developer is advised to contact each affected utility agency at the earliest possible time to confirm timing and co-ordination requirements.

#### 9.9.2.2 Communications

Franchisee communication companies (ex/ telus, shaw, fiber) will require advance written notice to allow for scheduling of crews for modifications and/or relocation of existing underground lines within road allowances. Temporary lines may be required to facilitate construction and then replaced with permanent lines installed upon completion of construction.

The cost of modifying, relocating, or providing and replacing temporary lines may be charged directly to BLC by the communication company, pursuant to an agreement with respect to construction within municipal road allowances. Such charges are then assessed against the Developer by BLC along with any additional charges with respect to inadequate notice of construction start provided by the Developer. Any damages to permanent or temporary communication facilities by the Developer's construction activities will be the Developer's responsibility and will be charged directly to the Developer.

#### 9.9.2.3 Power

Electrical franchise utility operators generally require advance written notice to arrange for and schedule power line adjustments or relocations required by BLC road construction. Along with the notification, the franchise operator shall be provided with the design plan-profile for the section of road requiring power line adjustment or relocation. The Developer shall then provide the franchise operator with ten (10) days notice prior to the date on which the franchise operator can commence relocation work. The Developer is responsible for carrying out clearing in addition to roadway clearing as might be required for power line relocation, some of which may be beyond the road allowance boundary.





Where overhead power lines and/or underground power line crossings are within the existing road allowance, the costs of any required modification or relocation will require discussions and negotiations with the franchise operator. Where power lines are presently on private property adjacent to the existing road allowance, the actual costs of any required modification or relocation incurred by the franchise operator are charged to BLC. In turn these costs are assessed against the Developer's construction activity or will be charged directly to the Developer by the franchise operator. In all cases the Developer is responsible for paying the costs of all clearing required.

The natural gas distribution agencies in BLC require advance written notice to schedule and arrange for modifications of low-pressure gas line crossings of the road allowance. In the case of high-pressure steel line crossings longer periods of advance notice are required depending on the type and size of line and the extent of modification required. For such high-pressure lines every effort shall be made to design the road grade to accommodate the existing pipeline grade. In some cases, the costs of modifications to natural gas line crossings are borne by the natural gas distribution agency. Where costs are chargeable to BLC, such costs will be assessed against the Developer.

#### 9.9.2.4 Pipeline Crossings

- Where transmission pipelines, such as oil and gas pipelines, oil distribution pipelines, water or any other pipelines not covered elsewhere within these standards, are found to exist within the road allowance the developer shall be responsible for:
  - Contacting and advising the appropriate pipeline agency of the proposed road construction or reconstruction crossing its pipeline.
  - Acquiring the necessary approvals and crossing agreements from the pipeline agency prior to road construction start.
  - Coordination and scheduling the road construction and any required modifications to the pipeline with the pipeline agency.
  - Monitoring the road construction in the pipeline crossing to ensure the requirements of the pipeline agency have been met.
  - All costs incurred in the acquiring of approvals, crossing agreements, and all construction costs connected with the lowering, modifying, or relocating of a pipeline to accommodate road construction, as well as any damages resulting from the road construction shall be the responsibility of the Developer.

#### 9.9.2.5 Utility Markers

Where utility markers exist within a road allowance identifying the location of an underground line, and the markers require relocating to accommodate road allowance widening and/or road construction, the developer shall be responsible for contacting the appropriate utility company and arranging for marker relocation.

### 9.9.3 Land Acquisition and Access Agreements

#### 9.9.3.1 General

- The construction or reconstruction of a BLC road can result in the need for negotiation and formal agreements and adjacent landowners with respect to one or more of the following typical requirements:





- Road allowance widening.
  - Back sloping.
  - Borrow areas.
  - Power line clearing.
  - Telephone right-of-access.
  - Fencing.
  - All negotiations and preparations of formal agreements will be carried out by BLC land buyers for consideration and approval by BLC Council.
- All required payments pursuant to the provisions of the agreements, as well as the costs incurred by BLC in arranging the agreements, will be assessed against the Developer.

#### **9.9.3.2 Road Allowance Widening**

- In all cases, BLC will normally attempt to acquire additional road allowance equally on both sides of the original road allowance for a total width appropriate to the standard and classification of road in question.
- Land acquisition payments to landowners are normally based on rates established by BLC Council for various areas in BLC. There may also be damage payments to the landowners for circumstances such as loss of crop, shelter belt trees, fencing, etc.

#### **9.9.3.3 Back-sloping**

- A back-sloping arrangement with a landowner enables roadway excavation and/or fill slopes to extend beyond the road allowance limits into private property to slope gradients and under conditions mutually agreed upon. Agreements for such arrangements are normally pursued by BLC in cases where road allowance widening is not possible or where large cuts and/or fills necessitate construction beyond the road allowance widening acquired. The Developer is responsible for identifying the location and extent of areas along the road where back-sloping is necessary.
- Landowner compensation for back-sloping normally consists of damage payments for such items such as loss of crops, trees, etc. There is generally no compensation for earth material removed from private property.
- Back-slope easements may require a legal survey and preparation of related easement documents and the registration of plans and documents at Land Titles, all of which shall be at the sole expense of the Developer.

#### **9.9.3.4 Borrow Areas**

- Where the Developer identifies the need for borrow material to complete construction or reconstruction of a BLC road, the developer will endeavor to plan with agreeing landowners for suitable borrow area(s). The location of suitable borrow relative to the area of requirement on the road will generally be governed by landowner willingness and adjacent terrain characteristics. Borrow material to be supplied and transported by contract.
- Landowner compensation for borrow areas normally consists of damage payments for such items as loss of crops, trees, fencing, etc. In some cases, it is necessary to compensate the landowner for the volume of material removed.
- All borrow areas shall be reclaimed to meet the requirements of Alberta Environment.





#### 9.9.3.5 Power Lines Clearing

- In cases where road allowance widening has been acquired and power line relocation is required, the developer will endeavor to obtain the affected landowner's approval for the clearing of trees on private property beyond the widened road allowance to provide clearance for the power line. Through their liaison with Electric Utility franchise operator, the Developer is responsible for identifying the location and extent of such clearing required.
- Landowner compensation for power line clearing, if required, normally consists of damage payments for tree loss, fencing and is generally included as part of the compensation for road allowance widening.

#### 9.9.3.6 Telephone Right-of-Access

- Where it is identified that a temporary telephone line is required to continue phone service during construction, the developer will attempt to arrange an agreement with the affected landowner to allow Telus to place the temporary line on private property adjacent to the road allowance. Through their liaison with Telus, the Developer is responsible for identifying the area(s) where a temporary telephone line is required. There is normally no landowner compensation resulting from a Telephone Right-of-Access Agreement.

#### 9.9.3.7 Fencing

- The requirements for the replacement of property line fencing are commonly included in agreements with landowners for road allowance widening, back sloping or borrow areas. Agreements for back sloping or borrow areas may also include a requirement for temporary fencing during the period of construction. All fence construction will be approved directly by BLC, to standards specified or approved equal in the agreements with landowners. BLC requires a minimum of four (4) weeks notice of any required permanent or temporary fencing.
- All fencing costs will be assessed against the Developer by BLC. Permanent fencing will be charged at an established unity length price with additional labour charged for erection and removal of temporary fencing where required. Refer to Figures 9.1 to 9.6
- Class "B" Fence (4 stranded Barbed Wire).
- All permanent fencing to be installed minimum 0.3 m onto private property.

### 9.9.4 Coordination of Traffic

#### 9.9.4.1 General

Wherever it is considered necessary by the BLC to accommodate the passage of traffic during construction or reconstruction of a road, the Developer shall be responsible for ensuring that their contractor makes all needed and suitable provisions for such traffic, whether pedestrian or vehicular as per Transportation Association of Canada (TAC) latest addition. This includes maintaining signs, barriers, fences, lights, and flag persons as may be required for this purpose. No construction project shall start until all necessary construction signs are in place. A Traffic Accommodation Strategy (TAS) shall be prepared and submitted to BLC for review.

