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REGULAR COUNCIL MEETING AGENDA
TOWN OF MILLET

Wednesday, April 27, 2022
5:30 p.m.
MCC Council Chambers

1.0 **CALL TO ORDER**

2.0 **TREATY 6 RECOGNITION**

3.0 **PUBLIC HEARING**

4.0 **ADDITIONS AND ADOPTION OF AGENDA**

5.0 **ADOPTION OF MINUTES**

5.1 April 13th, 2022 - Regular Meeting of Council

6.0 **DELEGATIONS**

6.1 The Chamber of Commerce – Tourism
6.2 Millet Fire Department – Chief Moen

7.0 **REPORTS**

7.1 Millet Fire Department
7.2 Chief Administrative Officer Meeting/Course

8.0 **BYLAWS** - None

9.0 **AGREEMENTS** - None

10.0 **CORRESPONDENCE** - None

11.0 **NEW BUSINESS**

11.1 Request for Decision – Smiles

11.2 Request for Decision – Financial Statements 2021

11.3 Request for Decision – Municipal Design Standards

11.4 Millet Civic Centre Parking Lot Re-habilitation and Sewer Repairs

12.0 **CLARIFICATION OF AGENDA**

13.0 **CLOSED SESSION**

13.1 Land

13.2 Land

1.0 **ADJOURNMENT**

REGULAR MEETING OF COUNCIL
TOWN OF MILLET
MMC - Council Chambers
April 13th, 2022
5:30 p.m.

PRESENT:

MAYOR	Doug Peel
COUNCILLORS	Mike Bennett Rebecca Frost Gerdie Hogstead Mathew Starky Charlene Van de Kraats
C.A.O.	Lisa Schoening (via zoom)
OFFICE MANAGER	Joyce Vanderlee
DIRECTOR OF INFRASTRUCURE	Lisa Novotny
PRESS	Christina Max

1.0 ***CALL TO ORDER:***

The meeting was called to order by Mayor Peel at 5:30 p.m.

2.0 **TREATY 6 RECOGNITION:**

3.0 ***PUBLIC HEARINGS:*** NONE

4.0 *ADDITIONS, DELETIONS AND ADOPTIONS OF AGENDA:*

4.1 Deletion 6.2 The Chamber of Commerce
4.2 Deletion 11.2 Library Trustee Re-appointment
4.3 Addition 13.2 Personnel Summer Student

Res #092/22 ***Agenda***	Moved by Councillor Bennett that the Agenda is adopted, as presented.

5.0 *ADOPTION OF MINUTES:*

Res #093/22 ***Minutes Regular Meeting***	Moved by Councillor Frost that the March 23rd, 2022, Regular Meeting of Council Minutes are hereby approved, as presented.

CARRIED

6.0 *DELEGATIONS:*

Honorable Rick Wilson, Minister of Indigenous Relations

7.0 *REPORTS:*

Res #094/22 ***Reports***	Moved by Councillor Van de Kraats that the Reports are hereby accepted as information.

CARRIED

8.0 *BYLAWS:* *NONE*

9.0 *AGREEMENTS:* NONE

10.0 *CORRESPONDENCE:*

Res #095/22 ***Correspondence***	Moved by Councillor Bennett that Alberta Municipal Affairs Correspondence is hereby accepted as information.

CARRIED

Res #096/22 ***Correspondence***	Moved by Councillor Hogstead that Canadian Mental Health Association Smile Correspondence is hereby accepted as information.

CARRIED

11.0 ***NEW BUSINESS***:

11.1 Request for Decision – National Public Works Week, May 12-21, 2022 – "Ready & Resilient

Res #097/22 ***National Public Works Week***	Moved by Councillor Bennett that Council proclaims May 12–21, 2022 as National Public Works Week, "Ready & Resilient"

CARRIED

11.2 Request for Decision – Millet Wellness Committee

Res #098/22 ***Millet Wellness Appointment***	Moved by Councillor Hogstead that Council appoints Vicki Pyle as Member at large for the Millet Wellness Committee for a 2-year term.

CARRIED

11.3 Request for Decision – Skateboard Park

Res #099/22 ***Skateboard Park Banner***	Moved by Councillor Van de Kraats that council approves the Banner with Contest Winners Logo be installed at the future Skateboard Park location subject to the approval of materials by the Town.

CARRIED

Res #100/22 ***Skateboard Park***	Moved by Councillor Bennett that council approves the concept of a sponsor plaque with the location to be proposed during the design process.

CARRIED

Res #101/22 ***Skateboard Park naming contest***	Moved by Councillor Frost that council approves Skateboard Committee to hold a contest to Name the Skateboard Park and will bring submissions to council for consideration.

CARRIED

11.4 Request for Decision – Ag Society Pickleball

Res #102/22 ***Ag Society Pickleball***	Moved by Councillor Frost that council approves the Ag Society to put in 2 temporary pickleball courts on half the ice surface at the Agriplex at the discretion of the Parks Recreation and Facilities Foreman, contingent on the following conditions being met; that the Ag Society will be responsible for all costs associated with the installation and removal of the lines that shall be installed by a professional insured company. Further that the term of this approval would be from May 9th 2022 to August 9th 2022 on Tuesdays within the hours of 6:30 pm and 8:30 pm

CARRIED

12.0 ***CLARIFICATION OF AGENDA:*** *NONE*

Christina Max left the meeting at 6:24 p.m.

Manager of Enforcement Services left the meeting at 6:24 p.m.

Council temporarily adjourned the meeting at 6:24 p.m.

Council reconvened at 6:39 p.m.

Res #103/22 Closed Session	Moved by Councillor Starky that Council moves into Closed Session to discuss Items 13.1 pursuant Sections 16 thru Section 29 of the Freedom of Information and Protection of Privacy Act at 6:39 p.m.

CARRIED

13.0 *CLOSED SESSION:*

Res #104/22 Reconvene	Moved by Councillor Van de Kraats that the Regular Council Meeting reconvene from Closed Session at 7:30 p.m.

CARRIED

13.1 Land

Res #105/22	Moved by Councillor Starky that council accepts the offer from 1183393 Alberta Ltd. To purchase Plan RN15A (XVA), Block 4 Lot 20 subject to the notification requirements as set out in Section 70 of the Municipal Government Act.

CARRIED

14.0 *ADJOURNMENT:*

The meeting was adjourned at 7:31 p.m.

THESE MINUTES ADOPTED BY COUNCIL THIS ____DAY OF APRIL 2022.

MAYOR ***CHIEF ADMINISTRATIVE OFFICER***

Millet Fire Department
Call History Report by Date
3/1/2022 - 3/31/2022

Date	Type	Incident #	Incident Type	Primary Action	Address	# Of Attendees	Total Time
Thu 03/03/2022 06:05	County - Wetaskiwin (Extra Hours)	2200013	52 Alarms	55 Establish safe area		12	01:25
Fri 03/04/2022 02:44	County - Wetaskiwin	2200014	29 Traffic/ Transportation Incidents	55 Establish safe area		13	00:54
Mon 03/07/2022 15:25	County - Leduc	2200016	77 Motor Vehicle Collision			9	00:26
Thu 03/10/2022 08:31	County - Wetaskiwin (Extra Hours)	2200015	77 Motor Vehicle Collision	55 Establish safe area		13	01:43
Fri 03/11/2022 12:33	County - Wetaskiwin	2200017	77 Motor Vehicle Collision	55 Establish safe area		7	00:21
Mon 03/14/2022 04:04	County - Wetaskiwin (Extra Hours)	2200018	06 Breathing Problems			11	01:04
Wed 03/16/2022 09:57	County - Wetaskiwin (Extra Hours)	2200019	29 Traffic/ Transportation Incidents	55 Establish safe area		11	01:11
Thu 03/17/2022 04:05	County - Wetaskiwin (Extra Hours)	2200021	69 Structure Fire	55 Establish safe area		12	02:40
Thu 03/17/2022 21:52	County - Wetaskiwin	2200020	67 Outside Fire	55 Establish safe area		13	00:19
Sun 03/20/2022 12:46	County - Wetaskiwin (Extra Hours)	2200022	71 Vehicle Fire	55 Establish safe area		13	01:06
Sun 03/20/2022 15:15	County - Wetaskiwin (Extra Hours)	2200023	77 Motor Vehicle Collision			12	01:11
Fri 03/25/2022 16:59	County - Wetaskiwin (Extra Hours)	2200024	15 Electrocution / Lightning	31 Provide first aid & check for injuries		17	01:18

Total calls for City - Millet:	0	
Total calls for County - Leduc:	1	
Total calls for County - Leduc (Extra Hours):	0	
Total calls for County - Wetaskiwin:	3	
Total calls for County - Wetaskiwin (Extra Hours):	8	
Total calls:	12	**Avg. Call Attendance: 11.92**
Total Time:	13:38	

SM

Chief Administrative Officer Meeting/Course Report – January/February 2022

January

4	City of Wetaskiwin Meeting
5	Meeting with Historical Society
7	DEM Meeting
10	Millet Wellness committee
11-12	Employee Evaluations
14	JEDI Strat Planning
19	WCB Meeting
19	JEDI Management
21	Millet Historical Society Meeting
24	Staff Meeting
25	Millet Wellness Committee
26	Department Head Meeting
31	Skateboard Park meeting

February

1	Meeting with Sol Gen
1	JEDI Board Meeting
9	All day meeting with Council
9	Council
10	Meeting with County
14	DEM Meeting
15	JEDI AGM
16	Millet Wellness Meeting
17	Brownlee LLP Emerging Trends

22	DEM Meeting
23	Council
25	Custodian Tender
28	Meeting with County

March

1	Skateboard Park Meeting
1	Meeting with City
3	Meeting with Millet Ag Society
9	Millet Wellness Committee
9	Council
10	Meeting with Griffith-Scott
11	Meeting with City
14	New Admin building wind up meeting
16	Brownlee LLP Synergy
17	SATO tour
18	Department head Meeting
21	Emergency Management tabletop exercise with County
22	DEM Meeting
23	Council
24	Millet Wellness Committee
25	Meeting with Historical Society
28-29	Auditor
31	JEDI Management with City

April

4	Meeting with Chamber of Commerce
4	Meeting with County
7	Millet Wellness Committee
11	DEM Meeting
13	Department Head Meeting
13	Council
19	Meeting with Millet Lions Campground
20	Meeting with County
20	JEDI Management
21	Capital Region Southwest Water Commission AGM
26	JEDI Board Meeting

Respectfully submitted

Lisa Schoening, CLGM

TOWN OF MILLET
REQUEST FOR DECISION (RFD)

Meeting: Regular Council Meeting

Meeting Date: April 27, 2022

Originated By: Joyce Vanderlee

Agenda Item: **Smiles**

BACKGROUND/PROPOSAL

Smiles Non-Profit Society has submitted a request to host an event at William Leonard Gray Park on May 30th from 3:30 pm – 7:00 pm.

DISCUSSION/OPTIONS/BENEFITS/DISADVANTAGES

Smiles would like to recognize winners from the Rock painting as well as the art contest winners of the posters. They would also like to invite council to have their picture taken for the ceremonial transfer of the Distancing Diamonds at 5:30 pm.

RECOMMENDED ACTION:

That council grant permission for Smiles Non-Profit Society to host this event on May 30th and send representatives to ceremonial accept the ownership of the Distancing Diamonds.

TOWN OF MILLET
REQUEST FOR DECISION (RFD)

Meeting: Regular Council Meeting

Meeting Date: April 27, 2022

Originated By: **Lisa Novotny, Director of Development and Infrastructure**

Agenda Item: **Municipal Design Standards**

BACKGROUND/PROPOSAL

In 2021 the Town engaged McElhanney Ltd to update the Municipal Design Standards as the previous standards were prepared by UMA Engineering Ltd and adopted by Council in March 2004.

DISCUSSION/OPTIONS/BENEFITS/DISADVANTAGES

Attached is a technical memo from McElhanney highlighting significant areas of change.

COSTS/SOURCE OF FUNDING

The cost of this project was $11,331 to come from the operating budget.

RECOMMENDED ACTION:

That Council Rescind Policy 51 the Municipal Design Standards.

That Council approve the 2022 Municipal Design Standards as presented.

TECHNICAL MEMORANDUM

McElhanney | Canada's Best Managed Companies

To	From
Lisa Novotny, Director of Development and Planning	Jarrett Zilinski, EIT. Project Manager, Infrastructure
Re	**Date**
Millet Design Standards Update	April 14, 2022

The purpose of this memorandum is to provide comments, update and authenticate the engineering design standards for the Town of Millet.

1. INTRODUCTION

The scope of work involved in the update of the Town of Millet Engineering Design Standards was as follows:

- Review existing standard drawings package provided by the Town of Millet;
- Provide comments to the Town regarding any recommended changes;
- Complete corrections on the package including text and design standard drawings;
- Authenticate drawings by a Professional Engineer licensed in Province of Alberta; and
- Provide a Tech Memo summarizing the project.

The table below outlines the documents that were provided by the Town that were reviewed by McElhanney:

Document	Description
Town of Millet Municipal Development Standards	Text document outlining the details of the engineering and development standards required for municipal development, as well as re-development or reconstruction of Town infrastructure.
Town of Millet Engineering Standard Drawings	Engineering standard drawings for transportation, utility and landscape details.

2. UPDATES TO STANDARDS AND DRAWINGS

A marked-up package of standard drawings and specifications was submitted to the Town for final comments and clarification in January 2022. Following the comments from the Town, a finalized package was delivered in March 2022.

McElhanney verified all drawings and authenticated each standard drawing through Professional Engineer registered in the province of Alberta.

The table below summarizes the updates to the municipal standards and engineering drawings package completed by McElhanney and reviewed by the Town.

Topic/Drawing	Summary of Updates
All Documents	• Update contact info and address for the Town of Millet to new office location. • Add authentication stamp to each drawing by a licensed Professional Engineer in Province of Alberta.
Municipal Development Standards Document	• Minor formatting updates and language clarifications. • Updated frame and cover titles clarified recommendations based on application.

Topic/Drawing	Summary of Updates
	• Updated recommended hydrant colour revised from black to yellow. • Updated geotechnical testing recommendations to typical industry standards.
Roadway Cross-sections	• Maintained same roadway widths and dimensions; however, improved formatting to display proper offsets and more clear details. • Increased required subgrade preparation from 150mm to 300mm depth.
All Concrete Works	• Formalize specifications for concrete quality and base preparation (e.g. Class C concrete, gravel to be minimum 150mm thickness and gravel and subgrade to be 100% standard proctor density.)
Sidewalks	• Add detail showing recommended widths of 1.20m, 1.50m or 1.80m to adhere to industry standards. • Improved detail of curb ramps to allow safe dismount onto roadway for all users, regardless of age or ability.
Curbs and Gutters	• Separated additional drawings to clearly present all types of curb and gutter. No major design changes, primarily formatting and additional level of detail regarding rebar requirements. • Added concrete swale detail.
Utility Drawings	• Updated formatting to clearly show the use of each frame and cover. Improving formatting of pages to separate each utility drawing. • Updated list of approved manholes and catch basins (including frame and covers). No major changes, but provided updated list of preferred options.
Landscape Details	• Most landscape details were removed from the engineering design standards as they were not relevant to current industry practices. • Tree planting and fence details should be reviewed as part of the landscape design process on a case-by-case basis.

3. CERTIFICATION

This technical memorandum has been prepared solely for the Town of Millet by McElhanney Ltd. under the direction of a professional engineer registered in the Province of Alberta. There are no beneficiaries of this report, and no other person or entity is entitled to rely upon this report for any purpose whatsoever. It is intended only for the use of the Town of Millet, and for the purposes and within the limitations stated in the report. McElhanney makes no guarantees and disclaims all liability to any third party with respect to any information or opinions set forth herein.

MCELHANNEY LTD.

Report prepared by:

Jarrett Zilinski, E.I.T.
Project Manager, Infrastructure
jzilinski@mcelhanney.com

Report reviewed by:

Andy Heath, P.Eng., P.E.
Division Manager, Infrastructure
aheath@mcelhanney.com

Millet

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MUNICIPAL DEVELOPMENT STANDARDS

March 2022

MUNICIPAL DEVELOPMENT STANDARDS

Table of Contents

1 Introduction to Standards

1.1 FOREWARD

This document, "Town of Millet - Municipal Development Standards", has been prepared to guide the designer and development industry in the design of municipal improvements and systems that will meet the requirements and ultimate approval of the Town of Millet.

These Standards encourage good engineering and construction practices. Any deviation from these Standards requires a formal request complete with justification to the Town of Millet for approval prior to implementation.

This manual will be updated on an as-required basis and shall be a useful tool for all persons interested in developing within the Town of Millet. Persons in receipt of and using the Municipal Development Standards are required to ensure they have the latest revisions. Current revisions of the document are available on the Town's website (www.millet.ca) or from the Millet Civic Centre located at 4528 51 St Millet, AB T0C 1Z0

1.2 SCOPE

1.2.1 Municipal Development Standards

These Standards and Procedures apply to the preparation, submission and approval of engineered plans for all proposed developments. Municipal servicing of rural or urban residential, commercial and industrial developments will require the following minimum plans for review and approval:

- Water distribution systems, fire protection systems and lot service connections;
- Sanitary sewage systems and lot service connections;
- Storm collection systems, lot grading and lot service connections;
- Facilities including storm water management facilities;
- Roadways, sidewalks, curb and gutter and lane improvements;
- Shallow (franchised) utilities (i.e. gas, power, lighting, telephone and cable television);
- Landscaping requirements including hard and soft elements and walkway systems.

1.2.2 Re-Development

The Standards outlined in section *1.2.1 Municipal Development Standards* also apply to the re-development of residential and industrial/commercial lands.

1.3 DEFINITIONS

In this manual the following words shall have the meaning hereinafter assigned to them:

- "Applicant" shall be synonymous with Developer.
- "Approved for Construction" shall be the ultimate acceptance by the Town of drawings and documents as submitted by the Developer, confirming that they have been reviewed and found to be in conformance with the municipal development standards. This approval does not relieve the Developer or Consulting Engineer of their responsibilities to ensure that all work proposed and completed continues to be in conformance
- "Construction Completion Certificate (CCC)" shall mean a certificate issued by the Consulting Engineer and executed by the Town confirming that the work is complete and operational; all deficiencies have been resolved to the satisfaction of the Town and the warranty period for the work has commenced. See Construction Completion Certificate in the Municipal Development Standards, Appendix B.
- "Developer's Consultant or Consulting Engineer" shall mean the professional engineer retained by the Developer to be responsible for the design, layout and supervision of construction, recording as-built information, certifying the installation is in accordance with the current standards, submitting design drawings and design specifications, and performing these duties in connection with the provision of municipal services as set out in this document.
- "Contractor" shall mean any person, persons or corporation who shall enter into a contract to undertake installation of municipal services on behalf of either the Developer or the Town.
- "Developer" shall mean any person, persons or corporation which has applied to enter into a development agreement to subdivide and/or develop, or to service an existing parcel of land, whether as the owner or an agent for the owner of the land.
- "Development Agreement" shall mean a contract between the Developer and the Town detailing the responsibilities of both the Developer and the Town in relation to a particular development.
- "Development Authority" shall mean the Chief Administrative Officer of the Town of Millet and/or his appointee.
- "Easement" shall mean an easement, interest or right held by the Town of Millet for the purpose of providing utilities, access or drainage.
- "Engineer" shall mean an individual appointed by the Town that represents the Town in any engineering or related functions, also called the "Town's Engineer".
- "Environmental Reserve (ER)" shall mean land owned by the Town to be preserved in its natural state. Environmental Reserve includes swamps, gullies, ravines, natural drainage courses, flood plains, steep slopes and shorelines as defined in Section 664(1) of the Municipal Government Act of Alberta, as amended.