#### 9.9.4.2 Construction Signs





- All construction signs and barricades shall be fully reflectorized and shall conform to the latest Transportation Association of Canada (TAC) edition of the manual “Uniform Traffic Control Devices for Canada”. Any required oversize signs or special signs for specific circumstances shall be of a design meeting with the approval of the BLC.
- Refer to Figure 9.7: Minimum Construction Signage.
- The type and spacing of construction signage shall conform to the requirements for construction signage developed by Alberta Transportation and Utilities except where otherwise specified by the BLC.
- Signs shall be erected at right angles to the roadway with their bottom 1.5 m above the road and not less than 2.0 m or more than 4.0 m from the nearest traffic lane. Signs shall be kept as close to the work as is practical and portable signs on weighted stands may be used where signs must be moved often. All signs must be always kept clean and clearly legible.
- When work is not in progress, regulatory and construction signs not essential for the protection of the public shall be removed or covered to reduce inconvenience to a minimum. All construction signs shall be removed as soon as possible after the project is completed.

#### 9.9.4.3 Existing Signs

All existing signs and guideposts which must be removed to carry out the work shall be carefully salvaged and turned over to the BLC. Certain essential existing signs such as railway crossing, intersection warning or stop signs shall be maintained on the work for the duration of the project.

#### 9.9.4.4 Flag Persons

Certified flag persons, if required, shall be instructed in the proper traffic control procedures applicable to the work and shall be dressed in light colored clothing with fluorescent orange over vests and armlets for maximum visibility. Flag persons shall be provided with standard traffic control sign paddles and where it is necessary to have a flag person at both ends of the jobsite, they shall be provided with the ability to communicate with each other.

#### 9.9.4.5 Detours

- Detouring of traffic around the work, off the road allowance, or along other roadways must receive the prior written approval of the BLC.
- Where the BLC approves the use of a detour route, the Developer’s contractor shall provide and maintain such signs, barriers, light, and flag persons as may be considered necessary by the BLC to divert the traveling public over the detour. The contractor shall acceptably maintain the detour route and upon completion of its use, shall restore it to its original condition or better.

#### 9.9.4.6 Traffic Assistance

In circumstances where development has created detours that are of lesser quality than the standard, traffic assistance might be required on a twenty-four (24) hour per day, seven (7) days week basis, particularly during periods of inclement weather.





### 9.10 GUARD RAILS

Guard rails are to be installed as per Transportation & Economic Corridors; (formerly referred to as Alberta Transportation) specifications. Refer to Figure 9.8.

### 9.11 BOLLARDS

For protection of structures and for protection of emergency access rights of way, refer to Figure 9.9.

### 9.12 SPEED BUMPS

For details on speed bumps, refer to Figure 3.46.

### 9.13 EROSION AND SEDIMENT CONTROL MEASURES (ESC)

In accordance with the Alberta Soil Conservation Act, every Developer shall take appropriate measure to prevent soil loss or deterioration from taking place. Furthermore, the Developer must stop the loss or deterioration from continuing.

All new development and redevelopment that include land disturbing activities such as clearing, grading, filling and excavation will require an Erosion and Sediment Control (ESC) plan and Best Management Plan (BMP).

The objective is to control erosion and prevent sediment from leaving the site. The ESC plan should provide for the interception and treatment of all potential silt-laden runoff that could occur during clearing, grading, construction, and site stabilization.

The site plan for an ESC plan shall be prepared by the Consulting Engineer and include the following: location of clearing limits and easements, setbacks, water quality sensitive areas and their buffers, locations and descriptions of all erosion and sediment control measures for each phase of construction, and cross-sections of fill or excavations.

All ESC shall be in place prior to any site material disturbance.

### 9.14 NOISE IMPACT ASSESSMENT (NIA)

BLC may request that a Noise Impact Assessment (NIA) be conducted during the planning stages of a project where projects are situated adjacent to or near major roadways, railways, commercial or industrial facilities and any other land use identified to generate noise.

The threshold at which noise mitigation measures shall be implemented is 65 dB (24-hour average). With typical house construction, the inside noise level would be approximately 15 dB lower, at 50 dB. This is considered acceptable for most applications.

There are several strategies that can be considered as part of the design to mitigate the impact from noise due to external sources. These include:

- Acoustical site planning
  - Modifying orientation of buildings / houses
  - Locating barrier-type buildings parallel to source of noise
  - Situate non-residential land uses closest to source (parking areas, maintenance facilities)





- Employ perimeter berms.
- Construct noise reducing fencing.

For developed areas, there are products that are readily available to retrofit existing fencing that will reduce noise (E.g., vinyl panel inserts for chain link fencing).

### **9.15 MARINAS AND BOAT LAUNCHES**

Marinas and Boat Launches must be approved by several Provincial and Federal Agencies. The following is a list, but not limited to:

- Public Lands Act
- Water Act
- Fisheries Act
- Navigation Protection Act

Although facilities such as marinas and boat launches fall under Provincial and Federal Legislative Agencies, BLC still must approve these facilities as part of any development within the County's boundaries.

### **9.16 RECREATIONAL FACILITIES**

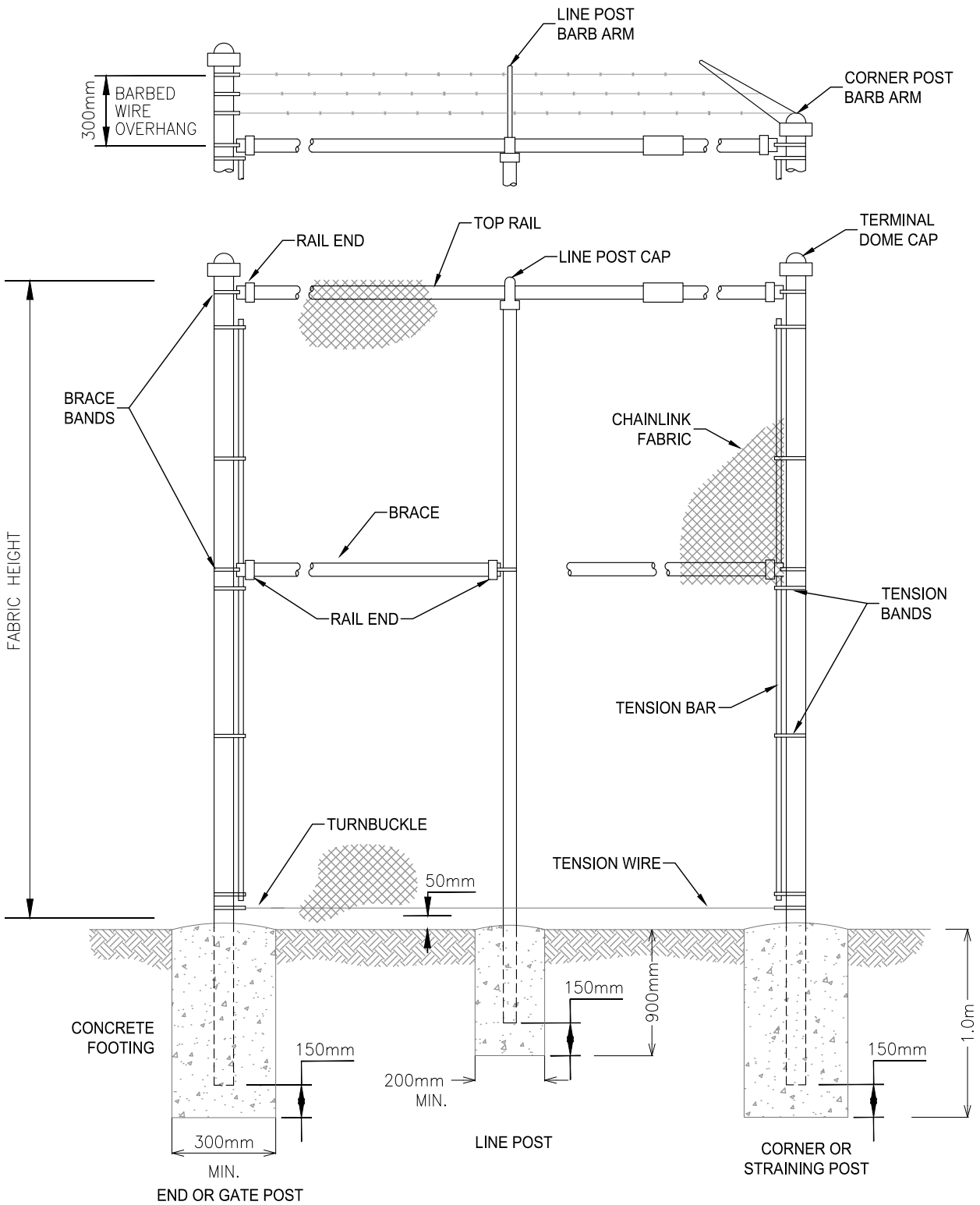
Design criteria for recreational facilities are not included within these standards. The expectation is that any proposed facilities would meet the applicable Provincial or Federal standard and would be designed by a qualified professional.

Facilities may include:

- Parks
- Playgrounds
- Outdoor Rinks
- Toboggan Hills
- Informal and Formal Sports Fields
- Campgrounds







N.T.S.



# CHAIN-LINK FENCE FRAME DETAIL MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

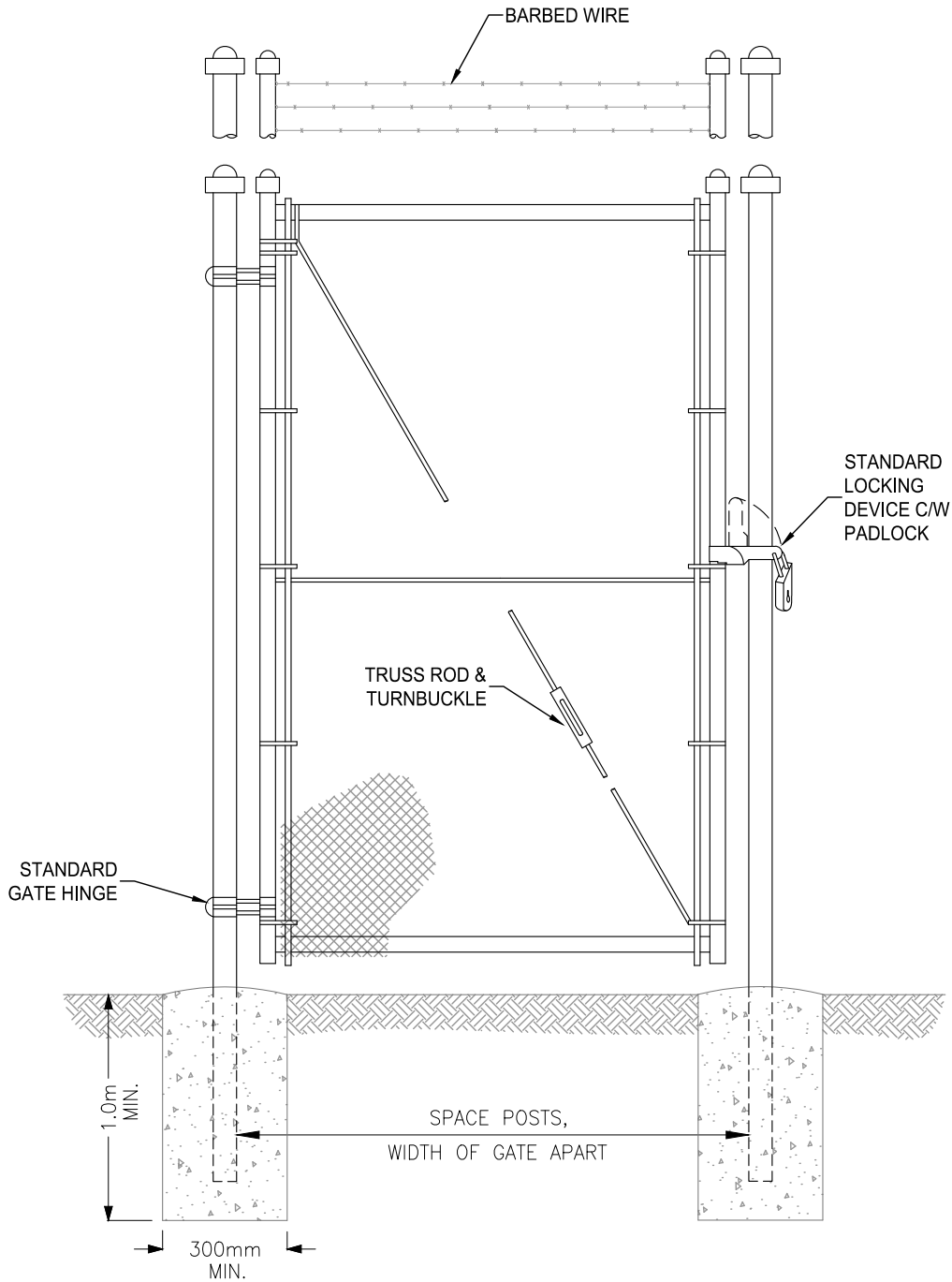
SEPT. 2023

REVISED:

DRAWING NO:

9.1





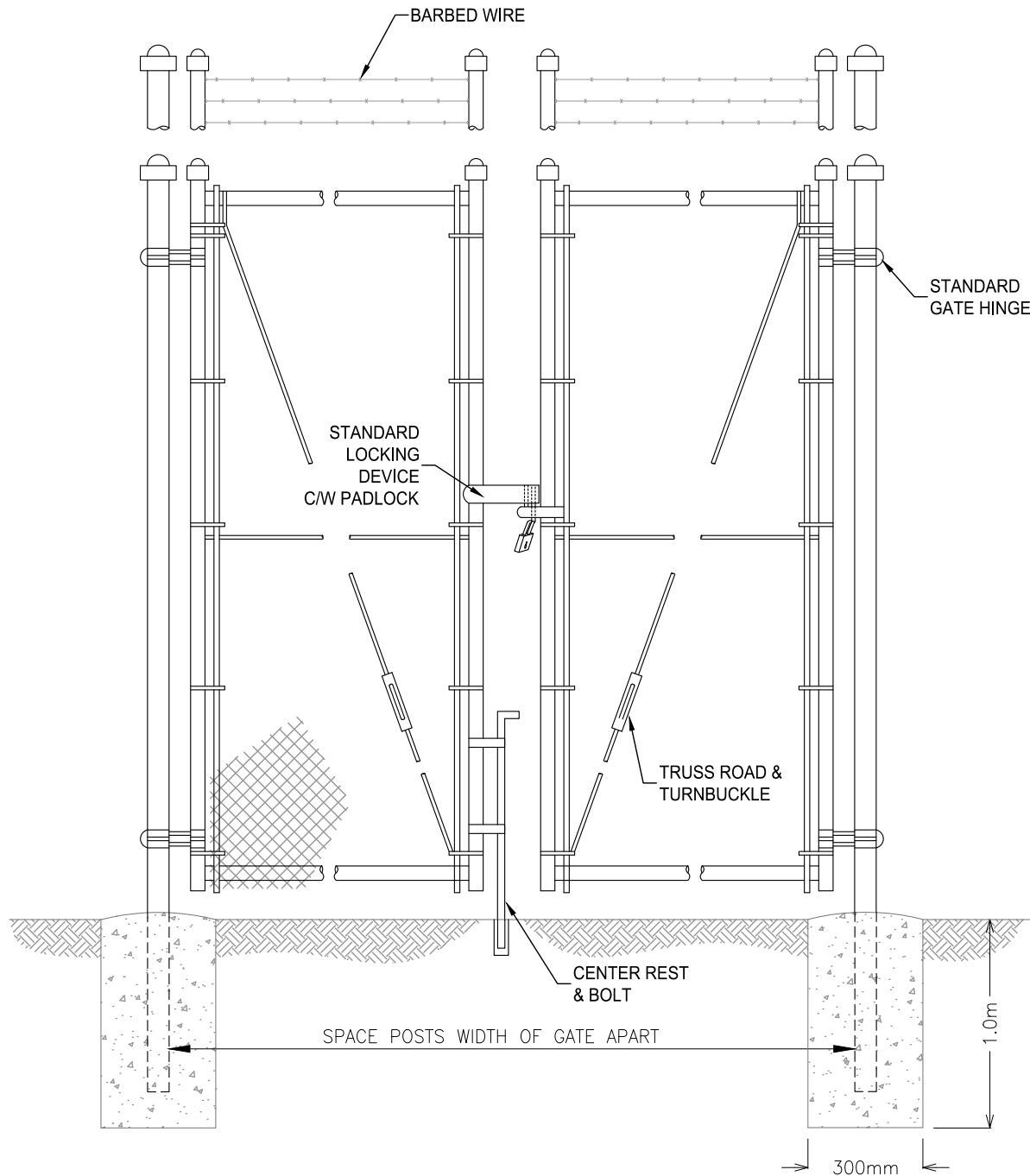
N.T.S.