- "Final Acceptance Certificate (FAC)" shall mean a certificate issued by the Consulting Engineer and executed by the Town, confirming that the work is complete and acceptable to the Town, that all deficiencies and maintenance work has been resolved to the satisfaction of the Town, and that the warranty period for the work has expired. See Final Acceptance Certificate in the Municipal Development Standards, Appendix B.
- "Landscape Consultant" shall mean the Landscape Architect or qualified landscape designer that is retained by the Developer to be responsible for the design, layout and supervision of installation of landscape and related work; recording as-built information; certifying that the material and installation is in accordance with the standards, design drawings and design specifications; and performing those duties in connection with the provision of municipal services as set out in these Municipal Development Standards.
- "Local Improvements" to be provided by the Developer shall include but are not limited to: deep utilities, shallow utilities, franchise utilities, roadways, lanes, street lighting and landscaping, also called "Municipal Improvements".
- "Maintenance" shall be Developer's sole responsibility for any and all repairs, rework and replacements of any improvements which, in the opinion of the Town, is necessary to address during the warranty period.
- "Municipal Reserve (MR)" shall mean land owned by the Town for the development of parks and school grounds pursuant to Section 666 and Section 667(1) of the Municipal Government Act of Alberta, as amended.
- "Open Space" or "Public Open Space" shall mean any parcel of land or body of water which is set aside and reserved for public use including Municipal and Environmental Reserves.
- "Outline Plan" shall mean a plan providing a more specific planning framework and servicing strategy for an area included in an Area Structure Plan and conforms to the general principals and concepts established in the Area Structure Plan.
- "Public Utility Lot (PUL)" shall mean land designated for a public utility.
- "Rural" shall generally mean an area within the Town limits with "rural services".
- "Rural services" shall generally mean an area with either a private individually owned water supply system and sewage collection system or public trickle fill water supply system and low pressure sewage collection system.
- "Town" shall refer to the Town of Millet.
- "Urban" shall generally mean an area within the Town limits with "urban services".
- "Urban services" shall include Town owned sanitary collection system and water distribution system installed to the property in an urban development.

- "Warranty Period" shall mean a minimum two (2) year period of time commencing with the execution of a Construction Completion Certificate and ending with the execution of a Final Acceptance Certificate. The warranty period duration will be coordinated to correspond with the development agreement.

1.4 REFERENCE MATERIALS

Throughout the Standards, reference will be made to other standards and regulations. These include, but are not limited to:

- Occupational Health and Safety Rules and Regulations;
- Transportation Association of Canada, Geometric Design Guide for Canadian Roads (including supplements);
- Alberta Infrastructure, Highway Geometric Design Standard;
- Transportation Association of Canada (TAC);
- Manual of Uniform Traffic Control Devices for Canada (MUTCD);
- Alberta Environment and Parks: Standards & Guidelines for Municipal Waterworks, Wastewater Systems, and Stormwater Management Guidelines;
- Canadian Standards Association (CSA);
- American Society for Testing and Materials (ASTM);
- American Water Works Association (AWWA).

1.5 FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY ACT

The Freedom of Information and Protection of Privacy Act is in effect for the Town of Millet and it gives any person a right of access to the records in our custody or control, subject to limited and specific exceptions. All documents and information, including correspondence, agreements, plans and specifications that are written, photographed, recorded or stored in any manner by the Town of Millet may be subject to the access and privacy provisions of the Act.

While the Town will endeavour to use Sections 16 through 29 of the Freedom of Information and Protection of Privacy Act, as amended, to protect the confidentiality of the information identified by the Developer or his agents as confidential, other sections of the Act may apply and the information may have to be disclosed to members of the public who request access to records in the Town's custody and control.

2 Procedures for Development

2.1 GENERAL

In addition to these Municipal Development Standards, the Town of Millet has a number of documents that Developers and/or their agents should be fully aware of in advance of undertaking the design of a specific subdivision or project. These documents include:

- Municipal Development Plan – 2015
- Land Use Bylaw – 2018

Together the Town's "Municipal Development Plan – 2015" and the "Land Use Bylaw – 2018" serve to guide future growth and development and put forward a list of permitted and discretionary uses for each land use district which may coincide with specific design parameters.

The Town encourages Developers to initiate early preliminary meetings with Town administration to discuss various land development concepts, proposals and alternative options.

2.2 SUBMISSION AND APPROVAL

2.2.1 Area Structure Plans, Outline Plans and Supporting Documents

The Developer shall prepare and submit for review and approval an Area Structure Plan (ASP) of the road network, site servicing layouts and landscape improvements for developments completed within new subdivisions. For submission to the Development Authority the ASP will include or be accompanied with Outline Plans showing detailed calculations and layout supporting the means by which the development will be serviced including all proposed right-of-way's, easements, and utility lots.

Conceptual Landscape Plans are to provide an overview of the development indicating community themes, reserve areas, open play areas, pedestrian linkage and facilities including spray parks, playgrounds, gazebos, rest areas and other park amenities.

2.2.2 Detailed Engineering Drawings and Specifications and Landscape Plans

Upon acceptance of the ASP and Outline Plans, the Developer shall submit for approval to the Development Authority two (2) sets of full size design drawings and specifications, sanitary sewer, storm drainage and water distribution network diagrams and geotechnical report(s) sealed by a Consulting Engineer registered in the Province of Alberta. All full size drawing and specification submissions need to be accompanied by an electronic duplicate of the same document in PDF format.

The review by the Town is for the sole purpose of ascertaining conformance to the current Municipal Development Standards, Land Use Bylaw and all other Municipal Plans, Master Plans, Standards and Guidelines. Approval to construct does not relieve the Developer of his responsibility for errors or omissions or meeting all requirements of the Municipal Development Standards and other Federal and Provincial Acts and Regulations.

Engineering drawings, diagrams and reports must be sealed by a Professional Engineer registered in the Province of Alberta. Landscape plans are to be submitted with the Engineering Drawings and be signed by the Landscape Consultant, who is a member in good standing of the Alberta Association of Landscape Architects.

Other information required prior to construction:

- Fully endorsed development agreement;
- Geotechnical Investigation;
- Design calculations shall be provided for, but not limited to, the Water Distribution System, Sanitary Collection System, and Stormwater Management;
- A copy of any required approvals from Alberta Environment;
- Tender documents and construction specifications;
- Traffic Impact Analysis if applicable;
- Construction drawings and specifications.

2.2.3 Approval by the Development Authority

The Development Authority shall inform the Developer, within twenty (20) working days after receipt of the detailed design submission, whether or not the Developer's submission has been approved for construction. Should the Development Authority not approve a part of the Developer's plans or proposals, they will be returned to the Developer for revision to the satisfaction of the Town. The twenty (20) working day approval period will begin again on the receipt of any re-submission.

Subsequent design submissions requiring changes to the previous submission shall consist of the following:

- Two (2) complete sets of drawings supplemented with an electronic duplicate in PDF format;
- All submissions subsequent to the first submission shall have highlighted with yellow any changes made by the design engineer which are in addition to "Red Line" revisions to accommodate the changes required by the Town of Millet.

2.2.4 Development Agreement

Developments within the Town of Millet that include new (greenfield) subdivision developments, and/or municipal improvements require a Development Agreement. The Town of Millet will prepare

a detailed draft Development Agreement for review with the Developer. Once the elements of the draft agreement are finalized, a final agreement will be prepared for signature.

The Development Agreement will detail the duties and responsibilities of both the developer and the Town of Millet in respect to the development. Generally, the Developer will be responsible to either construct, or provide funds to the Town of Millet for the construction of municipal improvements that will be required for the development.

2.2.5 Design Revisions after Approval

Whenever it is necessary to make changes to the design drawings after they have been approved, two (2) prints of each original drawing affected shall be submitted with the proposed changes shown in red with an electronic duplicate in PDF format, accompanied by a letter outlining the reasons for the required changes. The Engineer will inform the Developer within ten (10) working days after receipt if the proposed changes meet the approval of the Town. One (1) copy of the requested change will be signed and returned, accompanied by a letter authorizing the changes to be made on the original approved detailed design drawings. No changes are to be made to any original approved drawings without following this procedure.

2.2.6 Municipal Development Standards Deviation Process

The Developer shall identify and provide justification for any deviations from the Municipal Development Standards along with their submission.

The Town of Millet has the ultimate authority to reject and proposed deviations from the current Municipal Development Standards.

A deviation from the Municipal Development Standards will not be considered by the Town without the submission of detailed documentation demonstrating the justification for the deviation and the added benefit to the Town.

2.2.7 Approval by the Alberta Environment

The Developer shall be responsible to obtain Alberta Environment approvals. A copy of all correspondence, and the approval, shall be included in the submissions package to the Town. For the proposed development, Alberta Environment approval is a condition of the development agreement. Obtaining any approvals in no way removes the responsibility of the Developer to comply with the Municipal Development Standards to obtain the Town's approval to construct.

2.2.8 Mailing Address and Canada Post - Community Mailboxes

Mailing addresses for new developments will be determined by the Development Authority with collaboration from the Developer. The Developer is responsible to coordinate community mailbox locations with Canada Post. Proposed locations of community mailboxes are to be shown on all development plans. The Development Authority has final approving authority of all community mailbox locations.

2.2.9 Approval by Other Agencies

The Developer shall submit documentary evidence to the Development Authority that permission has been received from appropriate authorities and utility companies to address pipelines, railways, highways or other facilities. All agreements and approval are to be in place prior to approval to construct.

2.2.10 Acts, By-Laws and Standards

Any reference to Acts, By-Laws and Standards shall be to the most recent edition of each applicable document.

2.2.11 Required Drawings

2.2.11.1 Cover Page

The cover sheet shall include the following project information:

- Project Name & Reference Number if applicable;
- Description of the location of the project and/or legal description of lands involved in the project;
- Site location (key plan) showing the extents of the development and any offsite improvements;
- Developer's Consultant's logo (if available);
- Developer's name/logo (if pertinent);
- The year of construction.

2.2.11.2 Legend Page

The Legend page shall contain all symbols with definitions used in the project and an index of all drawings contained in the set.

2.2.11.3 Site Plan

This drawing shall include, but not limited to, the following existing and proposed information:

- Property lines;
- Street names, lot and block numbers;
- All easements and right of ways;
- Water, sanitary, storm information (pipes, valves, hydrants, catch basins, manholes, etc.,);
- Curb lines, sidewalks, trails;
- Limits of contract;
- Drawing number references to plan/profile and plan details sheets;
- Community mailboxes;
- Shallow utilities;
- Overhead utilities;
- Surface drainage.

2.2.11.4 Storm Water Management Plan

A Storm Water Management plan shall at minimum consist of the following:

- Include the site and surrounding area (400 m minimum outside of the development) showing roads and major features (1:2500 scale). A small location plan of the watershed is also to be included;
- Topographic contours of the existing ground (0.5 m intervals), with source and date;
- Major flood routing (1 in 100 year event);
- Stormwater management facility details, if applicable;
- Area, in hectares, of the development and the total area of the drainage basin;
- Directional arrows of the flow within the site and on surrounding and impacted areas;
- Sub-catchment boundaries, coefficients and areas;
- Pipe system including size, grade and minor and major flows (a table may be utilized).

2.2.11.5 Water-Sanitary-Storm Plan/Profiles

The plan/profile drawings shall show all the detailed information as to the underground utilities to be installed. Scales to be used are: 1:500 horizontal and 1:50 vertical.

The top half of a Plan/Profile sheet shall show the plan view, and shall show all the property lines (proposed, existing), legal description of all properties, the location of catch basins, underground utilities such as sanitary sewer, storm sewer, water, telephone, television, power, cable, manholes, valves, hydrants, curb cocks, inspection chambers, etc.

The following shall also be shown:

- Dimensions from all mains to property line to two (2) decimal places;
- Label all mains with the following: *###mm Material Wtr/San/Stm* (ex. 200mm PVC Wtr);

- Manhole numbers;
- Service/lateral diameter and material as well as inverts at the end of pipe;
- Existing franchise utilities with type and size (if applicable).

The bottom half of a Plan/Profile sheet shall show the profile view and show the following:

- Surface profiles of both the existing and design/proposed;
- Label all mains length, size, material, type, and grade of each main (ex. *###m-###mm PVC Wtr/San/Stm @ #.##%)*;
- Show the invert and top of pipe (crown) of all mains;
- Invert elevations at the inlet and outlet side of all manholes;
- Manholes are to be labelled with their respective number as well as the rim elevation;
- Franchise utilities with type, elevation, and size (if applicable);
- Bedding type, backfill, and surface restoration;
- Grades are to be to two (2) decimal places, while all invert, top of pipe, and rim elevations are to be to three (3) decimals;

2.2.11.6 Surface Works and Lot Grading Drawings

The surface works and lot grading sheet shall show all detailed information as to the road design and area grading. This sheet(s) shall be drawn at a scale of 1:500 and shall include the following:

- Property line, (proposed and existing);
- Legal dimensions of all properties;
- Legal description of all properties (Lot: ## / Blk: ## /Pln: ######);
- Property design lot elevations (two (2) decimals);
- Proposed garage elevations;
- Lot grade arrow and percent of slope;
- Hydrants, valves, manholes, catch basins, service shutoff valves and inspection chamber;
- Sidewalk (separate sidewalk shall show both sides of the walk while a monolithic walk will only show the back of walk);
- Face of curb (gutter) line with design/as-built elevations at grade changes, end of curb/back of curb, catch basins (three (3) decimals);
- Edge of pavement line;
- Gutter grade percent (two (2) decimals) with flow direction arrow;
- Area of pavement to be constructed or as-built shall be hatched;
- All manholes shall show their number and rim elevation (design/as-built);
- Centerline elevations at critical locations (grade change, vertical curves, etc.).

2.2.11.7 Street Sign, Pavement Markings, Traffic Control Devices

A separate plan shall be prepared in all cases for road surface works. This plan(s) shall detail all eradications, alterations, additions and new regulatory and advisory signage and line painting. The design shall conform to Manual of Uniform Traffic Control Devices guidelines. The following information shall be shown:

- Dimensions, lengths and color of proposed lane or curb markings, medians and crosswalks;
- Lane widths, median radii and taper ratios;
- Dimensioned location and type of new or relocated signs.

2.2.11.8 Landscaping

The landscaping sheet(s) shall show all detailed information as to the landscaping of the development. This shall show what is to be constructed as well as what is to be removed. This sheet(s) shall be drawn at a scale of 1:500 and shall include the following as a minimum:

- Fencing;
- Seeded/sod areas;
- Tree/shrub locations and types;
- Flower beds;
- Trails;
- Playground Equipment;
- Park/trail signage and lighting;
- Bollards.

2.2.11.9 Details

The Detail Drawing(s) shall show all specifications for construction which are not covered or specifically detailed in the Town of Millet Design Standards. Where there is a Standard Detail, it is expected to refer to the Standard Drawing Number. It is not necessary to include or provide work(s) for which there is a Standard Drawing.

2.2.12 Requirements for Geotechnical Reports

It is the responsibility of the Developer to have a Geotechnical Report completed by a Professional Geotechnical Engineer registered in the Province of Alberta and submit the report to the Development Authority for review. The Geotechnical Report shall include information about:

- Suitability of the soil for the type of development proposed;
- Physical properties of soil;
- Mechanical properties of soil;
- Design parameters (including water tables, sulfates and frost zone);
- Foundations, road structure and pavement design and any special construction requirements.
- Location of all bore holes and bore hole logs showing original ground elevation at the test hole and recorded water levels.

2.2.13 Reference Standards

All references to specifications, standards or methods of technical associations refer to the latest adopted revision, including all amendments, in effect on the date of submission of bids, except where a date or issue is specifically noted.

2.3 GENERAL CONSTRUCTION REQUIREMENTS

All work for construction of municipal improvements carried out by the Developer shall be in accordance with all Federal, Provincial and Local Statutes, acts, bylaws and regulations and meet the following general requirements.

2.3.1 Occupational Health and Safety

The Developer, Contractor, Consulting Engineer and Landscape Consultant shall comply with the provisions of the Occupational Health and Safety Act in Alberta. All subcontractors at the worksite shall also comply with the requirements of this Act. The Contractor shall be the general representative and agent to the Developer for the purposes of ensuring compliance with safety regulations for both itself and any subcontractors. The Contractor shall bring to the attention of subcontractors the provisions of the Occupational Health and Safety Act.

2.3.2 Project Supervision

The Consulting Engineer shall be responsible for the layout, field surveys, inspection, approval of materials and the supervision of all improvement installations which are the responsibility of the Developer. The Consulting Engineer or his authorized representative shall be on-site at all times during the installation of services to certify that all improvements are in conformance with the approved plans and specifications.

In addition to supervision carried out by the Consulting Engineer, the Town may periodically inspect the work and assist in coordinating the subdivision works with any related Municipal works. The Town will bring the use of any unacceptable materials or practices to the attention of the Consultant. If remedial action is not taken to the satisfaction of the Town, a Stop Work Order (See 2.3.11) will be issued and all work will cease. The unacceptable work will be corrected and/or replaced.

2.3.2.1 Coordination of Survey Layout and Materials Testing

The Consulting Engineer will coordinate with the Contractor survey layout and materials testing as required. Minimum 24hr notice for survey layout or material testing services must be provided by the Contractor. Inadequate notice (less than 24hrs) to schedule these services will result in potential delays that will be the responsibility of the Contractor and their staging plan.

2.3.3 Right-of-Way Documents

Where easement or right-of-way documents are deemed necessary, they shall be prepared by a registered Land Surveyor at the Developer's expense. Easements or right-of-ways shall be of sufficient size to allow access for maintenance purposes. All easements and right-of-ways shall be registered in the Town of Millet's name.

2.3.4 Construction Approval

Upon receipt and approvals of certified drawings and specifications, the Developer on the satisfactory execution of Development Agreement and payment of security deposit may proceed to install the municipal improvements.

A copy of all approved drawings and specifications shall be maintained at the construction site during the installation of services.

2.3.5 Construction Commencement Notice

The Developer shall give the Engineer at least two (2) weeks notice prior to commencing construction to allow for time to arrange for inspection staff.

2.3.6 Stockpile Locations

The location and composition of all stockpiles on Town of Millet property shall be approved by the Town. All agreements with private landowners must be provided in writing and approved by the Town.

2.3.7 Barricades, Guards and Safety Provisions

The Developer is responsible to protect persons from injury and to avoid property damage. The Developer shall place and maintain adequate barricades, construction signs, warning lights and guards during the progress of the construction work and until it is safe for traffic or pedestrian use. Whenever required, flag people shall be provided to prevent accidents.

2.3.8 Erosion and Sedimentation Control

The Developer shall have erosion and sedimentation control measures in place to prevent erosion and the transport of sediment from the development. The Developer shall comply with the federal and provincial acts, regulations, codes of practice, standards and guidelines that are applicable to development activities that result or could result in erosion, sedimentation and adverse effects on the environment.