# CHAIN-LINK SINGLE GATE MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	-
DRAWING NO:	9.2





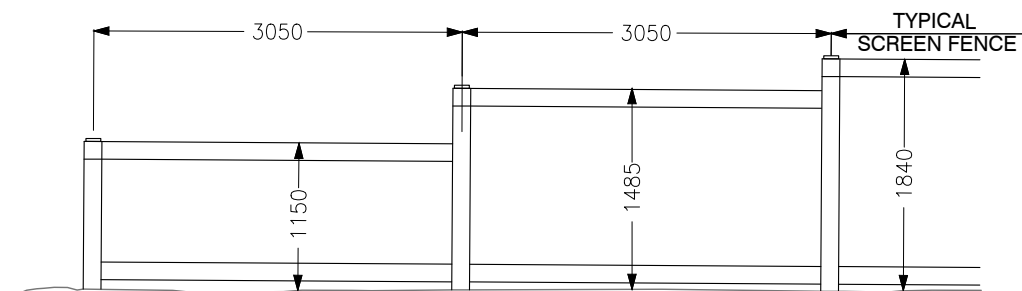
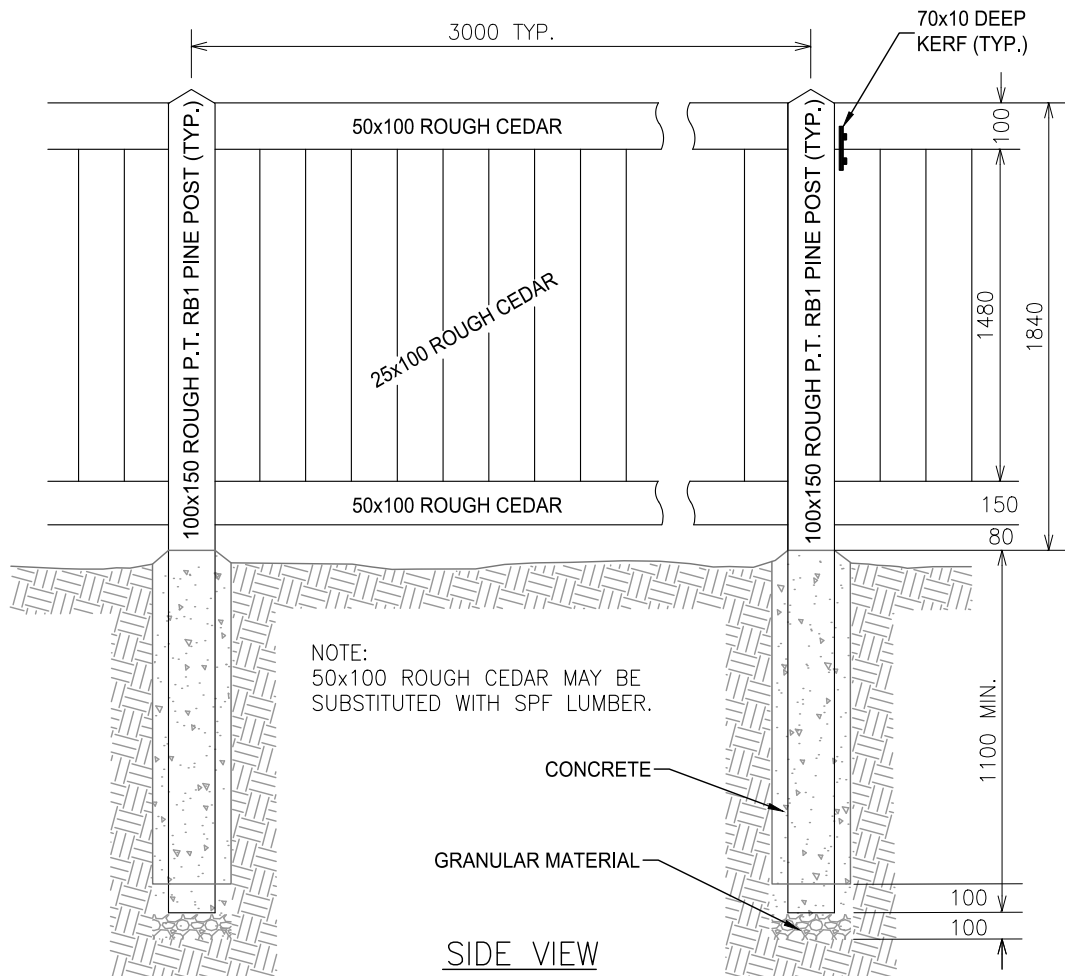
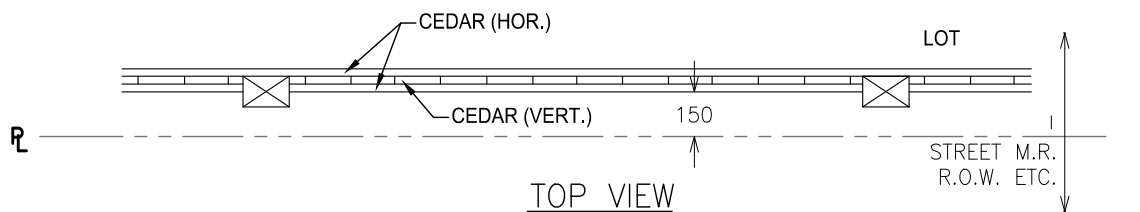
N.T.S.



# CHAIN-LINK DOUBLE GATE MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	-
DRAWING NO:	9.3





N.T.S.