2.3.9 Traffic and Utilities Controls

Approvals
Prior to any work being done within the Municipal right-of-way, the Developer must obtain approvals from the Town of Millet at least five (5) working days prior to work commencing.

A Traffic Accommodation Strategy (TAS) showing proposed temporary construction signage layout, identified work area, and pedestrian accommodation (if required) must be submitted to the Town for review.

Traffic Disruption
Excavations for pipe laying operations shall be conducted to cause minimal interruption to traffic. The Developer shall provide and maintain safe and suitable temporary bridges at street and driveway crossings where traffic must cross open trenches. Hydrants under pressure, valve pit covers, valve boxes, curb stop boxes or other utility controls shall be unobstructed and accessible during the construction period.

Utility Disruption
Adequate provision must be made for the flow of sewers, drains and water courses encountered during construction. No valve, switch or other control on the existing utility system shall be operated for any purpose by the Developer. If utility disruption is unavoidable, the Town must have a written request for a temporary shutdown stating timelines for shutdown and a contingency plan for unforeseen problems. A minimum of five (5) days notice shall be required. A response will be given within 24 hours to leave enough time to give affected residents and businesses a written notice a minimum of 72 hours before shutdown. All costs incurred by the Town will be the responsibility of the Developer.

Adjacent Property Owner Notification
All property owners affected by such operations shall be notified by the Developer in consultation with the Engineer 72 hours before the service interruption and advised of the probable time when service will be restored.

Detours
Prior to any road closure, the Developer must submit a detour plan to the Development Authority for approval. The Developer shall be responsible for supplying, placing and maintaining detour signage for the duration of construction. Garbage pickup must be coordinated with the Town and facilitated with impacted residents. Emergency access must be maintained at all times.

Signage
The Developer must, at his expense, provide, erect, and maintain all signs, barricades, flares, flagpersons, etc.

2.3.10 Boundary Controls

A boundary valve is to be placed at the tie-in to the existing water distribution system as approved by the Town. All boundary valves are to be operated by the Town of Millet Public Works personnel.

2.3.11 Stop Work Order

The Town may issue a "Stop Work Order" to the Contractor due to non-conformance. Examples of non-conformance includes:

- Unsafe practices;
- Imminent danger;
- Lack of traffic control;
- Failure to submit required testing certification;
- Construction not in accordance with approved drawings and specifications;
- Non-compliance with the development requirements;
- Damage to existing facilities.

Should a "Stop Work Order" be issued, the Developer shall immediately cease operation, rectify the non-conformance, and obtain the Town of Millet's approval prior to proceeding.

2.4 RECORD DRAWINGS AND OTHER DOCUMENTS

The Developer shall submit record drawings and other related information giving detailed measurements of the actual municipal services constructed to the Development Authority. The submission of this data for record purposes is a condition of the execution of a Construction Completion Certificate by the Town. If applicable, Record Drawings can be completed in two stages.

2.4.1 Underground Construction

On completion of the sanitary sewer, storm sewer, the water distribution system, and lot servicing, the Developer shall submit to the Development Authority two (2) sets of as-built drawings, an electronic copy (pdf format) and video-inspection tests.

The Consulting Engineer shall certify that all work had been completed in accordance with the plans and specifications, the Municipal Development Standards and that all work and deficiencies have been completed. A written request must be submitted to the Town of Millet for Chlorination of water distribution system.

Together with the above, the Developer shall submit the lot service records, compaction test results, successful pressure, leakage, and chlorination tests and an accurate as-constructed bill of materials for the Town's inventory database.

Upon satisfactory acceptance of this data, the Developer may request a construction completion inspection for underground improvements.

2.4.2 Surface Construction

After satisfactory completion of surface improvements and as a condition of the execution of Construction Completion Certificate for surface improvements, the Developer shall submit the following information to the Development Authority:

- Certification by the Consulting Engineer that all work has been completed in accordance with the plans and specifications, the Municipal Development Standards, and that all work and deficiencies have been completed;
- Two (2) sets of black line prints and an electronic copy of as-constructed drawings sealed by a professional engineer registered in the Province of Alberta. At this stage, the drawing shall be stamped "Record Drawings";
- All previously unsubmitted certificates concerning materials inspection and testing, mix designs, deflection tests, concrete strength tests, and compaction tests, as required by this document and by the Town of Millet;
- Operation and Maintenance Manuals, spare parts, and lubricants;
- Completed tender document as tendered by the successful contractor and a copy of the Final Progress Payment Certificate;
- An accurate as-built bill of materials for the Town's inventory database.

Upon satisfactory acceptance of this data, the Developer may request a construction completion inspection for surface improvements.

2.4.3 Seasonal Conditions

Should seasonal conditions not permit the inspection, execution of the Construction Completion Certificate by the Town will be delayed until appropriate conditions exist and/or conditional acceptance may be granted based on the Consulting Engineer's Certification.

2.4.4 Additional Information

Record drawings shall be of the same format as the original construction drawings with all changes noted and the following information added:

- Design data is erased on original and replaced with record data;
- All hydrants, valves, curb stops, manholes and catch basins are to be dimensioned in two (2) directions.

2.4.5 As-built Survey

Included with the project as-built submittal drawing shall be a coordinate file (PNEZD-comma delimited) containing as-built (as-constructed) locations and elevations of all surface structures.

This coordinate file shall be referenced to the Town's coordinate system and include ties to at least two (2) survey control monuments or approved alternate. Horizontal accuracy for this survey shall be less than or equal to 0.050 m and vertically of less than or equal to 0.025 m. The following shows what information shall be included in the survey:

- Manholes;
- Valves;
- Pipe Fittings (Elbow, Cross, Tee, Plug, etc.) At a minimum all plugs shall be captured;
- Clean out;
- Catch basin;
- Inlet / Outlet Structures;
- Service shutoff valve (CC);
- Hydrant;
- Hydrant Valve;
- Face of Curb, Front and/or Back of walk, Centerline. These shall be surveyed at grade change points and at least every 20 m along the feature;
- Lot corners.
- Street Furniture

2.4.6 Service/Lateral As-built Sheets

All services/laterals shall be surveyed and recorded. The survey will consist of recording the invert of the sanitary and/or storm service at up to three (3) locations (main, property line and the end of pipe). This survey information can be included with the above noted file(s).

2.4.7 Dimensions

All dimensions, elevations and inverts shown shall reflect the as-built conditions of the construction and references to "Proposed" shall be removed. As-built drawings shall be to scale in accordance with the as-built dimensions shown.

2.4.8 As-built Drawings

All as-built drawings shall also include the following information:

- The location and elevation of all existing utilities and services encountered in the construction operation;
- The location and invert elevation at the end of all service connections.

2.5 CONSTRUCTION COMPLETION CERTIFICATE (CCC)

Upon satisfactory completion of the project, a satisfactory construction completion inspection, and after all the deficiencies have been corrected and submissions received, the Town shall execute the Construction Completion Certificate submitted by the Developer and Consulting Engineer, notifying:

- Acceptance of the portion of work by the Town;
- Commencement date of warranty.

A copy of the Construction Completion Certificate is included in Appendix B.

If provided for in the Development Agreement, separate Construction Completion Inspections and commencement of warranty periods shall be required for the following:

- Underground utilities;
- Surface works;
- Landscaping.

2.6 WARRANTY PERIOD

The Developer shall be responsible for any defect, fault, or deficiency in the completed work during a minimum twenty-four (24) month warranty period and shall remedy it at his own expense.

The Developer shall be responsible for any and all third party damages up until the issuance of the Final Acceptance Certificate.

Upon commencement of the warranty period, the Town will assume responsibility for regular summer and winter maintenance on paved streets within the occupied subdivision and garbage pickup. The Developer shall remain responsible for all other maintenance and repair items including third party damages, maintenance of street signs, flushing of sewer lines, thawing and flushing of watermains and landscape maintenance.

2.7 FINAL ACCEPTANCE CERTIFICATE (FAC)

Prior to the expiration of the warranty period, the Developer shall submit a written request for a final inspection, and within fifteen (15) working days of receipt of such request, the Town will carry out an inspection. Final Acceptance shall include underground services and surface work and facilities, where applicable, and upon correction of all deficiencies, shall be issued under one combined Final Acceptance Certificate. Landscape improvements will be approved under a separate Final Acceptance Certificate. A copy of the certificate is included in Appendix B. The warranty period shall remain in effect until the Final Acceptance Certificate is accepted by the Town.

Should seasonal conditions not permit the inspection, execution of the Final Acceptance Certificate by the Town will be delayed until appropriate conditions for inspection exist.

2.8 BUILDING PERMITS

Submissions for Building Permits are made to The Inspections Group Inc. of Edmonton, Alberta for any construction project within the Town of Millet. Their contact information is as follows:

The Inspections Group Inc.
12010 – 111 Avenue NW
Edmonton, AB T5G 0E6
Ph: 1-780-454-5048
Ph (Toll-Free): 1-866-554-5048

2.9 CONSTRUCTION COMPLETION CERTIFICATES AND FINAL ACCEPTANCE CERTIFICATE INSPECTIONS

Five (5) working days prior to any construction completion inspection or final acceptance inspection, the Developers Consultant shall prepare a Pre-Inspection Checklist that certifies the readiness for inspection.

The Engineering/Landscape Consultant shall take the lead role in the inspections. The Town will observe the inspection and only provide comments whenever necessary. The Engineering/Landscape Consultant is responsible to confirm that the project has been constructed in general conformance to the Contract Drawings and Specifications.

3 Roadway Systems

3.1 GENERAL

This guideline covers the general design and construction of roads, lanes, curbs, gutters, sidewalks, boulevards, and accessories to be built or re-built in the Town of Millet. Drawings relating to roadway design and construction are provided in the Municipal Development Standard Drawings.

3.2 TRAFFIC & TRANSPORTATION

These requirements and standards are the minimum basis for roadway and walkway facilities. Changes in the design values may be considered, provided that the changes are justified and added benefits are provided by the Developer to the Town's satisfaction.

Roadway capacity and safety can be affected by the following factors:

- Roadway Geometrics - Road right-of-way, road width, lane width, storage turnbay lengths and geometrics, grade and curvature, intersection configuration, etc.;
- Traffic Characteristics - Traffic volume, speed, traffic composition, traffic fluctuations, saturation flow, etc.;
- Road "Frictions" - Traffic control measures, parking conditions, access locations and numbers, driver sight distance, street furniture, etc.

3.3 ROAD CLASSIFICATION AND GEOMETRIC STANDARDS

The classification and designation of roads and walks shall be undertaken during the subdivision design stage, commencing with the Outline Plan, in order that roads and walks, utility, and right-of-way requirements can be coordinated, established and approved in the design stages of subdivision development.

3.3.1 General

- Roads are classified in a functional hierarchy. The road classifications are local, collector, and arterial;
- The design standards for roads shall be in accordance with the geometric design standards outlined in the latest edition of the "Geometric Design Guide for Canadian Roads" by the Transportation Association of Canada;
- Typical cross-sections are provided in Municipal Development Standard Drawings.

3.3.2 Arterial Road

Arterial roads generally serve as line-haul facilities carrying traffic between activity centres - connecting with collectors, other arterials, and freeways, but not local streets. On-street parking is not normally permitted on this type of facility in the Town of Millet.

3.3.3 Collector Road

A Collector road is to provide local access to frontage developments, collect traffic from several local streets or from an industrial area and channel it towards the arterial system. A collector street can connect with local streets, other collectors or with arterial roadways; however, their location should minimize the potential use as a short-cut between arterial roadways. Parallel and angle parking may be allowed on these streets.

3.3.4 Local Road

A Local road is intended solely to provide access to individual properties. This street should only be permitted to connect with similar type facilities or with collector streets. All sites should provide sufficient on-site parking to meet demands and service no industrial bus routes. School buses may be permitted.

3.4 PAVEMENT STRUCTURES

A geotechnical investigation and independent pavement design is required for all developments and shall be based on a 20-year design life for insitu conditions and projected traffic volume.

Pending the results of the geotechnical investigation, additional pavement structure strengths and/or materials testing may be required in areas with poor subgrade materials. This would include areas with heavy industrial applications. Where road use is mixed (i.e. commercial and residential) the pavement structure shall meet the higher load criteria.

Roadways in all urban subdivision developments shall be surfaced with asphaltic concrete pavement (hot mix asphalt).

Good roadway industry construction practices and techniques shall be employed.

In no case shall the total pavement thickness be less than 100 mm on a local road and 120 mm on a collector road. The pavement shall be placed in two (2) separate lifts. The fist lift shall be designed to withstand the expected loads due to construction activity in the first two (2) years and must be placed prior to Construction Completion Certificate being issued by the Town. The second lift being placed after a two (2) year period and prior to Final Acceptance Certificate being issued by the Town.

3.5 ROAD CONSTRUCTION REQUIREMENTS

3.5.1 General

Roadway construction must be in accordance with the planning documents within the Town and must follow the roadway design approved by the Town.

The work shall be completed in an efficient manner with approved equipment and capable personnel. During the evaluation of contractor proposals, the Town will assess the personnel assigned to the Project. Should a personnel change be required, the contractor must notify the Town with details of the reason for the change and details on the replacement personnel including, but not limited to, their up-to-date resume. The Town reserves the right to deny the change in personnel if the replacement personnel are not adequately capable.

The Town or an appointed representative shall at all times have access to the site and will promptly be provided with all test results and all information necessary to assess the Contractor's performance.

3.5.2 Temporary Roads and Access

Plans for temporary roads, access, and detours shall be approved by the Town. All weather type construction will be required and the Developer is responsible for all maintenance of temporary roads, access, and detours.

All signing, channelization, detours, closures, etc. shall be in accordance with the most recent copy of the Manual of Uniform Traffic Control Devices (MUTCD) as published by the Transportation Association of Canada.

3.5.3 Dust Control, Street Cleaning and Snow Removal

The Developer shall be solely responsible for dust control and debris and mud removal from sidewalks, curb, gutter, and boulevards within the subdivision or project limits for the duration of the Warranty Period. The Developer/Contractor shall also be solely responsible for ensuring silt and debris cannot enter into catch basins within the new development and directly adjacent to the new development.

The Town shall be responsible for snow removal and street cleaning once the Construction Completion Certificate has been executed.

3.5.4 Maintenance of Existing Facilities

The Developer is responsible to ensure that existing infrastructure, such as sewer mains, watermains, roadways, and landscaped areas, are not disturbed or become inoperable as a result

of actions by the Developer, his agents or Contractors. Existing services shall not be exposed to loadings beyond their design capacities. Existing services shall continuously be maintained and cleaned by the Developer where his actions are cause for additional maintenance. The existence and location of underground utilities indicated on the plans that have been determined from the Town's records are not guaranteed.

3.5.5 Staged Construction

Staged construction shall meet the approval of the Town. The Developer is responsible for all maintenance of partially completed works which have been opened for use. All partially completed works shall be properly restored prior to commencing with the next stage of construction. The Developer is required to place a temporary turnaround on dead end streets to accommodate garbage trucks and school buses.

3.6 MATERIALS

3.6.1 General

Materials used in roadway construction shall be from sources approved by the Town of Millet. Manufactured goods shall meet the standard manufacturer's specifications and the approved roadway specifications. Under no circumstances shall defective, rejected or substandard materials be used in the construction of roadways.

3.6.2 Excavation and Embankment

In general, the following design standards should be followed for excavation and embankment required to facilitate roadway preparation:

- Embankment materials require approval by the Town. Material unsuitable for roadbuilding purposes shall either be removed from site entirely or utilized onsite for non roadbuilding purposes as directed by the Town.

- Materials used in roadway embankment shall not contain organic matter, frozen lumps, weeds, sod, roots, logs, stumps or any other objectionable matter.

- Embankment material shall be compacted to a minimum 97%. The upper 300mm shall be compacted in 150mm layers to a minimum 100% of Standard Proctor Density at optimum moisture.

- Stripped topsoil stockpiles shall avoid contamination from suitable roadway excavation stockpiling.

- Contractor shall notify Town when material below natural ground level under embankment requires to be excavated.

3.6.3 Subgrade and Fill materials and Granular Road Base

Subgrades under the roadway structure shall be constructed of suitable soils, free from organic and frost susceptible materials. Subgrade preparation shall typically include scarification to a depth of 300mm, condition of the soil, and replacement of the material compacted to 100% Standard Proctor Density (at optimum moisture content).

Granular Road Base placement without subgrade proof roll or approval to proceed shall be removed by the Contractor at their own cost.

Granular Road Base Materials shall be conditioned and installed in suitable lifts (minimum 150mm depth) to meet compaction requirements to 100% Standard Proctor Density. Granular road base material sieve and proctor shall be submitted to Town for review before use.

3.6.3.1 Proof Roll

All roadway subgrade must be proof-rolled and witnessed by the Town or appointed representative prior to granular road base placement. If proof roll determines subgrade deficiencies, the Contractor is responsible for repairs at their own cost. Any placement of granular road base material prior to approval of subgrade proof roll shall be removed entirely by the Contractor at their own cost.

3.6.4 Concrete

Concrete for roadways, including sidewalks, walkways and structures, shall be to a C-2 exposure classification (CSA-A23.1), have a minimum compressive strength of 30 MPa in 28 days (20 MPa in 7 days), be Type HS (unless specified differently) 5% to 8% air content, have a nominal maximum size course aggregate of 14.0-20.0 mm, a maximum water/cement ratio of 0.45, and use a curing compound. Contractor shall submit concrete mix design to Town for review before use.

Fall mix (October 1 to October 15) shall contain replacement of minimum cement content with fly ash and Type HS cement cannot be used.

Type HS sulphate resistant cement shall not be used after October 15. Contractor shall utilize cold weather concrete mix that will attain a minimum compressive strength of 27 MPa in 7 days and shall be provided with cold weather protection to CSA A23:1:19 / CSA A23:2:19.

Cold weather protection must be adequate to maintain concrete surface temperatures at a minimum 10 C for a period of 7 days following placement. Concrete shall be protected from freezing for a minimum of 4 days after placement or for the time necessary to achieve 75% of the specified 28 day compressive strength, whichever is greater.

3.6.5 Asphalt

Asphalt surface shall not be laid prior to the base course meeting the required testing. See Section 9.2. Contractor shall submit asphalt mix design to Town before use.

Asphalt materials, mixing, spreading and rolling shall conform to good paving practice. Refer to the latest edition of the Asphalt Institute Manual Series No. 22 (MS-22), Construction of Hot Mix Asphalt Pavements, for guidance in good practices of handling materials and hot mix production.

No paving shall occur when rain or snow is imminent or when surface to be paved is wet, icy or snow covered, or frozen to at any point within 150mm of the surface.

Mixes shall conform to the following:

- Asphalt Concrete Base (ACB): base course lift for arterials, industrial/commercial roadways and collector roadways.
- Asphalt Concrete Residential (ACR): paving alleys, local roadways and trails
- Asphalt Concrete Overlay (ACO): top lift paving arterials, industrial/commercial roadways and collector roadways

A tack coat shall be applied to all horizontal and vertical surfaces prior to paving. Tack coat shall be SS-1 liquid asphalt grade 50% concentration. The required densities shall be as follows in Table 3.2:

Table 3.2

Minimum Density	*Type of Paving*
98%	New paving and all stages in staged paving except 2nd stage residential mat 40 mm thick or less.
96%	Second stage residential mat 40 mm thick or less
97%	Lane paving.
97%	Rehabilitation overlay more than 40 mm thick.
96%	Rehabilitation overlay 40 mm thick or less.
96%	Paved walkway and bikeways

3.7 TRAFFIC CONTROL DEVICES, STREET SIGNS, AND PAVEMENT MARKINGS

Traffic control devices, street signs, and pavement markings shall be installed by the Developer and shall be in accordance with the latest edition of the Manual of Uniform Traffic Control Devices for Canada, issued by the Transportation Association of Canada.