# WOOD-SCREEN FENCE DETAIL

## MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

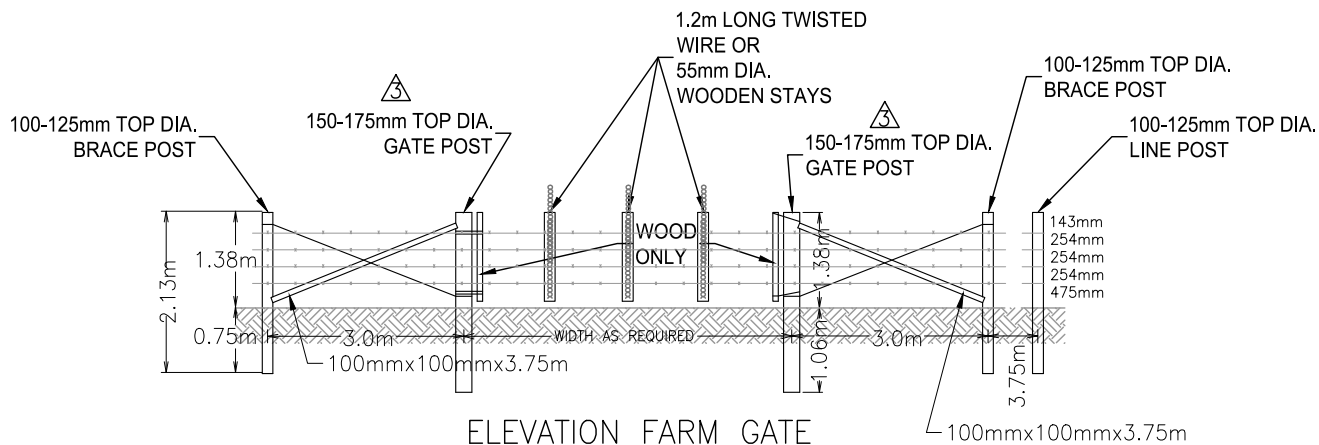
SEPT. 2023

REVISED:

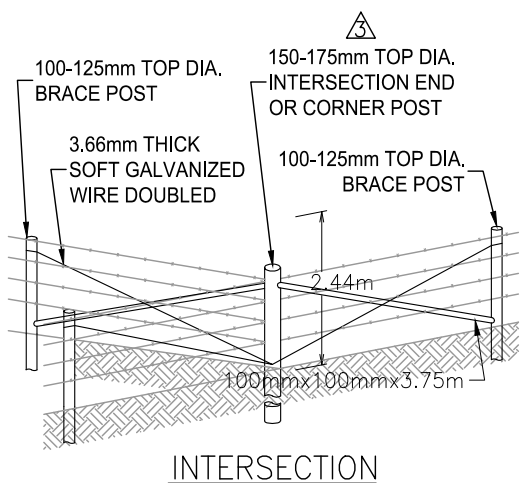
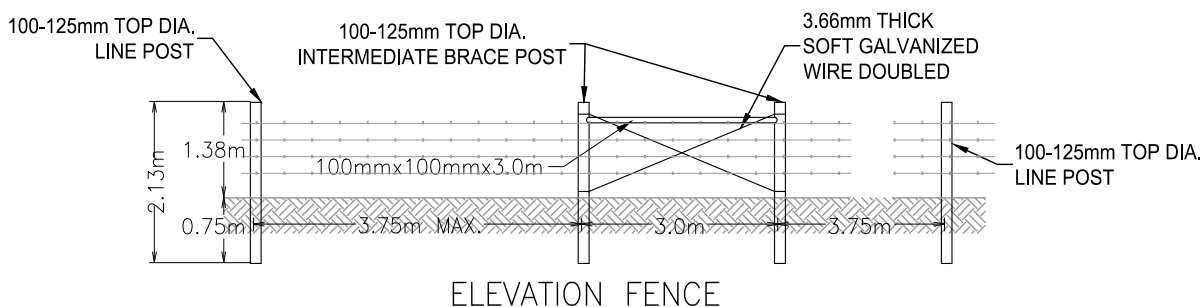
DRAWING NO:

9.4





SPACING OF BRACE ASSEMBLIES:  
ON TANGENT- 400m MAX.  
ON CURVES- 200m MAX.



#### ESTIMATED MATERIAL INCLUDED IN 1km OF FENCING:

- LINE POSTS- 2.13m LONG AND 100-125mm TOP DIA. .... 267
- BARBED WIRE (1 SPOOL=402m) ..... 10 SPOOLS
- TWO STRAND BARBED WIRE (FOUR POINT GALVANIZED 2.5mm THICK STRANDS)
- 40mm STAPLES (APPROX. 140 STAPLES PER kg) ..... 8kg
- PROPER STAPLE CLEARANCE TO ALLOW WIRE TO MOVE

#### ESTIMATED MATERIAL REQUIRED FOR 1 GATE:

- GATE STAYS:
  - 1.2m LONG AND 55mm TOP DIA. WOODEN OR ..... 3
  - 1.2m LONG TWISTED WIRE ..... 3
- GATE INTERSECTION AND END CORNER POSTS:
  - 2.44m LONG AND 150-175mm TOP DIA. .... 4
  - 100x100mm DIMENSION LUMBER BRACES ..... 7
  - 3.66mm THICK SOFT GALVANIZED WIRE FOR DIAGONAL BRACING (APPROX. 1.5kg PER BRACE) ..... 11kg

#### NOTES:

1. ALL FENCE POSTS SHALL BE PRESSURE TREATED, RATED 30 YEAR.
2. ALLOWABLE TAPER FROM END TO END OF POSTS SHALL NOT EXCEED 38mm IN DIAMETER. POSTS SHALL BE INSTALLED WITH THE LARGE END DOWN.
3. SINGLE STRAND CANADIAN BARBED WIRE OR EQUIVALENT ALLOWED IF REQUESTED BY THE LANDOWNER.
4. ANY FENCE MODIFICATIONS TO BE APPROVED BY GENERAL MANAGER OR DESIGNATE IN WRITING.
5. ALL FENCING TO BE 0.3m OR GREATER ONTO PRIVATE PROPERTY.

N.T.S.



## CLASS 'B' FENCING

### MUNICIPAL SERVICING STANDARDS

#### BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

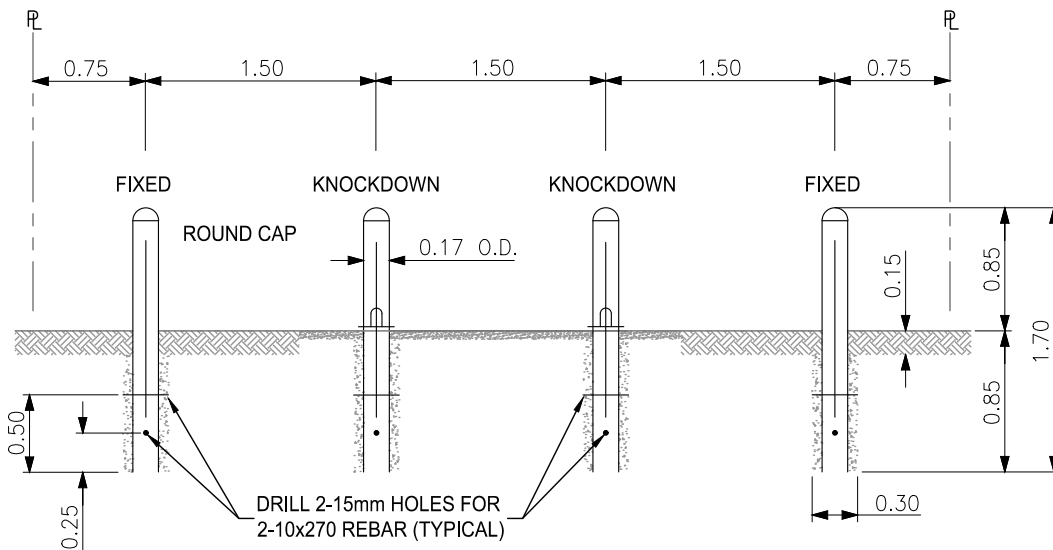
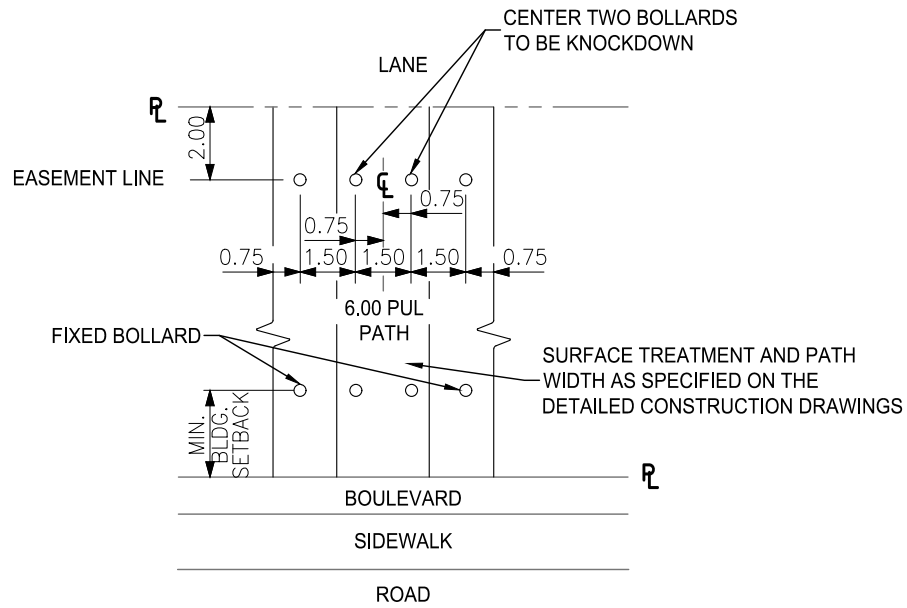
SEPT. 2023

REVISED:

DRAWING NO:

9.5





DIMENSIONS SHOWN IN METRES

N.T.S.



# POST & CABLE FENCE-SECTION MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

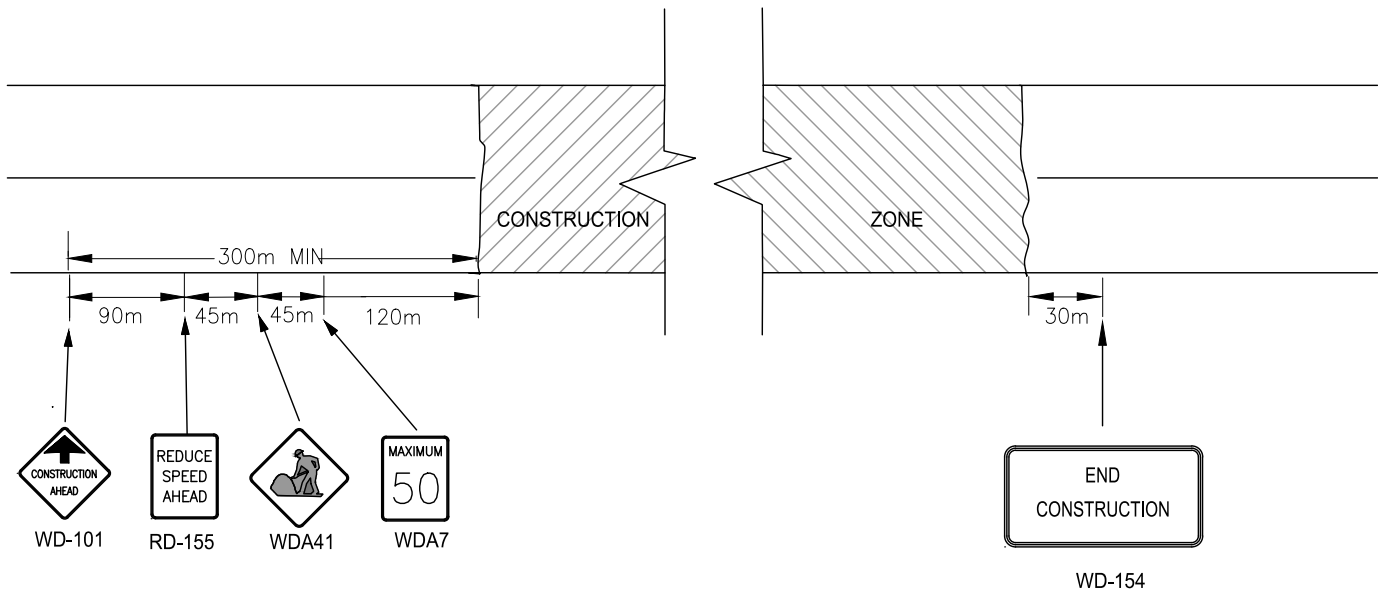
SEPT. 2023

REVISED:

DRAWING NO:

9.6





NOTE:

1. A TRAFFIC ACCOMMODATION STRATEGY (TAS) IS TO BE SUBMITTED FOR ALL CONSTRUCTION PROJECTS. THE REQUIREMENTS FOR SIGNAGE TO FOLLOW THE LATEST EDITION OF THE STANDARDS AND GUIDELINES FOR ALBERTA TRANSPORTATION AND THE TRANSPORTATION ASSOCIATION OF CANADA (TAC)
2. EACH SIGN TO BE PLACED 3m FROM EDGE OF TRAVELED SURFACE WITH BOTTOM OF SIGN 1.5m ABOVE ROAD TRAVEL.
3. REPEAT SIGNING FOR EACH DIRECTION OF TRAVEL SURFACE.
4. ALL SIGNS TO BE INSTALLED ON METAL OR WOOD STANDARDS.
5. MIN. STANDARDS FOR SIGNS SHALL CONFORM TO STANDARD SPECIFICATION NUMBERS ABOVE.