Highly reflective engineer grade street name signs and traffic control high density signs shall be mounted on a 4x4 pressure treated post to the satisfaction of the Town. Street sign blades are to be extruded aluminum street blades, blue in colour, 150mm x 400mm. Mounting hardware is to be bracket #ID-30B 6" as supplied by Alberta Traffic Supply. Stop signs are to be a minimum size of 600mm x 600mm. Diamond grade reflective signs are required for all signage.

Pavement markings, including lane markings, stop lines and pedestrian crossings, shall be provided by the Developer at his own expense. Pavement marking shall be painted on the top lift of asphalt. Pavement markings shall be inlaid thermoplastic on all arterial classified roadways within the Town.

3.8 ROADWAY ILLUMINATION

The Developer shall provide plans for street lights in accordance with IES – Illumination Engineering Society.

Street lights shall be provided for each internal park area that does not abut onto a lighted street. A street light shall be located at the point where each walkway opens out onto the park area. Street lights shall be placed at locations not interfering with proposed driveways and water and sewer services and in general shall be located in line with the extension of common property lines between two lots.

The location and density of the street lights shall be in accordance with the Transportation Association of Canadas "Guide for the Design of Roadway Lighting".

3.9 SWALES

In general, the following design standards should be followed for swales required to facilitate drainage

3.9.1 Grass Swales

- Minimum 2.0 m of right of way;
- 150mm depth, with 4:1 maximum side slopes;
- Minimum Slope of 1.50%.

3.9.2 Concrete Swales

- Minimum 500mm Width;

- 75mm depth;
- Minimum Slope of 0.70%

Asphalt swales will not be permitted in new developments.

3.10 LANES

In general, the following design standards should be followed:

- Minimum 6.0 m of right-of-way;
- Where lane traffic is expected to be high, such as for certain commercial developments, a wider surface width and right-of-way may be required, as determined by the Town;
- Road structure shall be as per geotechnical investigation;
- "Dead-end" lanes must be terminated with a means to turn around;
- Maximum length of lane between streets shall not exceed 350 m. Lane layout should not encourage possible short cutting between streets;
- Maximum length of drainage in lanes shall be 350 m cumulative to any one catch basin;
- Maximum lane grade shall be 6.0%;
- Minimum lane grade shall be 1.0%.

3.11 DEAD-END ROADS

In residential subdivisions, all dead-end roads shall be provided with a cul-de-sac or turnaround consistent with the requirements outlined in the Standard Drawings and the Transportation Association of Canada manual. The maximum length of dead end roads that terminate into a cul-de-sac, which service residential lots, shall be 300 m.

3.12 APPROACHES AND DRIVEWAYS (URBAN)

Urban approaches and driveways shall be in accordance with the Transportation Association of Canada Geometric Design Guide for Canadian Roads and as modified herein.

3.12.1 Private Driveways

All driveways shall be constructed to provide a minimum 1.5 m clearance from any structure such as hydrants, light-standards, service pedestals, transformers, manholes and catch basins. Driveways on corner lots shall be located to provide a minimum of 8.0 m clearance from the lot property line adjacent to the intersection.

3.12.2 Commercial/Industrial Driveways

Intersection spacing shall be at a minimum horizontal distance of 10 m from the edge of driveway to the end of the curb return and must be designed to accommodate the types of vehicles the business/industry will generate.
The maximum driveway width of any commercial/industrial lot shall be 60% of the frontage of lot. Deviation from this standard will require written approval from Infrastructure Services.

3.13 PEDESTRIAN PATHWAYS

3.13.1 Separated Sidewalks

Concrete sidewalks measuring minimum 1.2 m in width will be required in the following instances:

- On both sides of arterial roads where there is no parallel service road with sidewalk (separate walk on one side and multi-purpose 2.5 m Asphalt path on other side);
- On the same side as street lights on Collector roads;
- On the same side as street lights on Local roads;
- Where there is a possibility of a requirement to provide continuity of sidewalk to future development;
- Where linkage is required to maintain continuity of pedestrian network;
- Cul-de-sacs see Standard Drawings.

Refer to Standard Drawings for typical layouts and dimensions.

Curb ramps shall be provided on sidewalks at all roadway intersections and at all pedestrian crossings in accordance with the Standard Drawings.

3.13.2 Monowalk

Concrete sidewalks measuring minimum 1.2 m in width will be required in the following instances:

- On both sides of arterial roads where there is no parallel service road with sidewalk (separate walk on one side and multi-purpose 2.5 m Asphalt path on other side);
- On the same side as street lights on Collector roads;
- On the same side as street lights on Local roads;
- Where there is a possibility of a requirement to provide continuity of sidewalk to future development;
- Where linkage is required to maintain continuity of pedestrian network;
- Cul-de-sacs see Standard Drawings.

Refer to Standard Drawings for typical layouts and dimensions.

Curb ramps shall be provided on sidewalks at all roadway intersections and at all pedestrian crossings in accordance with the Standard Drawings.

3.13.3 Trails

Pedestrian trails shall be minimum 3.0 m wide in accordance with the Standard Drawings.

4 Sanitary Sewerage Systems

4.1 GENERAL

These standards cover the design and construction of sewer mains and accessories to be built or re-built in the Town of Millet. Drawings relating to sanitary sewer system construction, trenching and backfill are provided in the Municipal Development Standard Drawings.

These standards provide the minimum design criteria, general construction requirements and construction materials for consulting engineers to use in their preparation of specifications and drawings. These standards may be exceeded if warranted by the design consultant. Good engineering practices and designs must prevail on all projects.

4.1.1 Separation of Storm and Sanitary Systems

All new systems or extensions from existing systems are to be designed on a separated basis. Run off from roofs, lots, streets and other outside areas including yards and parking areas and infiltration water from foundation drains and other sources, is to be excluded from the sanitary sewer system.

4.2 DESIGN FLOW

The sanitary sewer system shall have sufficient capacity to convey the peak dry weather flow, extraneous flows, and sanitary flow from all future contributing areas. This section outlines the methodology and design criteria that applies to the design of the sanitary sewer system.

Sanitary sewage systems shall be designed on whichever of the following is greater:

- The ultimate subdivision design population in the Outline Plan or Land Use Bylaw;
- Equivalent population subject to the peak day demand multiplier.

The equivalent populations are:

- Residential = 42 persons/ha
- Medium Residential = 90 persons/ha
- High Residential = 178 persons/ha
- Commercial/Industrial/Institutional = 48 persons/ha

Residential design populations can be further broken down as follows:

Residential-Low Density

- Single detached dwelling — 12 units/ha @ 3.5 people/unit

Residential-Medium Density

- Semi detached or duplex dwellings — 25 units/ha @ 2.4 people/unit
- Mobile home parks — 17.5 units/ha @ 2.4 people/unit

Residential-High Density

- Apartments — 74 units/ha @ 2.4 people/unit
- Townhouses — 37.5 units/ha @ 2.4 people/unit

The sewer main capacity shall be designed to convey the peak hourly sewage contribution plus infiltration, without the use of holding tanks and based on the following:

4.2.1 Residential/Domestic Contribution

The sewer main capacity shall be designed on the basis of either the subdivision design population, or 42 persons per hectare, whichever is greater, including all future contributing areas.

- Minimum average contribution of 360 litres per capita per day.
- Peak hourly flow for each contributing area calculated at an average flow multiplied by a peaking factor:

$$\text{C Peak Factor} = 1 + \frac{14}{4+P^{1/2}} \quad \text{(Harmon Formula)}$$

Where P = the population in thousands.
The maximum peak factor shall be 3.8.

4.2.2 Commercial/Industrial Contribution

Commercial and Industrial design flows will be based on the gross developed area or the specific application.

- Industrial flows - minimum average contribution of 0.2 litres per second per gross hectare.
- Commercial and Institutional (churches, schools, etc.) flows - minimum average contribution of 0.2 litres per second per gross hectare. Lower contributions may be considered on a per case basis.

- Peak dry weather flow for each contributing area calculated at average flow multiplied by a minimum peaking factor of 3.0. Maximum peak factor shall be 3.8.

4.2.3 Infiltration

- Roof leaders and weeping tiles shall not be connected to the sanitary sewer system. New development of existing areas where roof leaders and weeping tile are connected to the sanitary system, connections must be removed.
- The sanitary sewer and manhole system shall be constructed as water-tight. However, a maximum infiltration rate of 0.28 litres per second per gross hectare is acceptable.
- All new manholes are to be located out of "sags".

4.3 PIPE FLOW FORMULA

All sanitary sewers shall be sized using the Manning's equation and an "n" value of 0.013 for all smooth walled pipes of approved material.

Application of a depth variable friction factor at a flow depth of 80% of the sewer diameter results in a flow rate of approximately 86% of the sewer's full flow capacity. Therefore, the required flow capacity for sizing of the sewer shall be computed using the following relationship:

4.3.1 Gravity Sewers

$$\text{Required full flow sewer capacity} = \frac{\text{estimated total design peak flow rate}}{0.86}$$

$$\text{Using Manning's formula } Q = \frac{AR^{0.667}S^{0.5}}{n}$$

Where Q = Design flow in m^3/s
A = Cross sectional area in m^2
R = Hydraulic radius (area/wetted perimeter) in m
S = Slope of hydraulic grade line (m/m)
n = Roughness coefficient

4.3.2 Sewage Force Mains

Use Hazen-Williams formula:

$Q = CD^{2.63}S^{0.54} \times 278.5$

Where Q = Rate of flow in L/s
D = Internal pipe diameter in m
S = Slope of hydraulic grade line (m/m)
C = Roughness coefficient = 120 for all mains

4.4 VELOCITY

4.4.1 Minimum Velocity

Gravity sewers	V = 0.6 m/s
Forcemains	V = 0.76 m/s

4.4.2 Maximum Velocity

Unless specifically designed the maximum velocities are:

Gravity Sewers	V = 3.00 m/s
Forcemains	V = 1.5 m/s

4.5 MINIMUM PIPE DIAMETER (GRAVITY SEWERS)

- Residential Areas — D = 200 mm
- Commercial/Industrial Areas — D = 250 mm
- Service Connections — D = 100 mm (single family dwelling)

Note: D = internal pipe diameter.

4.6 MINIMUM PIPE GRADE

Table 4.1 lists minimum pipe grades. Steeper grades are desirable.

Table 4.1
Minimum Pipe Grades

Internal Pipe Diameter mm	*All Pipe Types % Grade*
200	0.40*
250	0.28
300	0.22
375	0.15
450	0.12
525	0.10
600	0.10

*The % grade shall be increased to 1% for top ends/dead ends of sanitary systems.

For curved sewers, the minimum grade shall be as follows.

Table 4.2
Minimum Pipe Grades

Internal Pipe Diameter mm	*All Pipe Types % Grade*
200	0.40
250	0.31
300	0.25
375	0.18
450	0.15
525	0.13
600	0.10

4.7 MINIMUM DEPTH OF COVER

Minimum cover to be 3.0 m to invert and shall be of sufficient depth to satisfy the following requirements:

- Permit service connections to basements. Typically the obvert of the sewer should be at least 1.0 m to 1.5 m lower than the proposed basement elevation;
- Prevent freezing;
- Clear other underground utilities;
- Prevent damage from surface loading.

4.8 FROST PROTECTION

If minimum depth of cover for underground sanitary sewer system pipe cannot be achieved, pipe shall be insulated per Standard Drawings detail.

4.9 MANHOLE SPACING

- Manholes shall be provided at the end of each line and at all changes in pipe sizes, grades or alignment;
- The maximum allowable distance between manholes is 120 m for sewers smaller than 600 mm and 150 m for sewers 600 mm and larger;
- For curved sewers, manholes spacing shall be a maximum of 90 m for sewers smaller than 600 mm and 120 m for sewers 600 mm and larger.

4.10 CURVED SEWERS

Maximum joint deflection shall be as recommended by pipe manufacturer. Curved sewers shall be aligned parallel to the road centreline.

4.11 HYDRAULIC LOSSES ACROSS MANHOLES

The following criteria shall be used:

- Generally, for increasing pipe diameters the obvert of the downstream pipe shall match obvert of the upstream pipe;
- Minimum drop in invert levels across manholes:
    - Straight runs – 30mm drop minimum;
    - Deflections up to 45° - 30 mm drop minimum;
    - Deflections 45° to 90° - 60 mm drop minimum;
- Deflection greater than 90° shall be accommodated using two (2) or more manholes;
- A drop pipe shall be installed when the drop between inverts exceeds 1.0 m. The manhole barrel shall be sized to attain a clear main entry access of 1.0 m or greater.

4.12 PIPE LOCATION

- Sanitary sewers shall be installed on the centreline of the roadway;
- Separation of sewer main from watermains, storm sewers, power/telephone/cable:
    - Minimum 3.0 m horizontally unless sewer depth requires increased spacing;
    - Minimum 0.5 m vertical clearance between the bottom of the sewer service pipe and the top of the watermain;

- Minimum 0.3 m vertical separation between the top of the sewer service pipe and the bottom of the watermain.

4.13 SERVICE CONNECTIONS

- Service connections shall be installed:
  - In separate trench if larger than 200 mm;
  - In common trench with water service laterals. For service connection details, see Standard Drawings;

- The minimum size of sanitary sewer service connections to a single family dwelling shall be 100 mm;
- Sanitary sewer service connections for commercial, industrial, multi-family or institutional areas, unless otherwise approved by the Town, shall be 150 mm or greater based on required design flows;
- Each Sanitary sewer service connection shall be designed as a single connection from the main to the property line;
- Sanitary and water sewer service connections shall be extended 4.0 m past the property line;
- All sanitary sewer service connections from the main to property line shall be designed for gravity flow with a minimum grade of 2.0%, and provide a minimum of 2.85 m of cover at property line;
- Sanitary sewer service connection materials shall be polyvinyl chloride (PVC) DR35 building service pipe conforming to CSA specification B182.2, latest revision thereof;
- Sanitary service connections can be made at manholes but must connect to a sewer main within the manhole. Where this is not feasible, sanitary service connections shall be made by the use of in-line tees or saddles;
- Risers shall be employed where the service connection at the main is 4.0 m or deeper;
- Roof leaders and building foundation drains shall not be connected to the sanitary sewer system;
- Grease, oil and sand interceptions or filters shall be provided on private property for all restaurants, garages, petroleum service stations, vehicle and equipment washing establishments as per Bylaw 2002-06/43

4.14 SERVICE CONNECTION RECORDS

The Developer's Consultant shall provide detailed record drawings for all installed service connections with such drawings providing information related to pipe dimension, invert elevations at the property line, location of services relative to property line(s), manholes or watermain valves, and lot number.

4.15 MATERIALS AND SPECIFICATIONS

Pipe materials shall be selected using a rational design method with the following information as a guide:

4.15.1 Gravity Sewers

Table 4.3
Acceptable Pipe Materials for Gravity Sewers

Preferred Materials	*General Size Range (mm)*	*Specification*
Polyvinyl Chloride (PVC) Reinforced Concrete	100 to 900 900 & larger	ASTM D3034, SDR 35 (CSA B182.2) CAN/CSA A257, Class 3 min.

4.15.2 Force Mains

Table 4.4
Acceptable Pipe Materials for Sewer Forcemain

Preferred *Materials*	*General Size Range*	*Specification*
Polyvinyl Chloride (PVC)	150 to 300 400 & larger	AWWA C900, DR-18 or approved AWWA C905, DR-25 or approved
High Density Polyethylene HD PE	75 & larger	AWWA C906, DR-11 or approved

Alternate materials will be evaluated on individual presentations (justification for deviation) by the Developer to the Town.

4.15.3 Manholes

All manholes are to be 1200 mm inside diameter and as per standard drawings.

- Manholes shall be manufactured using sulphate resistant Type HS cement;
- Manhole sections shall be precast reinforced concrete sections conforming to ASTM C478 and CSA A257.4;

- Manhole steps shall be standard safety type, aluminum forged of 6061-76 alloy having a minimum tensile strength of 200 MPa. Spacing to be no more than 400 m on center for the full depth of manhole;
- All joints shall be sealed with rubber gaskets conforming to ASTM C443 and grouted inside and outside with non-shrink grout;
- Manholes shall be fitted with the appropriate cast-iron frame and cover conforming to Class 20 ASTM A48 as shown on the Standard Drawings;
- Pre-benched manhole bases shall be used wherever possible with pre-cored connection holes and water-tight Duraseal or G-Loc joints or approved equal;
- Tee-riser manholes shall conform to CSA 257.2/ASTM C76 (pipe components) and CSA A257.4/ASTM C76 for the manhole riser component;
- Aluminum safety platforms shall be required in all manholes with a depth greater than 5 m. See Standard Drawings.

4.15.4 Bedding Materials

Granular material for bedding of pipes in sound dry soils shall be Class B sand conforming to Table 4.5:

Table 4.5
Acceptable Bedding Material Gradation

Standard Sieve Size (µm)	*% Passing*
10 000	100
5 000	50 – 100
2 000	30 – 90
400	10 – 50
80	0 - 10

In high water table areas with poor soils, course granular or washed rock shall be used.

5 Storm Drainage Systems

5.1 GENERAL

These standards cover the minimum requirements for storm drainage systems. The requirements are to be in accordance with the Town of Millet Drainage System Assessment (2017). For each storm drainage system development shall be designed for proposed land use and ultimate drainage basin and shall be dependent on the type of development, the drainage area, and the length of surface drainage runs. Drawings relating to the storm drainage system construction, trenching and backfilling are provided in the Municipal Development Standard Drawings.

5.2 STORMWATER MANAGEMENT PLAN

Stormwater runoff generated from within the subdivision shall be routed through a stormwater management facility to regulate the rate of outflow to a controlled rate equivalent to 2.5 liters per second, per hectare (2.5 L/s/ha) or better.

Stormwater management facilities shall be designed in accordance with current Alberta Environment Design Standards as published by Alberta Environment.

Prior to submission of any detailed design, a stormwater management plan shall be prepared by the Developer subject to approval by the Town of Millet. The stormwater management plan shall be consistent with the Standards outlined herein, and shall:

- Be in accordance with the Town of Millet Drainage System Assessment;
- 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 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, man-made or a combination of both;
- Provide details of required stormwater retention/detention facilities;
- Provide details of water quality enhancement facilities;
- Identify all licensing requirements as may be required by Alberta Environment.

5.3 MINOR SYSTEMS

The Minor System shall consist of pipes, open channels and water courses that convey peak flows of a 5-year return period rainfall event with ponding of water to a depth no greater than 300 mm of depression at drainage inlets.

5.4 MAJOR SYSTEMS

- The Major System shall consist of surface flood paths, roadways, parkways and water courses which are designed to convey flows of a 100-year return frequency. The system shall include culverts crossing roadways;
- Major System Conveyance elements shall be designed to accommodate runoff rates and volumes for a 100-year return period rainfall event such that:

    - The depth of peak flows and ponding in developed area streets, conveyance channels and swales are to be limited so that major system flows will not constitute a significant hazard to the public or result in significant erosion or other property damage;
    - The maximum water surface level of surface flows and ponding in streets is below the lowest anticipated landscape grade or opening at any adjacent buildings, with a freeboard provision generally in the order of 300 mm with a minimum of 150 mm;
    - Depths of flow and ponding are less than 300 mm in roadways and other public rights-of-way;
    - For arterial roadways, the water depth at the crown of the road shall not exceed 150 mm.