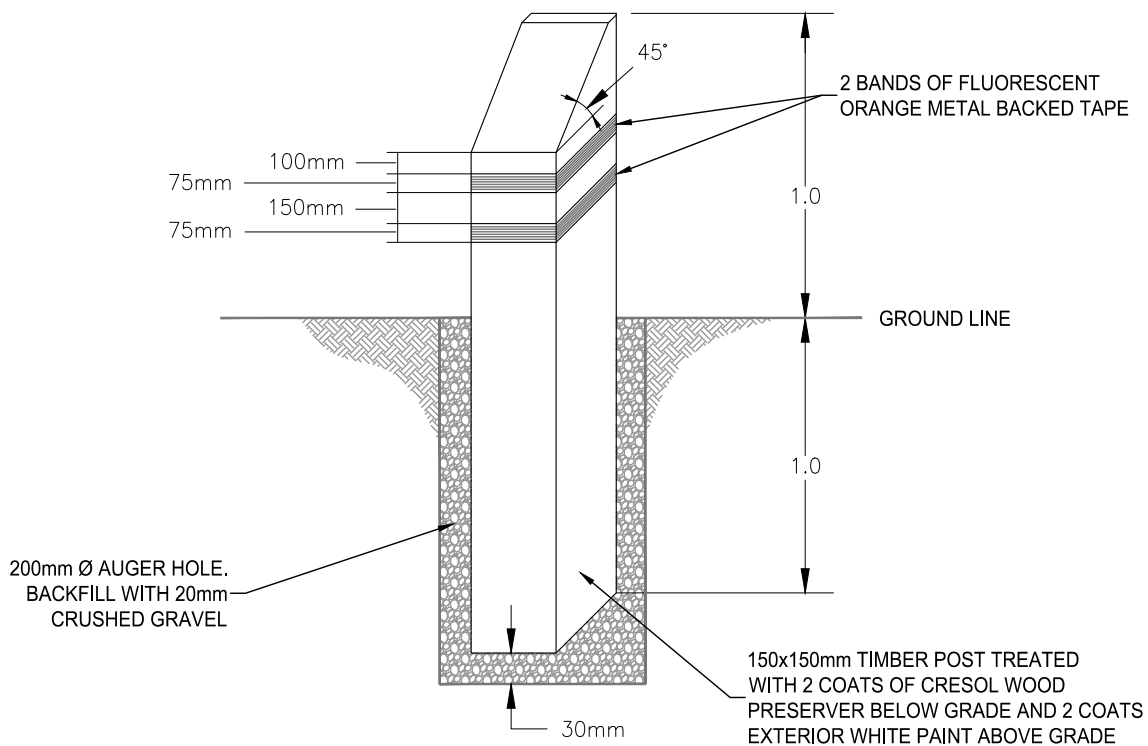
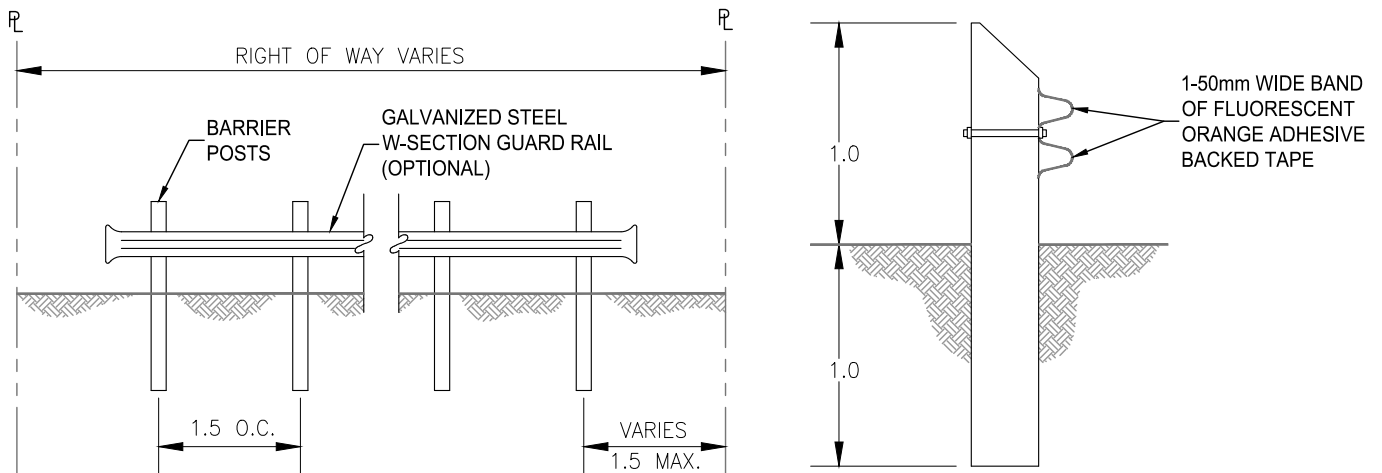
N.T.S.



# MINIMUM CONSTRUCTION SIGNING MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE	
DATE:	SEPT. 2023
REVISED:	-
DRAWING NO:	9.7





POST DETAIL

N.T.S.



# INSTALLATION OF GUARDRAIL OR BARRIER POST MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

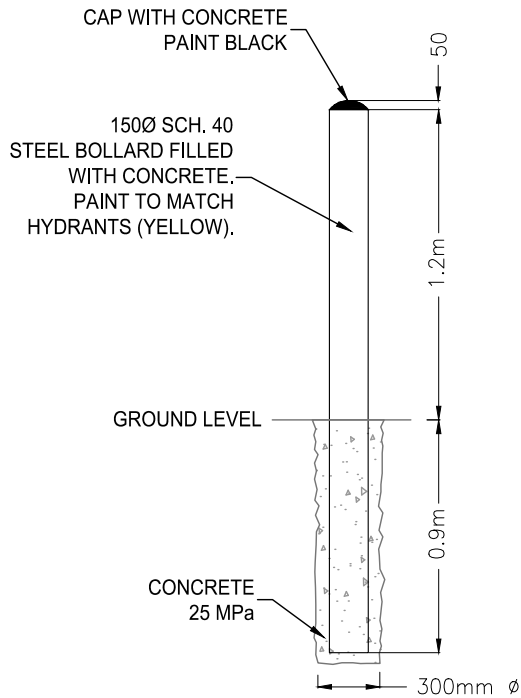
SEPT. 2023

REVISED:

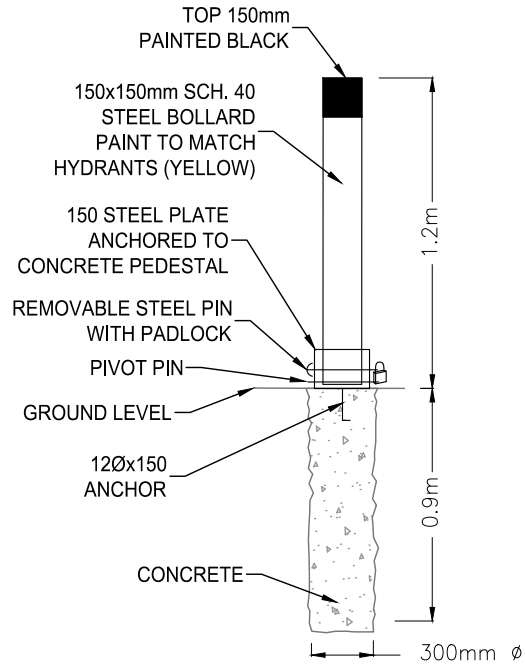
DRAWING NO:

9.8





TYPICAL  
PERMANENT BOLLARD NTS



TYPICAL  
KNOCKDOWN BOLLARD NTS

N.T.S.