5.5 DESIGN FLOWS

Design flows shall be computed using one or more of the following methods:

5.5.1 Rational Formula

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

Where Q = Design flow in m3/s
A = Drainage area in ha
I = Rainfall intensity in mm/hr
C = Runoff coefficient

The rational formula is allowable for the minor system storm sewer main design for watersheds (less than 50 ha) which discharge into detention facilities or other outlets approved by the Town of Millet.

5.5.2 Hydrograph Methods

Computer modelling shall be used for stormwater drainage design for:

- Residential and commercial/industrial development areas greater than 50 hectares in size;
- Any development requiring storage or detention facilities;
- Alternatively, computer modelling may be used for areas smaller than those outlined above;
- Storage or detention facilities shall be sized based on most critical rainfall event, four (4) hour modified Chicago or 24 hour Huff distribution.

Acceptable computer models are the SWMM/XPSWMM or MOUSE models. Other models shall be approved by the Town prior to design.

5.6 COEFFICIENT OF RUNOFF

The coefficients of runoff for return periods shall be taken from Table 5.1:

Table 5.1
Recommended Runoff Coefficients for Storm Drainage Design

	Imperviousness	*Rational Method C*	
Land Use	*%*	*1:5 Year*	*1:100 Year*
Parks/Playgrounds	10	0.25	0.35
Schools/Institutional	40	0.45	0.55
Residential - low density	40	0.45	0.55
Residential - medium density	60	0.60	0.70
Residential - high density (Multi-Family)	70	0.70	0.75
Light Industrial	70	0.70	0.75
Commercial	90	0.85	0.90
Paved Areas	100	0.90	0.95
Grassed Areas	0	0.15	0.30
Agricultural areas	0	0.10	0.30

5.7 RATE OF PRECIPITATION

The most updated rainfall curves available for the area of development should be selected for design purposes.

The 5-year frequency curve shall be used for all minor systems. The 100-year frequency curve shall be used for major systems.

The maximum inlet time shall be ten (10) minutes for residential and commercial land use area and fifteen (15) minutes for industrial land use areas.

5.8 SITE AND LOT GRADING

The following criteria shall be used:

- Each lot shall be graded to drain to the municipal storm drainage system, independently of adjacent lots;
- Areas around buildings shall be graded away from the foundations to prevent flooding. See Standard Drawings for typical grading requirements;
- Lots lower than adjacent roadways are not permissible in urban areas;
- To provide basic positive drainage until a lot is developed, the lot(s) shall be rough graded, allowing for earth balancing of future basement excavation and landscaping;
- Buildings shall be above the Major System hydraulic grade line for a 100-year storm event plus a minimum of 0.6 m freeboard. Note: may not apply to replacement of structures/developments within existing flood plains. In these areas, suitable precautions such as mounting electrical panels above the 1:100 year level shall be taken.
- It is the sole responsibility of the developer to ensure that improvements completed in the proposed area do not negatively impact adjacent land, including private and public property, roadways, and laneways. All impacts to adjacent properties need to be identified and presented to the Town of Millet, and consent must be given by the Town of Millet and the impacted landowners prior to completing any work.

5.9 STORM SERVICES

Storm services shall discharge to a storm sewer system. Storm mains shall be designed to collect storm service flows produced from basement sump pump discharge.

Sump pumps in basements shall have a pressure discharge connection to a storm service riser pipe at the outside of the building foundation and a storm service connection pipe from the riser connection at the house to the property line are required, see Standard Drawings. The pressure discharge connection to the gravity storm service riser pipe shall be provided with a cleanout and an overflow discharge to a concrete splash pad. Installation and maintenance of these on-lot components are the responsibility of the homeowner.

The following criteria shall be used:

- Under no circumstances shall a storm service be discharged to the sanitary system;
- Preferably, the depth of the storm service should match that of the sanitary sewer service at the property line, 2.85 m from invert to proposed finished grade. Otherwise, the minimum depth of the storm service shall be 1.5 m from top of service pipe to finished grade at the property line. If the storm service minimum depth cannot be achieved, a storm servicing plan shall be submitted to the Town for approval;
- Size the storm main to provide the capacity in free flow based on all connected sump pumps operating simultaneously;
- Pipe materials shall be restricted to:

    - PSM type PVC to CSA Standard B182.2 PVC Sewer Pipe and Fittings (PSM Type) with locked-in elastomeric ring gasket and integral bell system joint type with a minimum wall thickness as required for Standard Dimensional Ratio 35.

5.10 ROOF DRAINAGE

- Roof drainage from one-family and two-family dwellings shall be discharged to the ground and dispersed via splash pads at the downspouts. No connections to the storm or sanitary service are permitted;
- Roof drainage from apartment buildings and commercial/industrial areas may discharge to the storm sewer where the new and existing systems are designed to accommodate the direct discharge and only if approved by the Town.

5.11 FLOW CAPACITIES

5.11.1 Storm Sewers and Open Channels

Using Mannings Formula $Q = \frac{AR^{0.667} S^{0.5}}{n}$

Where Q = Design flow in m^3/s
A = Cross sectional area in m^2
R = Hydraulic radius (area/wetted perimeter) in m
S = Slope of hydraulic grade line in m/m
n = Roughness coefficient
= 0.013 for all smooth-walled pipe
= 0.024 for corrugated steel pipe (unpaved)
= 0.020 for corrugated steel pipe (invert paved)
= 0.020 for gravel lined channels
= 0.015 for concrete or asphalt lined channels
= 0.05 for natural streams and grassed channels

5.11.2 Culverts

Use the inlet control and outlet control methods referred to in:

- The Handbook of Steel Drainage and Highway Construction Products, by the American Iron and Steel Institute;
- The Handbook of Concrete Culvert Pipe Hydraulics by the Portland Cement Association.

5.12 PIPE LOCATION

- See Standard Drawings for typical location within road right-of-way;
- Storm service connections should be located adjacent to sanitary service connections at property line and shall be as shown on the Standard Drawings;
- Minimum separation of storm sewer from water mains:
    - 3.0 m horizontally;
    - 0.5 m vertically above or below water pipe;
- Minimum separation of storm sewer from sanitary sewer: 3.0 m horizontally.

5.13 MINIMUM DEPTH OF COVER

The minimum depth of cover shall be as follows:

• Storm sewers	minimum 1.8 m to invert for pipes
• Culverts:	minimum 1.0 m to obvert
• Catch basin leads at the catch basin:	minimum 1.4 m to obvert

5.14 MINIMUM PIPE DIAMETER

• Storm Sewers connected to storm services only	200 mm
• Storm Sewers connected to catch basins	300 mm
• Culverts	600 mm
• Catch Basin Leads	250 mm
• Storm Services	100 mm

5.15 FROST PROTECTION

If minimum depth of cover for underground storm sewer system pipe cannot be achieved, pipe shall be insulated per Standard Drawings detail.

5.16 MINIMUM VELOCITY AND GRADE

- All storm sewers shall be designed with mean velocities, of 0.90 m/s, and a maximum velocity of 3.0 m/s, based on Manning's formula, when flowing full. Mean velocities below 0.60 m/s will not be allowed.

- Storm sewers with velocities in excess of 3.0 m/s must be designed appropriately to protect against displacement of sewers by erosion or shock.

The minimum grades are as follows; steeper grades are desirable:

Pipe Size mm	*Minimum Grade, %*
200	0.40 (storm services only)
250	0.28 (storm services only)
300	0.22
375	0.15
450	0.12
525	0.10
600 and Larger	0.10

5.17 CURVED SEWERS

For storm sewers aligned in a curve, the minimum slopes shall be permitted for various sewer sizes are as follows:

- Maximum joint deflection shall be as recommended by the pipe manufacturer;
- Curved sewers shall be aligned parallel to the road centreline.

Pipe Size mm	*Minimum Grade, %*
200	0.40 (storm collector mains only)
250	0.31 (storm collector mains only)
300	0.25
375	0.18
450	0.15
525	0.13
600 and Larger	0.10

5.18 MANHOLES

- The obvert of the downstream pipe shall not be higher than that of the upstream pipe;
- A smooth transition will be provided between the inverts of incoming sewers and the outlet sewers. Extreme changes in elevation at manholes will be avoided;
- Minimum drop in invert levels across manholes to account for energy loss:
    - Straight runs – 10 mm drop minimum;
    - Deflections up to 45° - 30 mm drop minimum;
    - Deflections 45° to 90° - 50 mm drop minimum;
- Deflections greater than 90° shall be accommodated using two (2) or more manholes;
- Where drops greater than 1.0 m cannot be avoided, a specifically designed drop manhole will be required to address the hydraulic requirements of the change of elevation. Considerations include:
    - The pipe shall be of sufficient size so that it does not surcharge;
    - A smooth vertical curve shall be formed between the inlet pipe and the drop shaft with no breaks in grade, projections, or edges;
    - The drop shaft diameter shall be equal to or greater in size than that of the largest inlet pipe. For multiple connections, a larger drop shaft shall be supplied;
    - Air vent to be provided at the crown of the outlet pipe downstream of the drop structure to allow removal of air released at the lower connection. This vent is to be located upstream of the point where full flow in the outlet pipe is anticipated under design flow conditions. The air vent may be connected to the shaft vent system;
    - The cover shall be able to withstand pressures from air discharge and surcharging;
    - The outlet shall provide a hydraulic jump basin to dissipate energy, to convert the flow to sub-critical velocity, and to allow for air release;
- Baffled vertical drop shafts are not permitted due to potential maintenance and access problems. Vortex type drop shafts are preferred. Proposals to use vortex type drop shafts must be supported by the appropriate design calculations and approved by the Town.

5.19 MANHOLE SPACING

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

The maximum distance between manholes shall be 120 m maximum for sewers 900 mm and smaller, and 150 m for sewers larger than 900 mm.

For curved sewers, manhole spacing shall be 90 m maximum for sewers 1200 mm and smaller, and 120 m for sewers larger than 1200 mm.

5.20 CATCH BASINS

- Catch basins shall be of sufficient number and have sufficient inlet capacities and adequate catch basin leads to receive and convey the calculated stormwater flow;
- Catch basins shall be provided to intercept surface runoff and shall be spaced a maximum of every 120 m. The maximum distance to first catch basin shall be 120 m;
- Catch basins shall be a minimum of 900 mm diameter, see Standard Drawings;
- All catch basin bodies shall be poured in place or precast concrete sections conforming to the most recent ASTM specifications and constructed so as to provide a 500 mm sump to trap rocks and gravel;
- Catch basin leads shall be installed to provide a minimum depth of cover, from the design finish grade, of 1.4 m to obvert unless otherwise approved. The minimum slope on catch basin leads shall be 2% and a maximum length of 30 m;
- All catch basin leads shall discharge directly into stormwater manholes;
- Catch basin installation shall be upstream of any crosswalk whenever possible;
- Catch basin leads greater than the 20.0 m in length will use 300 mm diameter pipes;
- Catch basin neck section and catch basin frame shall be installed within 50 mm of plumb with catch basin shaft.

Frame & Cover Type	*Curb Type*	*Min. Barrel Size (mm)*	*Allowable Application*
F-36	Straight Face	900	Catch basins only
F-36A	Straight Face	1200	Catch basin manholes only
F-39 Round Top	No Curb	900	For off roadway locations or temporary inlets on roadways
K-7	80 mm rolled face	900	Current preferred inlet for residential areas
DK-7	80 mm rolled face	900	Preferred for residential areas where additional capacity is needed
F-38	No Curb	900	Lanes, swales, gutters and curb ramps
F-51 (no side inlet)	No Curb	900	For situations requiring increased capacity of F36
F-51 (with side inlet)	Straight Face	900	Situations requiring increased capacity over F51

5.21 CULVERTS AND DRAINAGE

The minimum allowable ditch grade shall be 0.5%. Ditch grades in excess of 2.0% shall be protected against erosion through ditch checks dams, silt fences, Enviroberm fences and/or erosion control blankets.

The minimum ditch bottom width shall be 1.5 m, sloping away from the roadway at a minimum of 5.0%.

Culvert size requirements shall be determined through the stormwater drainage analysis however, the minimum size culverts shall be as follows:

- Roadway cross culvert 600 mm
- Residential approach culvert 400 mm
- Industrial approach culvert 600 mm

Culverts shall be of approved material 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 and shall be installed complete with 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 500 mm or one-half (½) the culvert diameter, whichever is greater, as measured from the finished shoulder grade of the roadway to the top of the culvert.

Riprap shall be placed around the inlet and outlet of all culverts. Riprap 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 riprap installations are illustrated in the Standard Drawings.

5.22 PIPE, MANHOLE AND BEDDING MATERIALS AND SPECIFICATIONS

5.22.1 Pipe Materials

Pipe shall comply with the specifications in Table 5.2:

Table 5.2
Acceptable Pipe Materials

Material	*Range (mm)*	*Specification*
Reinforced Concrete	300 and up	CAN/CSA A257 Class 3 min.
PVC	200 to 900 mm	ASTM D3034 Min. Class DR35
Open Profile (PVC)	400 to 900 mm	CSA-B182.4, 320 kPa pipe stiffness AASHO-M-36 (Storm only)
Corrugated Steel Culverts	400 and up	

Pipe shall be jointed with rubber gaskets or gasketed fittings or couplings.

5.22.2 Manholes

- Manholes shall be manufactured using sulphate resistant Type HS cement;
- Manhole sections shall be precast reinforced concrete sections conforming to ASTM C478 and CSA A257.4;
- Manhole steps shall be standard safety type, aluminum forged of 6061-76 alloy having a minimum tensile strength of 200 MPa;
- All joints shall be sealed with rubber gaskets conforming to ASTM C443 and grouted inside and outside with non-shrink grout;
- Manholes shall be fitted with the appropriate cast iron frame and cover conforming to Class 20 ASTM A48 as shown on the Standard Drawings. All castings shall be true to form and dimensions, free from faults, sponginess, cracks, blowholes, or other defects affecting their strength;
- Pre-benched manhole bases shall be used wherever possible with pre-cored connection holes and water tight Duraseal or G-Loc joints or approved equivalent;
- Tee Riser manholes shall conform to CSA 257.2/ASTM C76 (pipe components) and CSA A257.4/ASTM C76 (manhole riser component);
- Aluminum safety platforms shall be required in all manholes with a depth greater than 5.0 m. See Standard Drawings.
- Manhole frame and cover shall be NF-80, F-39 or approved equivalent.

5.22.3 Bedding Material

Bedding material shall be Class B sand bedding in accordance with the Standard Drawings and gradation specified under Item 4.14.4.

5.22.4 Outfall Structures

- For all outfalls, it is required that a hydraulic analysis be completed to ensure that the exit velocities will not damage natural watercourses. Final velocities into a natural drainage course shall not exceed 1.5 m/s;
- Appropriate erosion control measures, including energy dissipaters, are to be provided downstream of the outfall to prevent erosion;
- All sewer outlets shall be constructed with lockable grates to allow maintenance but prevent entrance of unauthorized personnel. Where required, guardrails and/or fences shall be installed to provide fall protection;
- Outfall structures shall be designed with consideration of aesthetics, as they are generally located within parks, ravines, and on channels. Concrete surface treatment is recommended.

5.23 MAJOR SYSTEMS

Major stormwater management systems must meet with current Alberta Environment Design Standards as published by Alberta Environment. Prior to final submission to the Town of Millet for approval, all stormwater management plans need to be submitted to Alberta Environment and all applicable third party approvals must be received and included in the final submission to the Town of Millet. Refer to the "Application Form and Guide for Registration to Construct and Operate a Municipal Storm Drainage System" as published by the Government of Alberta.

5.24 EROSION AND SEDIMENTATION CONTROL

All storm drainage systems, including storage facilities, pipe outlets and other drainage channel outlets or overflows, shall be designed to control erosion that may result from piped or overland stormwater flows and discharge into the storm drainage system.

6 Water Distribution Systems

6.1 GENERAL

These standards cover the requirements for water distribution systems. This section also covers the design and construction of watermains and accessories to be built in the Town of Millet. Drawings relating to the construction of water distribution systems, trenching and backfilling are provided in the Municipal Development Standard Drawings.

This section provides the minimum acceptable standard for general construction requirements, construction materials, and construction procedures. These standards may be exceeded wherever appropriate. Good engineering practices and designs must prevail on all projects.

6.2 DESIGN FLOW

- The waterworks system shall be designed in accordance with the Alberta Environment guidelines as part of the overall municipal distribution system. The system shall be capable of delivering the peak day demand plus fire flow, or the peak hour flow - whichever is greater. Velocities at maximum flows shall not exceed 1.5 meter per second;
- The rate of water demand shall be determined by the land use density basis of either the ultimate subdivision design population in the Outline Plan or if population is unknown: 45 persons per hectare, or 3.5 persons per residential unit, whichever is greater. The minimum per capita water demands for the Town are as follows:

    - Average Daily Demand = 360 litres/capita/day (L/c/d)
    - Peak Daily Demand = 2.0 times average daily demand
    - Peak Hour Demand = 3.0 times average daily demand

- Commercial and industrial areas shall be designed on the basis of equivalent population subject to the peak daily demand and peak hourly demand multipliers.

  The equivalent populations are as described in section 4.2 Design Flow for sanitary systems

- Fire flows shall be in accordance with the recommended Standards of the Insurance Bureau of Canada. Typical requirements are:

Land Use	*Flow Rate (L/s)*	*Duration (Hours)*
Residential - Single Family	92	1.5
Residential - Multi-Family	303	2.0
Residential - High Density	303	4.0
Commercial	227	3.0
Industrial	227	3.0
Commercial Business District/Institutional	303	4.0

Confirm the required flows for these and other types of construction with the latest edition of Fire Underwriters Survey "Water Supply for Public Fire Protection."

In instances where automatic sprinkler systems are to be installed in residences, the distribution and/or storage systems must consider the additional demand resulting from these fixtures.

6.3 DESIGN COMPUTATIONS

Use the Hazen-Williams formula:

$$Q = CD^{2.63}S^{0.54} \times 278.5$$

Where
- Q = Rate of flow in L/s
- D = Internal pipe diameter in m
- S = Slope of hydraulic grade line in m/m
- C = Roughness coefficient 125 for all mains

Minimum pressure at peak demand	= 273 kPa
Minimum pressure with automatic sprinklers	= 350 kPa
Maximum allowable pressure	= 690 kPa
Minimum fire pressure at main	= 140 kPa

Network analysis shall be by the Hardy-Cross method or a suitable computer program.

6.4 MINIMUM MAIN PIPE DIAMETER

- Single Family Residential = 200 mm
- Multi-Family Development = 250 mm
- Industrial/Commercial = 250 mm

Main sizes may be increased as considered necessary by the Infrastructure Services Department to accommodate future development.

Temporary blow off valve may be required, dependent upon construction staging, at the discretion of the Town. See Standard Drawings.

6.5 DEAD ENDS

Except in cul-de-sacs of less than 300 m length, all watermains shall be looped. A Hydrant must be provided at the end of all cul-de-sacs greater than 300 m in length and dead end watermains. Dead end roads terminating in cul-de-sacs shall not be greater than 300 m in length if they are servicing residential lots.

6.6 PIPE LOCATION

Minimum horizontal separation of watermains from sanitary or storm sewers shall be 3.0 m and from power, telephone, or gas services shall be 3.0 m; minimum vertical separation shall be 0.5 m from all sewer mains.

All watermains are to be installed 3.0 m from the centreline of the roadway.

6.7 MINIMUM DEPTH OF COVER

Minimum cover to be 3.0 m below finished grade to obvert and shall be of sufficient depth to:

- Prevent freezing;
- Clear other underground utilities.

6.8 FROST PROTECTION

If minimum depth of cover for underground water distribution system cannot be achieved, pipe shall be insulated per Standard Drawings detail.

6.9 VALVING

In general, valves shall be located as follows:

- In intersections at projected property lines:
    - Three (3) valves at cross intersection;
    - Two (2) valves at tee intersection;
- Not more than two (2) hydrants isolated;
- A maximum of four (4) valves will be closed to isolate any one section;
- A maximum of 30 lots cut off from the water supply in all areas.

6.10 HYDRANT LOCATION

Fire hydrants shall be located at street intersections and spaced as follows:

- In accordance with "Water Supply for Public Fire Protection - A Guide to Recommended Practice" published by Public Fire Protection Survey Services;
- Location to be 2.0 m back from curb, 0.5 m from property line, no closer than 1.0 m to back of walk, and 3.0 m from franchise utilities (pedestals, transformers, street lights, etc);
- No more than 180 m apart in residential areas;
- No more than 100m from a dwelling;
- No more than 90 m apart in a commercial/industrial area.

6.11 SERVICE CONNECTION

See Standard Drawings for service connection installation details.

- Water and sanitary services in a common service trench shall have the following minimum horizontal separation from other services:

    - 50 mm diameter or less = 0.2 m
    - Greater than 50 mm diameter = 2.0 m
    - Separate trenches required for services 100 mm diameter or larger

- Water service connection pipes shall have minimum 2.85 m cover at the property line. Services shall extend 4.0 m past property line, or 2.0 m past the shallow utility easement;
- Locate water service curb stops as per Standard Drawings, outside of hard surface areas (driveways, concrete pads, etc).

6.12 THRUST BLOCKING

Concrete thrust blocking (Type HS Cement) shall be provided at bends, tees, wyes, reducers, plugs, caps, hydrants and valves as per the Standard Details.

6.13 CHAMBER DRAINAGE

Chambers or manholes containing valves, blow-offs, meters or other appurtenances shall not be connected directly to a storm drain or sanitary sewer, nor shall blow-offs or air release valves be connected to any sewer. Such chambers or manholes shall be drained to the surface by gravity where they are not subjected to flooding by surface water or to absorption pits underground where it is above the groundwater table or pumped to a storm or sanitary sewer. They shall be insulated to prevent freezing where necessary and shall also be sealed to prevent groundwater infiltration.

6.14 DISINFECTION AND FLUSHING

All disinfection and flushing of new water mains will be the responsibility of the Developer. Test procedure reports and approved sample results shall be forwarded to the Town of Millet for review. For test procedure requirements see 9.6.2.

6.15 HYDRO STATIC PRESSURE TESTING – SEE SECTION 9.6

6.16 MATERIALS

6.16.1 Pipe

Table 6.1 lists specifications for acceptable pipe materials and approved PVC materials are listed in Section 6.16:

Table 6.1
Acceptable Water Pipe Materials

Material	*General Size Range (mm)*	*Specification*
Polyvinyl Chloride (PVC)	150 to 300 400 to 900	AWWA C900, DR 18 AWWA C905, DR25

6.16.2 Fittings and Hardware

Cast Iron Fittings	-	AWWA C110 1.03 MPa (Class 150) working pressure
PVC Fittings	-	150 to 300 mm CSA B137.2 (Class 150), AWWA C907
	-	400 to 900 mm: CSA 137.3 (Class 150), AWWA C905
Flanged Joints	-	Class 125, ANSI B16.6, B16.5 flat-faced
Bolts and Nuts	-	Stainless Steel, Type 304, wrapped with Denso paste and tape

6.16.3 Cathodic Protection

- Cathodic protection for buried non-steel metallic fittings, valves and hydrants:
    - All buried non-steel metallic fittings and valves shall be cathodically protected with 2.3 kg zinc anodes;
    - All hydrants shall be cathodically protected with 5.5 kg zinc anodes. See Standard Drawings;
    - Zinc anodes shall conform to ASTM B418-73;
- All copper services 50 mm diameter and smaller shall have a 5.5 kg zinc anode attached to the copper service pipe. See Standard Drawings.

6.16.4 Bedding

Bedding material for pipes shall be Class B sand, conforming to the Standard Drawings and the gradation specified under Item 4.14.4.

6.16.5 Trench Section

See Standard Drawings for trenching.

6.16.6 Fire Hydrant

- Approved materials are listed in Section 6.16. Hydrants are to be complete with a breakaway flange and a 300 mm minimum spool piece. See Standard Drawings;
- The minimum hydrant connection size shall be a 150 mm hub end;
- The minimum cover shall be 3.0 m;
- Drain outlets shall be plugged when ground water is encountered during construction;
- Hydrants shall have two (2) 65 mm hose connections and one (1) 100 mm Storz pumper connection as presently used in the community;
- Hydrant will have threads conforming to the Alberta specifications;
- Hydrant main spindles shall turn to the left (counter clockwise) to open;
- A gate valve shall be provided on each connection between a hydrant and main;
- Hydrants shall be enamel painted to CAN/CGSB-1.59. Town of Millet hydrants are to be all yellow in colour;
- All bolts and nuts must be stainless steel, type 304;
- Hydrants shall be cathodically protected. See Standard Drawings;
- Hydrant ground flange shall be 50 mm above design grade.

6.16.7 Gate Valves

- Gate valves shall be in accordance with AWWA C509 and the following supplementary data:
- Gate valves shall have an iron body, bronze mounted, and are to be cathodically protected;
- Valves shall be resilient seat gates with non-rising stem, to open by turning in a counter-clockwise direction;
- Valve ends shall be provided to fit the pipe. Where flanged valves are used, they must be accompanied by flexible couplings;
- The position of the valve in line shall be vertical;
- Stem seals shall be o-ring;
- Valve boxes with operating stem and nut are required on all valves. All valve boxes shall be sliding Norwood Foundry Type A. PVC lower section of valve boxes are acceptable;
- Dresser style 450 mm diameter butterfly valves suitable for buried installation may be considered as an approved alternative, subject to written approval of the General Manager, Engineering Services on main sizes >400 mm;
- All bolts and nuts will be stainless steel, type 304;

- All gate valves larger than 350 mm shall have a bypass built into the body of the valve;
- All valve boxes are to be adjusted such that the top of the valve box is 10-15 mm below the finished design grade at the proposed roadway or flush with any concrete work.
- Valve boxes are to include a 150 mm cast iron or PVC Type 'A' sliding sleeve, complete with operating extension stem to provide for 600mm adjustment flexibility, rock disc and 25mm square steel valve spindle. Cast iron to be asphaltic coated.

6.16.8 Service Connections

- Water Service Pipe:
    - Approved Materials are listed in Section 6.16;
    - Service connections shall be copper pipe, Type K;
    - Couplings shall be Standard Brass, compression type;
    - Unsprinklered dwelling: 19 mm or 25 mm for services less than 30 m in length
      Sprinklered dwelling: 50 mm
      Multi-family/commercial: sized accordingly
- Water Service Fittings:
    - Approved materials are listed in Section 6.16;
    - Curb stop will be copper to copper invert and key stop and drain;
- Service Connection Reports:
    - The Developer's Consultant shall provide detailed record drawings for all installed service connections with such drawings providing pipe diameter, elevation, and location relative to property line(s) and lot number;
- Water service connections in new subdivisions shall be installed from the water main to 4.0 m inside the property line or 2.0 m past the shallow utility easement.

6.17 APPROVED MATERIALS

Polyvinyl Chloride (PVC) Water Pipe			
Manufacturer	***Model/Type***	***Size (mm)***	***Remarks***
Ipex	Blue Brute	100 to 300	AWWA C900, DR18
Ipex	Centurion	450 to 900	AWWA C905, DR25

Fire Hydrants			
Manufacturer	***Model/Type***	***Lead Size***	***Remarks***
Canada Valve Darling	Century	150	AWWA C502

Service Saddles			
Manufacturer	***Model/Type***	***Size (mm)***	***Remarks***
Robar	2616, 2626, 2706	100 to 600	AWWA C800

Main Stops			
Manufacturer	***Model/Type***	***Size (mm)***	***Remarks***
Cambridge Brass	301 Series	20 to 50	AWWA C800
Mueller	B2500 Series	20 to 50	AWWA C800

Water Service Unions			
Manufacturer	***Model/Type***	***size (mm)***	***Remarks***
Cambridge Brass	118 Series	20 to 50	AWWA C800 Compression Ends
Mueller	300 Series	20 to 50	AWWA C800 Compression Ends
Curb Stops – Select Connections to Suit Service Tubing Material			
Manufacturer	***Model/Type***	***size (mm)***	***Remarks***
Cambridge Brass	202 Series	20 to 50	AWWA C800 Compression Ends

Mueller	B-25209 Series	20 to 50	AWWA C800 Compression Ends

Service Pipe			
Manufacturer	***Model/Type***	***Size (mm)***	***Remarks***
Wolverine/Cerro/Halstead	Type K Copper	20 to 50	Third Party Certified to ASTM B88

Service Boxes Including Chairs and Rods			
Manufacturer	***Model/Type***	***Size (mm)***	***Remarks***
Norwood Foundary	Complete Service	20, 25	See Standard Drawings
Norwood Foundary	Complete Service	40, 50	See Standard Drawings

7 Franchised Utilities

7.1 GENERAL

All work necessary for the installation of power, gas, street lighting, telephone, and cable television shall be the responsibility of the Developer and the installation of these utilities will be a condition of development. In addition to the financial responsibilities, the Developer must initiate and coordinate the design, approval, and construction of these services as well as register all easements required in the name of the Town of Millet.

7.2 DESIGN STANDARDS

7.2.1 Location of Utilities

Unless otherwise approved by the Town of Millet, all gas, power, telephone and cable television distribution lines and service connections shall be installed in preferred locations as per the standard cross section details.

For all urban applications, power shall be underground. For isolated rural applications where the installation of buried power may not be practical, above ground power may be acceptable to the Town.

All distribution cables for primary and secondary power, telephone, cable television and street light feeders, may be installed in one common 300 mm wide trench at the required alignment.

Street lights shall be placed at location not interfering with proposed driveways and services and be located in line with the extensions of common property lines between two lots.

The face of the posts, poles, pedestals and transformers shall be at least 1.0 m clear of the face of the curb.

7.2.2 Separation From Other Utilities

The franchised utilities shall be separated from the deeper municipal utilities (i.e. water and sewer) by not less than 3.0 m laterally.

A separation of 1.2 m from other franchised utilities is also required, common (three-party) trench installations excepted.

7.2.3 Compaction of Trenches (refer to Section 11)

All trenches located on municipal property or within municipal easements are to be compacted to the following standards:

- 95% Standard Proctor Density for trenches in boulevards and landscaped areas;
- 97% Standard Proctor Density for base materials in roads;
- Restore to a minimum depth of 200 mm of 100% Marshall Density for Asphaltic Concrete Pavement in roads.

7.2.4 Rights-of-Way, Easements, and Public Utility Lots

The Developer shall provide, to the satisfaction of the utility companies, rights-of-way, easements and public utility lots (PUL's) to accommodate the utility servicing, registered in the name of the Town of Millet.

Easements shall be registered on each lot prior to the sale of any lot in the development area.

8 Landscaping and Fencing

8.1 GENERAL

One of the responsibilities of developing land in the Town of Millet is the landscaping of boulevards, buffer strips, utility lots, walkways, medians, public service land and recreation land.

Landscaping involves site preparation, establishment of a grass cover, planting and the installation of park furnishings.

This division covers all requirements for a complete landscaping package that is to be presented to the Town. Materials procedures and maintenance are also covered.

8.2 LANDSCAPE PLANS

Landscape plans shall show clearly both hard and soft landscape development. All plans shall show clearly both existing and proposed development.

8.2.1 Hard Landscape Drawings

- Site Plans - Layout Plans

  Layout plans shall indicate clearly the exact location of:

  - Buildings;
  - Roads;
  - Concrete and paving stone walks;
  - Asphalt/Gravel Trails;
  - Retaining walls, fencing and screens;
  - Underground services required for completion of the contract;
  - Site furnishings - benches, lighting, etc.;
  - Existing features to be retained;
  - Irrigation systems if applicable.

- Details - Working Drawings

  Detail drawings will be required to explain the working details of the Site Layout Plan. Drawings to include details for paving, benches, lights, fencing, walls, etc.

- Grading Plans

  Grading plans shall include:

  - Existing contours, including spot elevations, boundary conditions, road elevations and drainage outlets for surface water;
  - Proposed contours;
  - Proposed final spot elevations of strategic locations:

    - Corners of paved areas;
    - Top of curbs;
    - Top and bottom of steps, retaining walls and slopes;
    - Ground elevation of all structures;
    - Drastic changes in grade;

  - Direction of proposed surface drainage and drainage districts;
  - Cross sections and profiles where appropriate.

8.2.2 Soft Landscaping

Landscaping plans shall include:

- Location of trees, shrubs and planting beds
- Areas to be seeded, sodded or requiring special treatment
- A list of plant materials giving:

  - Keys to planting plan;
  - Quantity of individual species;
  - Botanical name and common name;
  - Size of material - height and calliper;
  - Method of transport, i.e. balled and burlap, container stock; bare root, etc.;
  - Canadian Plant Hardiness Zone.

8.3 ROUGH GRADING

- Rough grading shall be carried out without damage to the root and branch systems of existing plant material.
- All sites requiring topsoil shall be rough graded within 150 mm of final grade - for topsoil accommodation.
- The maximum allowable slope for all new hills and berms shall be 4:1, unless otherwise approved by the Town of Millet. 3:1 slopes will be acceptable in areas on minimal pedestrian traffic and on drainage side slopes. 3:1 slopes must be approved by the Town.

The Developer shall register a lot grading caveat against all lots within the subdivision prior to Final Acceptance Certificate issuance for surface improvements.

8.4 PLANT MATERIAL

- All plant material shall be of first grade quality, free from insects, disease and physical injury, shall have a strong fibrous root system and must be structurally sound. All plant material shall have straight stems, well and characteristically branched for the species. All plant material shall conform to the Horticultural Standards for nursery stock of the Canadian Nursery Landscape Associates (Canadian Standards for Nursery Stock).
- At the time of inspection and final acceptance, the plant material shall:
    - Be planted and staked;
    - Exhibit two (2) years of healthy growth to the satisfaction of the Town.

8.5 UNIFORM FENCING

- Pressure treated wood fencing shall be constructed adjacent to the following locations:
    - Arterial Roadways;
    - Town owned lands- e.g. Firehall sites;
    - Multifamily sites;
    - Neighborhood Commercial Sites;
    - Institutional Sites and;
    - Other areas as required by the Town of Millet;

  No stain shall be applied on locations identified above;

- Chain link fencing and gates shall be installed where playgrounds, parks and school sites are adjacent to residential properties;
- Gates shall be located approximately at the mid-point of each lot and shall open inwards onto private property;
- Wood rail fencing may be approved by the Town for selected park or walkway areas;

8.6 LANDSCAPE MAINTENANCE

- During 2-year warranty period, Contractor is responsible for landscape maintenance for seeded and sodded areas including watering, mowing, and weeding as required. Seeded and sodded areas shall be mowed minimum twice (2) per year during warranty period. Landscaped areas that fail to germinate due to failure to perform landscape maintenance shall be replaced at the cost of the Contractor.

9 Testing Procedures

9.1 GENERAL

It shall be the responsibility of the Consulting Engineer to ensure that the Contractor properly tests all aspects of each project. A quality control plan shall be provided to the Town of Millet prior to work commencing.

The Developer shall submit all test data performed by the accredited testing company to the Town on an on-going basis and prior to issue of the Construction Completion Certificate.

Failure to receive test results will be considered sufficient cause for not accepting such work.

9.2 MATERIALS TESTING - ROADWAYS

Subgrades, construction materials and construction standards shall be verified with a representative number of standard tests.

The Developer shall forward copies of such test results on an ongoing basis to the Town and prior to issuing the Construction Completion Certificate.

The Developer shall engage a qualified materials testing consultant to take representative samples of all materials to be incorporated in the pavement structure, prepare mix designs for approval by the Town, and to carry out quality control testing during construction.

9.3 MATERIALS TESTING - TRENCH BACKFILL FOR SHALLOW AND DEEP UTILITIES

9.3.1 Trench More than 15 m in Length

A minimum of two (2) density tests per 600 mm of trench depth per 100 m of length. The tests shall be representative of the entire length, width and depth of trench backfill, including around catch basins, manholes, valves and service connections.

9.3.2 Trench Less than 15 m in Length

A minimum of three (3) density tests evenly spaced through depth of trench. For service connection trenches, at least one (1) additional (fourth, or more) density test shall be taken between the back of curb and separate walk over each service connection line within the uppermost 0.5 m as measured from final finished grade.

9.4 TESTING – SANITARY SEWERS

Testing of installed pipes shall depend on the elevation of existing ground water and shall consist of at least one of the following tests:

9.4.1 Video Inspection Test

A televised inspection of the sewer system shall be carried out by the Developer at the end of construction and prior to the Construction Completion Certificate inspection. Any deficiencies found during this test shall be promptly remedied by the Developer at his own expense. A digital copy or USB device shall be submitted with all data in colour format only, and of acceptable clarity, and quality, along with inspection reports and summaries of the visual inspection, shall be supplied to the Town prior to issuing the Construction Completion Certificate.

The report shall also include the location of all service connections together with a statement of opinion as to whether or not the service connections are leaking.

9.4.2 Testing of Force Mains

Force mains shall be tested as described for watermains in 9.6.1.

9.5 TESTING - STORM SEWERS

Testing of installed pipe shall consist of the following:

- Visual checking between manholes to ensure proper alignment and grade of pipe;
- Visual checking for joint leaks where access is possible;
- Visual checking for pipe cracks where access is possible;
- Video inspection of the entire sewer system by the Developer at the end of construction;
- All testing and repair of deficiencies found during the testing shall be rectified by the Developer at his own expense.

All the results of acceptable tests shall be supplied to the Town.

9.6 TESTING - WATERMAINS

9.6.1 Pressure and Leakage Test

- Test completed mains after services are installed, backfill is complete, and at least five (5) days after placing concrete for thrust blocks and in accordance with AWWA Standards.
- Test in sections containing no more than 500 m.
- Fill the system with water and expel air at services and hydrants. Install temporary taps wherever necessary to expel air and plug after completion.
- Apply test pressure by means of a test pump with a measurable volume container.

- The Town of Millet shall witness all pressure tests.

9.6.1.1 Pressure Testing PVC Pipe

- Maintain test pressure for a period of two (2) hours. Test pressure shall be the greater of 1035 kPa (150 psi) or 1.5 times the normal operating pressure.
- For testing PVC sanitary forcemains (Section 9.4.2), the pressure shall be the greater of 690kPa or 2.0 times the normal operating pressure.
- Table 9.2 outlines a leakage allowance chart. This chart forms the basis for testing all watermains.