# FIXED & KNOCKDOWN BOLLARDS MUNICIPAL SERVICING STANDARDS BIG LAKES COUNTY

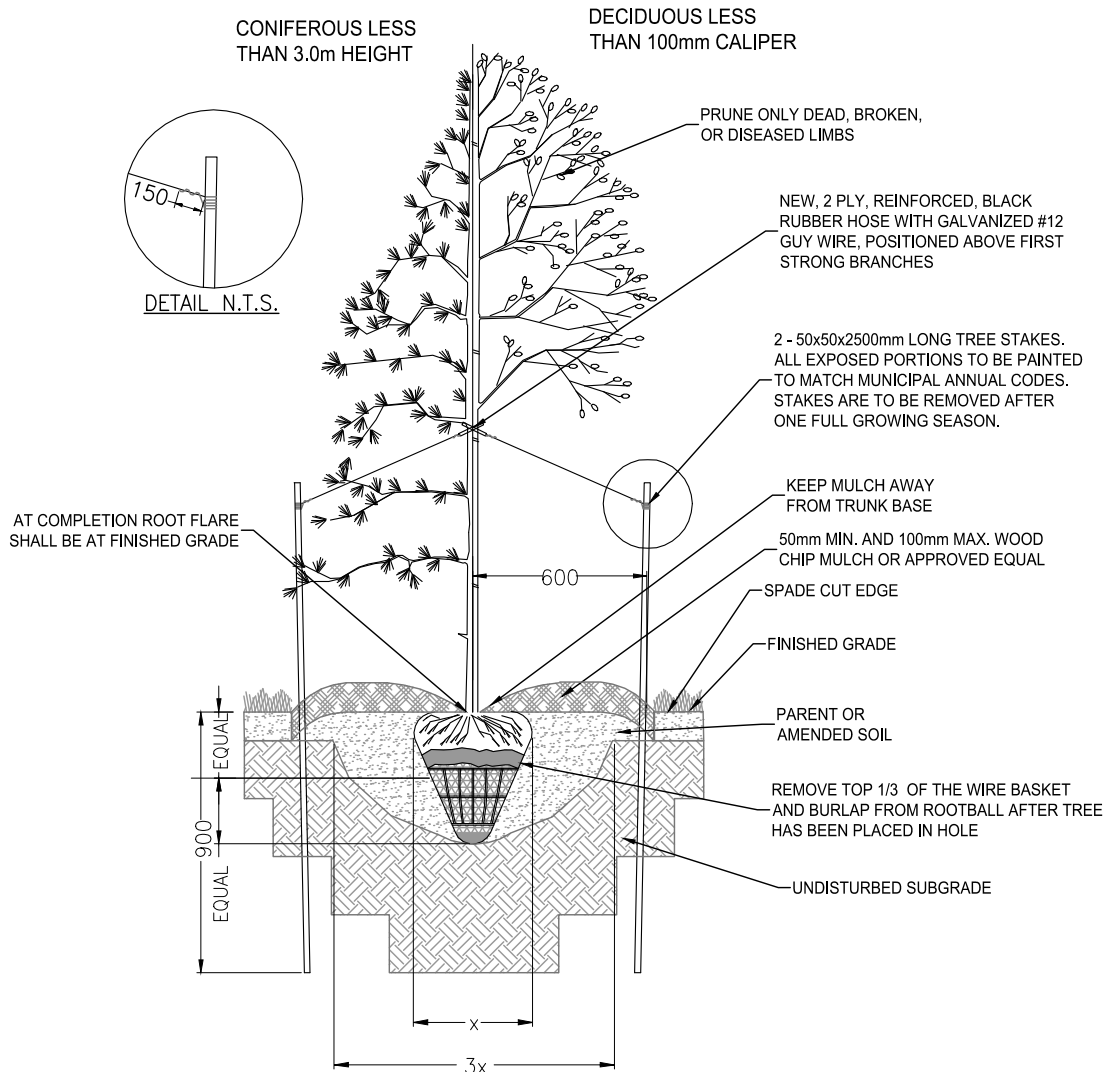
SPEC. REFERENCE

DATE: SEPT. 2023

REVISED: -

DRAWING NO: 9.9





#### NOTES:

1. IF MIN. UTILITY SETBACKS PERMIT POSITION TREE STAKES INTO DIRECTION OF PREVAILING WINDS.
2. ALL TREES TO MAINTAIN A MIN. CLEARANCE AS SET OUT IN THESE STANDARDS FROM ALL UTILITIES.
3. DIG ALL ROOT HOLES BY HAND WHEN TREE PIT IS CLOSER THAN ONE METER FROM EDGE OF PIT TO THE STAKED UTILITY LINE.
4. ALL SPECIMEN SHALL MEET THE CANADIAN NURSERY LANDSCAPE ASSOCIATION STANDARDS.
5. TREES LARGER THAN 100mm CAL. OR 3.0m HEIGHT REQUIRE 3 TREE STAKES.
6. ALL PAINT MATERIAL SHALL MEET THE HORTICULTURAL STANDARDS AND PRACTICES OF THE CANADIAN NURSERY LANDSCAPE ASSOCIATION.
7. SITES WITH HEAVY CLAY SHALL HAVE A LARGER THAN NORMAL HOLE AND EQUAL MIX OF SOIL FROM HOLE, ORGANIC MATTER AND SAND.
8. AVOID GLAZING THE SIDES OF THE HOLE. SIDES OF HOLE SHALL BE SCARIFIED.

N.T.S.



## TREE PLANTING DETAIL

### MUNICIPAL SERVICING STANDARDS

BIG LAKES COUNTY

SPEC. REFERENCE

DATE:

SEPT. 2023

REVISED:

DRAWING NO:

9.10



## **10 LOW IMPACT DEVELOPMENTS**

### **10.1 INTRODUCTION**

This section shall apply to subdivisions or developments which have a relatively low impact and, in the opinion of the Development Officer, may not necessitate application of the full Engineering Design and Construction Standards. Examples of such subdivision or development could include:

- First parcel out of an original titled area.
- Single parcel subdivisions.
- Subdivisions consisting of four (4) lots or less in an area which will have minimal impact on BLC infrastructure or on adjoining lands or owner (E.g., one approach per lot).

### **10.2 APPLICATION**

Applications for proposed subdivisions with low impact projects shall include the following information at a minimum:

- Application for subdivision in the prescribed form signed by the applicant and authorized by the registered owner if other than the applicant.
- Authorization for staff and agents of BLC to enter upon and inspect the property for the purposes of assessment of the application.
- A Proposed Tentative Plan of Subdivision prepared by a Land Surveyor showing the dimensions and size of the proposed parcel (s) along with the following specific information:
  - Relevant buildings & structures within and adjacent to the proposed parcel(s).
  - Fences, tree lines, tree stands or other topographic features which may affect the subdivision or consideration of the application.
  - Any drainage facilities in existence of proposed to facilitate the subdivision.
  - Location and complete description of sewage disposal facilities and accurate relationship to existing and proposed property boundaries. The applicant and owner should understand that it is the responsibility of the developer to comply with the Safety Codes Act and the Private Sewage Disposal Systems Regulation thereunder, in undertaking the subdivision. This may include moving or modifying the existing system to achieve compliance. Failure to do so may result in refusal of the application or the inability of BLC to endorse the final subdivision instrument to achieve registration at Land Titles.
- Any adjoining information such as proximity to urban centers, numbered highways, natural lakes or watercourses and nearby developments which may be impacted by the subdivision.
- Application fees in accordance with BLC current Policy.
- Copy of the current Certificate of Title.





### 10.3 DEVELOPER'S AGREEMENT

An abbreviated Developer's Agreement would be employed to facilitate any specific works required either as a condition of subdivision approval or by way of BLC Policy or Bylaw.

These works may include but are not limited to the following components to be provided at the sole expense of the developer/owner:

- Appropriate access to the new parcel of land and to the residual property, if applicable. In rural areas, this would generally constitute a crossing and culvert in accordance with Figures 10.1. **This work would be coordinated by BLC using an approved Contractor. See Section 10.4 for further details.**
- In urban areas with pavement, curb, and gutter, it may be specific access in accordance with the standards of development for that area or such higher standards as may be required by the BLC in writing.
- Offsite improvements such as roadways required to provide both legal and physical access.
- Extension of or provision of franchise utilities such as power and gas required to service the subject lands.

The Developer's Agreement and subdivision approval conditions may also require:

- Offsite levies in accordance with current Bylaws
- Additional conditions required by external authorities such as Alberta Transportation and other Provincial or Federal Agencies. For instance, any development within ½ mile of a numbered highway would require a Roadside Development Permit from Alberta Transportation and that Department may require such additional information such as Traffic Impact Assessment or an Area Structure Plan depending on the impact of the proposed development.

The Subdivision Approving Authority will specify the disposition of the requirement for Municipal, School or Environmental Reserve or all the above by way of dedication of land, deferral of Reserve requirements to the residual of the land, deferral of Reserve requirements to other lands, payment of money in lieu of Reserve dedication or such other disposition as may be deemed appropriate and in accordance with the Municipal Government Act.





## 10.4 APPROACH CONSTRUCTION BY BLC

For all approach construction that falls under this section, BLC will coordinate the work using one of their approved Contractors. The lump sum costs payable to BLC prior to commencement of the work (contact BLC for fee schedule) will include the construction of the approach, installation of the culvert, surfacing (gravel or asphalt), supervision and material testing (if required). Minimum approach widths are required as follows:

- Residential 8 m
- Agricultural 10 m
- Industrial/Commercial 10 m (max of 12 m with General Manger approval in writing)

Other work required as a condition of subdivision shall be coordinated and paid for directly by the developer / owner.

For any questions or clarifications, the applicant should contact:

### Director of Planning & Development

#### **Big Lakes County**

Box 239, 5305-56 Street

High Prairie, AB

T0G 1E0

Phone: 780-523-5955

Toll-free: 1-866-523-5955

Fax: 780-523-4227

Email: [biglakes@biglakescounty.ca](mailto:biglakes@biglakescounty.ca)