Table 9.2
Leakage Allowance Time
Leakage Allowance in Litres per 100 Joints Per Hour

Pipe Size	*Test Pressure (kPa)*	
	690	***1035***
150 mm	3.10	3.76
200 mm	4.09	5.02
250 mm	5.14	6.27
300 mm	6.14	7.52
350 mm	7.20	8.78
400 mm	8.18	10.00
450 mm	9.24	11.28
500 mm	10.22	12.56

Above leakage allowances have been calculated from the following formula from the AWWA Manual No. M23 (PVC Pipe – Design and Installation):

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

where: L = allowable leakage in L/hr
N = total number of joints
D = pipe diameter in mm
P = square root of the test pressure in kPa.

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

9.6.1.2 Pressure Testing HDPE Pipe

The test procedure consists of two steps. The initial expansion phase and the test period. In order to accommodate the initial expansion of the main under test, the following shall be done:

- Fill the line with water and pressurize to 1.5 times the Standard Pressure Rating of the main. Test pressure shall be 1035 kPa for DR11 HDPE pipe. All air shall be expelled from the line during filling of the test section.
- Add sufficient make-up water to the main at hourly intervals to return the main to the test pressure. The initial expansion shall be done for a three (3) hour period so the main shall be repressurized three (3) times during this phase.
- After the third repressurization, the test period shall begin. No make-up water shall be added to the main until the end of the test period which shall be one (1) to three (3) hours long. At the end of the three (3) hours, a measured quantity of make-up water shall be added to the main to repressurize it to the test pressure. The amount of make-up water shall not exceed the volume allowance for expansion given below.
- Allowance for expansion under test pressure in litres for each 100 m of pipe at 23°C.

Nominal Pipe Diameter in mm	*1 Hour Test*	*2 hour Test*	*3 Hour Test*
75	1.2	1.9	3.1
100	1.6	3.1	5.0
150	3.7	7.5	11.2
200	6.2	12.5	18.7
250	8.7	16.2	26.2
300	13.7	28.7	42.4
350	17.4	33.7	52.4
400	21.2	41.1	62.3
450	27.4	53.6	81.0
500	33.7	68.6	99.7
550	43.6	87.3	130.9
600	56.1	111.0	165.8

The amount of make-up water shown in the table above should be multiplied by the appropriate correction factor taken from below for the pipe temperature at the time of testing.

Temperature (°C)	*Correction Factor*
0	0.22
2	0.24
4	0.28
6	0.32
8	0.36
10	0.42
12	0.47
14	0.53
16	0.59
18	0.66
20	0.74
22	0.87
23	1.00
24	1.20

- Under no circumstances should the total time under test exceed eight (8) hours at 1.5 times the pressure rating. If the test is not completed due to leakage, equipment failure or any other reason with this time period, the test section shall be permitted to "relax" for an additional eight (8) hour period prior to starting the next testing sequence.
- Locate and repair defects if leakage is greater than amount specified. Repeat test until leakage is within specified allowance for the test section.

9.6.2 Flushing and Disinfection

- Flushing and Disinfection is the responsibility of the Developer;
- Boundary valves are only to be operated by Town of Millet personnel;
- The method of disinfection shall conform to AWAA Standard C651-05- Disinfecting Water Mains;
- Chlorine products must be NSF/ANSI 61 certified products for potable water use.

10 Abandoning Existing Infrastructure

10.1 MANHOLES

For manhole abandonment, plug all pipes with non-shrink grout, remove and dispose of manhole to 1.0 m below ground and fill with fillcrete.

10.2 CATCH BASINS

For abandonment of catch basins follow procedure for abandonment of manholes.

10.3 ABANDONED SERVICE CONNECTIONS

Abandoning existing service connections will be completed at property line. The water service CC is to be closed and the rod cut off 1.2m below finished grade. Sanitary services are to be disconnected at property line and cased in concrete. Documentation must be provided to the Town of Millet referencing existing property pins, sidewalks, underground infrastructure, and other street furniture to properly locate the abandoned service.

Appendix 'A' – Standard Drawings

ROADWAYS

3-01 24.0m Arterial ROW
3-02 20.0m Collector ROW no Frontage
3-03 20.0m Collector ROW with Frontage
3-04 Asphalt Trail
3-05 Lane or Commercial Crossing
3-06 Industrial/Commercial Curb & Gutter Crossing
3-07 Residential Crossing
3-08 Typical Monolithic Lane or Driveway Crossing
3-09 Ramp Locations
3-10 Types of Ramps
3-11 Pinned Concrete Curb
3-12 150mm STD. Curb and 250mm Gutter
3-13 150mm STD. Curb and 500mm Gutter
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3-15 1200mm/1500mm/1800mm Monolithic Sidewalk
3-16 1200mm/1500mm/1800mm Rolled Monolithic Sidewalk
3-17 1200mm/1500mm/1800mm Separated Sidewalk
3-18 500mm/1000mm Concrete Drainage Swale
3-19 Asphalt Speed Bump

SANITARY SEWER

4-01 Sanitary Riser

STORM SEWER

5-01 Storm Catch Basin Assembly C/ W 500mm Sump
5-02A Strom Catch Basin Neck (1 of 2)
5-02B Storm Catch Basin Neck (2 of 2)
5-03 Catch Basin Manhole
5-04 Manhole
5-05 Interior Drop Manhole Detail
5-06 Manhole Safety Platform
5-07 Preached Manhole
5-08 T-Riser Manhole
5-09 Catch Basin Frame & Grate Insolation (150 Curb & 250 Gutter)
5-10 Typical Dry Pond Detail
5-11 Typical Dry Pond Detail

5-12 Typical Construction Wetland Detail
5-13 Constructed/Engineered Wetland Zones
5-14 Typical Oil Grit Interceptor
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WATERMAINS

6-01 Off-line Hydrant Detail
6-02 Off-line Hydrant Detail
6-03 Typical Anode Installation at Valved Iron Fitting & Hydrants
6-04 Main Valve Casing Detail
6-05 Water Service Riser Detail
6-06 Thrust Block Details

TRENCH AND BACKFILL

9-01 Trench Detail
9-02 Pipe Bedding Details
9-03 Water, Storm and Sanitary Insulation Requirements

Appendix 'B' – Forms

Construction Completion Certificate
Final Acceptance Certificate
Request for a Variance to the Engineering Standards

Appendix 'C' – Revision Log

This section details changes made to the Municipal Development Standards.

- March 2022 – Municipal Development Standards Updated including updates to Appendix A – Standard Drawings

Town of Millet - Policy #51

Minimum Design Standards

Prepared for

Town of Millet

Prepared by

UMA Engineering Ltd.

17007 - 107 Avenue

Edmonton Alberta T5S 1G3

ADOPTED BY COUNCIL RESOLUTION 10th DAY OF MARCH, 2004

MAYOR _____

March 2004

TOWN OF MILLET
MUNICIPAL SERVICING STANDARDS

Dated: March 2004

TABLE OF CONTENTS

A SUBMISSION STANDARDS

A1 Design Drawings

A1.1 General

.1 All detailed engineering plans submitted for review and approval must comply with the specifications stated herein.

A2 Required Engineering Drawings

The drawings identified shall clearly highlight the detail as indicated.

A2.1 Cover Sheet

.1 This shall show the name of the subdivision, stage of development and names of the Developer, Planner and Consulting Engineer.

A2.2 Index Plan

.1 This plan shall be prepared on a scale of 1:1000 or a reduction thereof to fit the standard size A-1 sheet (594 mm x 841 mm) and shall indicate that portion of the street which relates to a particular plan/profile sheet.

.2 This sheet shall list each drawing included in that particular set of drawings. Each drawing name is to be listed sequentially along with its corresponding drawing number. Also included on this plan shall be a key plan in sufficient detail to show the location of the project with respect to major roads and built-up centres.

A2.3 Legal, Easement and Land Use Plan

.1 This plan shall indicate proposed land uses in the project along with existing and/or proposed land use on adjacent properties.

.2 All legal and easement information shall be shown on this plan.

A2.4 Road, Sidewalk and Storm Sewer Plan

.1 This plan shall indicate all walks, lanes, road and right-of-way widths and alignments, catch basin locations, the storm sewer system, the direction of overland flow on the streets and local drainage areas which contribute to the storm sewer system.

A2.5 Lot Grading Plans

.1 The plan shall highlight the following:

.1 the proposed finished lot corners, mid lot and house elevations, the direction of flow of surface drainage on the lot, proposed curb alignments, all required rear and side yard swales and sewer connection inverts at the property line,
.2 bench marks used in the construction of the project,
.3 existing contours shown at 0.5 metre intervals,
.4 the overland major drainage system including ponding areas and depths resulting from a 1:100 year storm, and
.5 elevation of services at the property line for each lot.

A2.6 Sanitary Sewer and Water Main Plan

.1 This plan shall indicate the alignments and locations of mains, size of mains, grade and directions of flow, and location of appurtenances such as manholes, valves, cleanouts, etc.

.2 Indicate location of sanitary and water services.

A2.7 Plan/Profile and Standard Detail Drawings

.1 The Plan/Profile and Standard Detail Drawings shall be drawn to avoid clutter and promote clarity and legibility.

END OF SECTION

B ROADS

B1 Geometric Design Standards

B1.1 General

.1 Road classification and designation shall be in accordance with the classification system outlined in the Transportation Association of Canada (TAC) Manual - Geometric Design Standards for Canadian Roads and Streets.

.2 Individual street classification is to be based on functional use.

.3 The Developer is responsible to make sure that the infrastructure is designed and constructed to achieve life expectations consistent with good design and construction practice.

B1.2 Road Right-of-Way

.1 The right-of-way shall be adequate width to accommodate the road, sidewalks, boulevards, underground utilities, streetlighting, etc., in an acceptable manner.

.2 Minimum right-of-way requirements are as follows:

Lanes .....6 metres
Cul-de-Sacs .....18 metres
Residential Streets.....18 metres
Collector Streets.....24 metres
Arterial Streets .....30 metres

B1.3 Road Width

.1 Road widths shall be designed to satisfy traffic requirements. Minimum requirements are as follows:

Lanes .....5 metres
Cul-de-Sacs .....10 metres
Residential Streets.....10 metres
Collector Streets.....13 metres
Arterial Streets .....15 metres

The road width is measured from curb face to curb face.

B1.4 Vertical Alignment

.1 Grade

.1 The minimum grade shall be 0.5% along all gutters and around curb returns.
.2 The maximum grade shall be 6.0%.
.3 All roads shall be crowned at a minimum slope of 3.0% or 150 mm, whichever is greater, and a maximum of 4.0%.

.2 Vertical Curves

.1 All vertical curves shall be designed to meet the minimum requirements as shown in Table B1.

TABLE B1

Design Speed (km/hr)	K Value	
	Crest (m)	Sag (m)
50	7	6
60	15	10

Where: K = L/A
L = Length of Vertical Curve in metres
A = Algebraic Difference in Grade Percent

.2 The minimum length of a vertical curve shall be 30 metres.
.3 Vertical curves are not required where the algebraic difference in the grades is less than 1.5.

B1.5 Horizontal Alignment

.1 Curves

.1 The minimum degree of curvature is dependent on the classification and its design speed.
.2 All horizontal curves shall be designed to meet the minimum design requirements as shown in Table B2.

TABLE B2

Classification	Minimum Radius of Curve (m)	Maximum Tangent Length (m)	Maximum Gradient (%)	Intersection Spacing (m)
Cul-de-Sac	90	30	6	60
Residential	90	60	6	60
Collector	130	60	6	60
Arterial	450	60	5	400

NOTES:
1. See TAC B-16 for superelevation requirements on arterials.
2. Design speeds are 60 km/h, except for arterials which are 70 km/h.

B1.6 Survey Control Markers and Legal Pins

.1 Existing Control

.1 The Developer or their Consultant shall make every effort to protect existing markers.

.2 Markers which are destroyed or disturbed shall be replaced by the Developer at his sole expense.

.2 Legal Posts

.1 Front lot legal posts shall be clearly marked with a flexible marker post extending a minimum of 1.0 metre above grade at initial posting of the subdivision.

.2 The Developer shall instruct the legal surveying consultant to replace any missing or disturbed posts as required by the Town of Millet. All costs are to be borne by the Developer.

B2 General Requirements

B2.1 Pavement Structure

.1 The Geotechnical Report for the proposed project shall be submitted to the Town of Millet for review as part of the overall submission.

.2 The Geotechnical Report must include specific recommendations for pavement structure construction based on in situ conditions and projected traffic volume. The stronger of the structure recommended by the Geotechnical Consultant and the structure shown in Table B3 shall be used.

.3 Table B3 indicates the minimum thicknesses of granular and asphaltic concrete materials required for each street classification. Note that a minimum subgrade preparation of 150 mm is required in every case. The subgrade and base gravel must be compacted to 100% Standard Proctor Density.

.4 Alternative pavement designs of equivalent strength along with supporting material, may be submitted to the Town of Millet for review and approval prior to construction.

TABLE B3				
	Road Structure			
Street Classification	Hot Mix Asphalt (mm)	Granular Base Course (mm)	Granular Subbase (mm)	Subgrade Preparation (mm)
Residential Lane	N/A	150	N/A	150
Residential Street	50 (initial) 35 (after 1 year)	250	N/A	150
Collector	50 (initial) 35 (after 1 year)	300	N/A	150
Arterial	75 (initial) 35 (after 1 year)	250	300	150

B2.2 Sidewalks and Walkways

.1 Separate sidewalks shall be a minimum width of 1.2 metres. Separate sidewalks shall be constructed on all collector roadways and may also be used on local residential streets.

.2 Paraplegic ramps are to be used at all curbed intersections and shall be constructed monolithically or securely dowelled.

.3 All sidewalks shall be imprinted with the Contractor's stamp showing company name and year of construction. Frequency of stamps shall be one per residential block or every 200 metres, whichever is less.

.4 Sidewalks shall be imprinted with a "CC" to identify all CC locations.

.5 All concrete structures are to be adequately reinforced. All concrete structures require a minimum compressive strength of concrete at 28 days of 30 MPa. In all, concrete air entrainment by volume shall be a minimum of 5.5% and a maximum of 8%. The subgrade and base gravel under concrete structures must be compacted to 100% Standard Proctor Density.

.6 The design of the subdivision should consider pedestrian needs and allow for walkways through cul-de-sacs and other appropriate locations, if necessary.

B2.3 Concrete Curb and Gutter

.1 Concrete curb and gutter shall be constructed on all streets.

.2 Vertical face curb and gutter is to be used on all arterial roads. All roads fronting parks, public utility lots (other than emergency accesses), and walkways shall also require vertical face curb and gutter unless another means of preventing vehicular access onto these public lands is provided.

.3 Curb returns on residential street intersections shall be constructed with a minimum radius of 8.0 metres.

.4 Curb returns in industrial/commercial areas shall be constructed with a minimum radius of 15.0 metres to accommodate truck turning movements.

.5 Local residential streets, collectors and cul-de-sacs will be low profile curb.

.6 All concrete curbs and monolithic curbs and walks shall be constructed with the same subgrade structure as the adjacent road. The structure is to extend 300 mm beyond the back of curb or walk.

.7 Concrete curbs and gutters may not be required in developments designed as County Residential.

B2.4 Driveways

.1 Residential subdivision lot layout shall be such that driveways shall not access directly onto arterial roadways.

.2 All driveways shall be constructed to provide a minimum clearance of 1.5 metres from any structure including hydrants, light standards, service pedestals, curb cocks and transformers.

.3 No driveways or any portion thereof shall be permitted to access an abutting road through a curb return area.

.4 For corner lots, the driveway zone must be indicated for the street of lesser traffic only.

B2.5 Utility Trenches

.1 In all new subdivisions, it shall be the Developer's responsibility to make sure that utility trenches are adequately compacted. In existing subdivisions, the utility companies shall be responsible to ensure adequate compaction in utility trenches for any new installations or modification of existing lines.

Required Compaction	Backfill Zone
A. Under proposed road, lane, walk, streetlight or similar structure and within a distance from such structure equal to trench depth:	
100% of one-mould	From designated subgrade elevation or existing ground level, whichever is lower, to 1.5 m below.
97% of one-mould	More than 1.5 m below.
B. Under existing improved road, lane, walk or similar structure or proposed widening thereof:	
95% of standard	From existing subgrade elevation to 1.5 m below.
97% of one-mould	More than 1.5 m below.
C. Adjacent to existing improved road, lane, walk, streetlight or similar structure and within a distance from the improvement equal to trench depth:	
92% of standard	Through full depth of trench.
D. Under existing or proposed underground sewer, water, gas or pressure pipeline or other utilities:	
100% of one-mould	From designated subgrade elevation or existing ground level, whichever is lower, to 1.5 m below.
97% of one-mould	More than 1.5 m below.

Moisture Content Requirements

The maximum permitted moisture contents for compacting backfill, based on one mold proctor test, are shown below:

Maximum Moisture Content	Backfill Zone
A. Conventional Trenching Techniques:	
Plastic Limit + $\frac{\text{(Plasticity Index)}}{3}$ to a maximum of 8% above Plastic Limit	From designated subgrade elevation, or existing ground level, whichever is lower, to 1.5 m below.
Plastic Limit + $\frac{\text{(Plasticity Index)}}{3}$ to a maximum of 10% above Plastic Limit	More than 1.5 m below.
B. Uniform Backfill:	
Plastic Limit + $\frac{\text{(Plasticity Index)}}{2}$ to a maximum of 10% above Plastic Limit	From designated subgrade elevation, or existing ground level, whichever is lower, to 1.5 m below.
Plastic Limit + $\frac{\text{(Plasticity Index)}}{2}$ to a maximum of 10% above Plastic Limit	More than 1.5 m below.

.2 The Developer is responsible to coordinate locations of shallow utility crossings of roadways with the respective utility company. All shallow utilities are to be contained in conduit of appropriate size and number for all roadway crossings.

B2.6 Street Signs

.1 High intensity reflective material is required for the lettering and background for all signage.

.1 Lettering sizes shall be as follows:

100 mm collector roadways
75 mm collector and local roadways.

.2 All street name signs shall be of theme design approved by the Town of Millet.

.2 Traffic control signage will be required at all intersections.

END OF SECTION

C SANITARY SEWERAGE SYSTEM

C1 Design Factors

C1.1 General

.1 The sanitary sewerage system shall be of sufficient capacity to carry peak flows plus infiltration. The factors outlined in the following sections shall be used in the design of sanitary sewerage systems.

.2 The Developer and the Developer's Consultant are responsible to make sure that the infrastructure is designed and constructed to achieve design life expectations consistent with good design and construction practice.

C1.2 Average Flows

.1 Residential - 320 litres/day/capita.

.2 Commercial/Industrial - 6.0 m^3/ha/day.

.3 In determining residential flows, a minimum of 3.5 persons per household shall be used.

C1.3 Peaking Factor

.1 The peaking factor shall be calculated on the Harmon Formula. The minimum peaking factor shall be 3.0.

.2 The peaking factor must reflect the projected population of the subdivision being designed.

C1.4 Velocities

.1 Minimum flow velocity - 0.60 m/s.

.2 Maximum flow velocity - 3.0 m/s.

C1.5 Manning's "n" Value

.1 Pipe sizing shall be determined by utilizing Manning's Formula using a minimum "n" value of 0.013.

C1.6 Weeping Tiles

.1 Weeping tiles and similar appurtenances shall not be permitted to discharge into sanitary sewers.

C1.7 Infiltration Allowance

.1 The design of the sanitary sewer system must provide for peak extraneous flow. A minimum allowance of 0.28 L/s/ha must be incorporated into the design.

C2 Materials

C2.1 Sewer Mains

.1 The minimum pipe size shall be 200 mm inside diameter.

.2 Pipe for sewer mains shall conform to one of the following:

Material	Class
PVC Pipe	ASTM D3034 Minimum Class DR35.
PVC Pipe Fittings	To comply with the Alberta Labour Plumbing and Gas Safety Standards for fabricated PVC DWV fittings 200 mm through 600 mm minimum Class DR35.

C2.2 Materials

.1 Manhole sections shall be precast reinforced concrete sections conforming to ASTM C478, latest revision thereof.

.2 All manholes shall normally be 1,200 mm inside diameter.

.3 Manhole steps shall be standard safety type, hot dipped galvanized iron or aluminum.

.4 All joints shall be sealed with rubber gaskets and grouted outside.

.5 Manhole frames and covers shall be cast iron conforming to Class 20 ASTM A48, latest revision thereof.

.6 Manhole bases shall be precast slabs, concrete poured bases, vaults or precast tees.

.7 Concrete for manholes and appurtenances shall be sulphate resistant with a maximum slump of 75 mm and minimum 28 day strength of 25 MPa.

.8 Safety platforms shall be required in all manholes with a depth greater than 6.0 metres.

C3 Installation

C3.1 Sewer Mains

.1 Mains shall be installed to provide a minimum depth of cover to obvert of 3.00 metres below the final finished surface grade.

.2 Class "B" pipe bedding shall be provided for all mains.

.3 Minimum gradients on straight runs shall conform to Alberta Environment Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems, latest edition.

C3.2 Manholes

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

.2 The maximum distance between manholes shall not exceed 120 metres.

.3 Inverts in manholes shall have a minimum 25 mm drop for straight run sewer manholes. At changes in direction, manholes shall have at least 40 mm fall across the manhole in the direction of flow from inlet to outlet elevation.

.4 Backfill around manholes shall be compacted with mechanical tampers to a minimum of 98% Standard Proctor Density.

.5 Internal drops are required for invert grade differences greater than 1.0 metre in sanitary sewer manholes.

C3.3 Curved Sewers

.1 Curves sewers shall be in accordance with manufacturer's guidelines.

.2 The curve shall run parallel to the curb or street centreline.

.3 The minimum grade for sewers on a curve shall be 50% greater than the minimum grade required for a straight run of sewer.

.4 Manholes shall be located at the beginning and end of each curve and intermediate locations as required.

C3.4 Compaction in Trench

.1 In all new subdivisions, it shall be the Developer's responsibility to make sure that utility trenches are adequately compacted. In existing subdivisions, the utility companies shall be responsible to ensure adequate compaction in utility trenches for any new installations or modification of existing lines.

Required Compaction	Backfill Zone
A. Under proposed road, lane, walk, streetlight or similar structure and within a distance from such structure equal to trench depth:	
100% of one-mould	From designated subgrade elevation or existing ground level, whichever is lower, to 1.5 m below.
97% of one-mould	More than 1.5 m below.
B. Under existing improved road, lane, walk or similar structure or proposed widening thereof:	
95% of standard	From existing subgrade elevation to 1.5 m below.
97% of one-mould	More than 1.5 m below.
C. Adjacent to existing improved road, lane, walk, streetlight or similar structure and within a distance from the improvement equal to trench depth:	
92% of standard	Through full depth of trench.
D. Under existing or proposed underground sewer, water, gas or pressure pipeline or other utilities:	
100% of one-mould	From designated subgrade elevation or existing ground level, whichever is lower, to 1.5 m below.
97% of one-mould	More than 1.5 m below.

Moisture Content Requirements

The maximum permitted moisture contents for compacting backfill, based on one mold proctor test, are shown below:

Maximum Moisture Content	Backfill Zone
A. Conventional Trenching Techniques:	
Plastic Limit + $\frac{\text{(Plasticity Index)}}{3}$ to a maximum of 8% above Plastic Limit	From designated subgrade elevation, or existing ground level, whichever is lower, to 1.5 m below.
Plastic Limit + $\frac{\text{(Plasticity Index)}}{3}$ to a maximum of 10% above Plastic Limit	More than 1.5 m below.
B. Uniform Backfill:	
Plastic Limit + $\frac{\text{(Plasticity Index)}}{2}$ to a maximum of 10% above Plastic Limit	From designated subgrade elevation, or existing ground level, whichever is lower, to 1.5 m below.
Plastic Limit + $\frac{\text{(Plasticity Index)}}{2}$ to a maximum of 10% above Plastic Limit	More than 1.5 m below.

C3.5 Inspection and Testing

.1 Video camera inspection reports shall be conducted on each sewer line and tapes shall be provided to the Town of Millet. Tapes used in the video reports shall be in colour and compatible with VHS viewing equipment.

C3.6 Service Connections

.1 The minimum size of a sanitary sewer service connection to a single family dwelling shall be 100 mm inside diameter. Each lot shall have its own separate sanitary service connection. The minimum grade on the service line shall be 2.00%. The maximum length shall be limited to 15.0 metres from the main to the property line.

.2 The minimum size of a sanitary sewer service connection to a multi-family dwelling shall be 150 mm inside diameter. Each lot shall have its own separate sanitary service connection. The minimum grade on the service line shall be 1.00%. The maximum length shall be limited to 15.0 metres from the main to the property line.

.3 Connection to a main sewer line shall be by means of a wye fitting. Saddles are allowed only for service connections to existing mains. T-fitting service connections for sanitary sewer will be allowed provided they discharge into the top half of the main.

.4 Service pipe shall be PVC DR28 building service pipe conforming to CSA Specification B 182.1, latest revision thereof.

.5 Minimum depth of cover shall be 2.70 metres to the obvert at the property line.

.6 Where sewer services are required to connect to mains in excess of 4.50 metres deep, risers shall be installed.

.7 Sewer services shall be extended beyond the property line and terminate 3.0 metres inside the lot. All services shall be properly capped.

.8 All sewer services shall be installed using Class "B" bedding.

.9 Red painted stakes of 50 mm x 100 mm size shall be extended from the end of the service connection to a minimum of 0.50 metres above ground level.

.10 Services shall be placed so that when facing the lot from the street the water service shall be on the right side of the sewer service.

.11 Services shall be located in a position such that they do not conflict with driveway locations.

END OF SECTION

D WATER DISTRIBUTION SYSTEM

D1 Network Analysis

.1 The Developer shall perform a hydraulic network analysis for the proposed development unless the Town of Millet approves otherwise.

.2 The criteria for network analysis shall be as follows:

.1 The maximum value of "C" in the Hazen-Williams Formula shall be 120, regardless of pipe material, for diameters less than 250 mm.

.2 The minimum diameter for distribution mains shall be 150 mm for residential development unless one or more hydrants are located on the line, in which case the minimum diameter shall be 200 mm. For commercial/industrial development, the minimum water main size shall be 250 mm.

.3 Per capita design consumption:

.1 Average Day Demand - 350 litres/day
.2 Maximum Day Demand - 1.8 x Average Demand
.3 Peak Hour Demand - 3.0 x Average Demand.

.4 Design population shall be the ultimate population for the area under construction.

.5 An analysis shall be made for peak hour demand and the mains shall be sized such that there shall be a minimum residual pressure of 280 kPa at ground level at any node in the network.

.6 A separate analysis shall also be made for maximum day demand plus a fire flow of 12,000 litres per minute at a node adjacent to a high value property, e.g. school or shopping centre. The minimum residual pressure at any node in the system shall be 140 kPa at ground level under this situation.

.7 Fire flow conditions within a residential area shall be analyzed using the criteria contained in the most recent edition of Fire Underwriters Survey. The Developer must take into consideration the architectural control features (i.e. house size and shake roofs) which may impact on the fire flow requirements.

.8 All calculations, schematic diagrams, computer printouts, etc., shall be submitted together with the design plans.

.9 New subdivisions shall be designed and constructed such that the water distribution and transmission systems through the area shall be looped.

.10 Distribution lines must all be looped except those serving single residence cul-de-sacs of less than 120 metres.

D2 Materials

D2.1 Water Mains

.1 Minimum Size - 150 mm for Residential Cul-de-sacs, 200 mm for Residential and 250 mm for Commercial.

.2 Pipe materials for use in the water main system shall conform to applicable CSA, AWWA and ASTM recommendations. Pressure ratings for the water main pipe shall be determined by the applications and conditions the pipe shall be subjected to.

.3 Pipe material shall be polyvinyl chloride C-900 Class 150 DR-18.

D2.2 Hydrants

.1 Hydrants shall be of a style and make acceptable to the Town of Millet and shall:

.1 be compression type conforming to AWWA Specification C502, latest revision, for dry barrel fire hydrants,
.2 include two 63 mm hose nozzles with AMA thread connection,
.3 include one pumper connection with 100 mm "Storz" connection,
.4 have hydrant body painted fire red in colour,
.5 hydrants shall be Canada Valve Century Model,
.6 hydrant buried components to be asphaltic coated,
.7 all hydrants shall be cathodically protected with a 5.5 kilogram zinc anode.
.8 All bolts shall be stainless steel.

D2.3 Valves

.1 Gate Valves

.1 Valves shall be iron body resilient seated gate valves with a non-rising spindle, which opens by turning in a counter clockwise direction. All valves shall conform with AWWA Specification C509, latest revision, for operation and materials.
.2 Cast iron, asphalt or epoxy coated valve boxes shall be required on all valves.

.3 Extension stem to be 25 mm square mild steel with 50 mm operating nut and flange suitable for 3.0 metre bury.
.4 All valves shall be cathodically protected with a 2.3 kilogram zinc anode.
.5 Valve boxes shall be Type "A" sliding.
.6 All bolts to be stainless steel.

D2.4 Service Connections

.1 Service pipe shall be of Type K copper or Kie-Tec AWWA 800.

.2 Residential services shall be 20 mm diameter unless the length of the service, measured from the main to the property line, is greater than 20.0 metres in which case 25 mm diameter shall be used. Non-residential service connections shall be sized according to anticipated user requirements.

.3 Corporation main stop shall be compression type conforming to ASTM C800. Stainless steel service clamps with double stainless steel straps shall be used with all main stops for services larger than 25 mm. Corporation main stops shall be left in an open position.

.4 Curb stop shall be copper to copper curb ball valve with stop and drain.

.5 Curb stop boxes shall be epoxy coated or galvanized and the rod shall be stainless steel.

D3 Installation

D3.1 Water Mains

.1 Minimum depth of cover shall be 2.7 metres to the obvert below finished ground elevation.

.2 Class "B" granular sand bedding shall be used for all water mains except where otherwise approved by the Town of Millet.

D3.2 Compaction in Trench

.1 In all new subdivisions, it shall be the Developer's responsibility to make sure that utility trenches are adequately compacted. In existing subdivisions, the utility companies shall be responsible to ensure adequate compaction in utility trenches for any new installations or modifications of existing lines.

Required Compaction	Backfill Zone
A. Under proposed road, lane, walk, streetlight or similar structure and within a distance from such structure equal to trench depth:	
100% of one-mould	From designated subgrade elevation or existing ground level, whichever is lower, to 1.5 m below.
97% of one-mould	More than 1.5 m below.
B. Under existing improved road, lane, walk or similar structure or proposed widening thereof:	
95% of standard	From existing subgrade elevation to 1.5 m below.
97% of one-mould	More than 1.5 m below.
C. Adjacent to existing improved road, lane, walk, streetlight or similar structure and within a distance from the improvement equal to trench depth:	
92% of standard	Through full depth of trench.
D. Under existing or proposed underground sewer, water, gas or pressure pipeline or other utilities:	
100% of one-mould	From designated subgrade elevation or existing ground level, whichever is lower, to 1.5 m below.
97% of one-mould	More than 1.5 m below.

Moisture Content Requirements

The maximum permitted moisture contents for compacting backfill, based on one mold proctor test, are shown below:

Maximum Moisture Content	Backfill Zone
A. Conventional Trenching Techniques:	
Plastic Limit + $\frac{\text{(Plasticity Index)}}{3}$ to a maximum of 8% above Plastic Limit	From designated subgrade elevation, or existing ground level, whichever is lower, to 1.5 m below.
Plastic Limit + $\frac{\text{(Plasticity Index)}}{3}$ to a maximum of 10% above Plastic Limit	More than 1.5 m below.
B. Uniform Backfill:	
Plastic Limit + $\frac{\text{(Plasticity Index)}}{2}$ to a maximum of 10% above Plastic Limit	From designated subgrade elevation, or existing ground level, whichever is lower, to 1.5 m below.
Plastic Limit + $\frac{\text{(Plasticity Index)}}{2}$ to a maximum of 10% above Plastic Limit	More than 1.5 m below.

D3.3 Inspection and Testing

.1 Prior to the initial acceptance of the project, all water mains shall be tested for leakage in accordance with AWWA C603, latest revision.

.2 Prior to the initial acceptance of the projects, water mains are to be disinfected in accordance with AWWA C651, continuous feed method. Procedural method of disinfection includes chlorine concentration calculations and contact times to be submitted to the Town of Millet for acceptance. Upon completion of the disinfection, one bacteria sample is to be submitted for each 200 linear metres of water main installed unless otherwise approved by the Town.

.3 Prior to initial acceptance of the project, bacteriological testing shall be carried out on all water mains.

D3.4 Hydrants

.1 Maximum allowable spacing between fire hydrants shall be 140 metres in single family residential areas and 90 metres in multiple family residential, school or industrial/commercial areas.

.2 Hydrants shall be set so that the bottom flange is approximately 50 mm above final ground elevation at the hydrant.

.3 Hydrants must have breakaway flanges installed at the base of the body and must not extend below the ground grade line.

.4 Installation shall be at the beginning of the curve of the curb return at the corners of intersections or at the extension of property lines.

.5 Hydrants are to be 0.6 metres clear of curb lines and 0.15 metres clear of back of sidewalk.

.6 In cul-de-sacs of 75 metres in length or less, the hydrant shall be installed at or near the intersection of the intersecting street.

.7 In cul-de-sacs of more than 75 m in length, a hydrant shall be installed at the end of the cul-de-sac.

D3.5 Valves

.1 Distribution main valves shall be located as follows:

.1 on the projection of property lines.

.2 Distribution main valves shall be located such that in the event of a shutdown:

.1 no more than two hydrants are taken out of service,
.2 no more than four valves are required to affect a shutdown,
:3 maximum length of a dead end line is 120 metres,

.4 no more than 25 single family units are involved in the shutdown, and

.5 commercial sites loop the main feeder with at least one valve on the loop.

.3 Valves on hydrant leads are to be located in the boulevard area. All hydrants must be separated from the distribution system by a valve located 1.0 metre from the hydrant. In areas where the water main is located in the back lane, the hydrant valves shall be located at the lane.

.4 Valve boxes, complete with operating extension stems and rock disk nut, are required on all valves.

.5 The top of the valve box is to be set 100 mm below final grade elevation on gravel areas and between 5 to 15 mm below finished grade on paved areas.

.6 The rock disk nut shall not be more than 600 mm below finished grade.

.7 Valves shall be of the same size as the main.

.8 Sliding type cast iron valve casing shall be installed over each valve.

.9 A water main in a cul-de-sac which exceeds 120 metres in length must be looped to an adjacent water main through a Public Utility Lot (PUL). The PUL should be a minimum of 4.0 metres wide with provision for a 1.0 metre easement on each side of the PUL.

D3.6 Water Service Connections

.1 Tapping for service connections shall be done with full operating pressure in the main unless otherwise approved by the Town of Millet.

.2 Each service connection shall be tapped into the upper portion of the water main at least 45 degrees from the vertical and utilize a corporation stop.

.3 Service pipe from the main to the curb cock shall be installed to provide a minimum depth of cover 2.7 metres below finished road grade.

.4 Curb cocks shall be located such that they do not conflict with driveway locations. Curb cocks are not to be placed in concrete driveways or sidewalks. Curb cocks shall be located 0.15 metres from the property line within the right-of-way.

.5 Each residential dwelling unit must have a separate service.

.6 Services shall be placed so that when facing the lot from the street, the water service shall be on the right side of the sewer service.

.7 The symbol CC shall be stamped in the sidewalk opposite the location of the curb cock.

.8 Water services shall be extended beyond the property line and terminate 3.0 metres inside the lot. All water service ends shall be wrapped with an approved filter fabric.

.9 A horizontal "goose neck" in the copper service shall be made at the corporation main stop.

END OF SECTION

E STORM DRAINAGE SYSTEM

E1 Minor System

E1.1 Design Criteria

.1 The Rational Method shall be used in the design of storm sewers as follows:

$$Q = CIA/360$$

Where Q = the quantity of runoff in cubic metres per second.
I = the intensity of rainfall in millimetres per hour.
A = the contributing area in hectares.
C = the runoff coefficient.

.2 Rainfall data shall be taken from the most current intensity-duration-frequency curves for the City of Edmonton Municipal Airport.

.3 The following runoff coefficients shall be used:

Land Use	Runoff Coefficient, C
Parks, Reserves and School Grounds	0.20
Residential Single Family	0.40
Residential Multiple Family	0.60
Residential High Density	0.70
Commercial	0.70
Industrial	0.70

.4 Maximum inlet time of 15 minutes shall be used. The use of longer inlet times requires the prior approval of the Town of Millet.

.5 The storm sewer shall be designed to accommodate the 5 year return storm without sewer surcharging.

.6 The minimum and maximum flow velocities in any sewer shall be 0.60 m/s and 3.0 m/s, respectively. Designs containing velocities in excess of 3.0 m/s shall require special provisions and the approval of the Town of Millet.

.7 Pipe sizing shall be determined by utilizing Manning's Formula using an "n" value of 0.013.

.8 Where groundwater levels are high, the Town may require separate storm sewer connections to each approved lot.

.9 Weeping tiles shall be connected to sumps, with pumped discharge directly to ground surface (splash pads are required to ensure positive drainage away from the house for a distance of 1.5 metres). Sump pump discharge lines to the ground surface shall be limited to 1.5 metres from the face of the building at the point of discharge to the rear of the lot. Other alternatives may be submitted to the Town of Millet for acceptance.

.10 The geotechnical report shall address weeping tile flows associated with a high groundwater table or other subsurface anomalies.

E2 Materials

E2.1 Sewer Mains and Leads

.1 Pipe for storm sewer mains shall be concrete pipe (sulphate resistant cement) conforming to ASTM C76 reinforced concrete pipe.

.2 Pipe for catch basin leads shall be PVC DR35 conforming to CAN B182.2 and ASTM D3034.

E2.2 Catch Basins

.1 Catch basin frames and covers shall be sized to provide sufficient inlet capacity.

E2.3 Manholes

.1 Manhole sections shall be precast reinforced concrete sections conforming to ASTM C478, latest revision thereof.

.2 Manhole frames and covers shall be cast iron conforming to Class 20 ASTM A48, latest revision thereof.

.3 Manhole steps shall be standard safety type, of hot dipped galvanized iron or aluminum.

E3 Installation

E3.1 Sewer Mains

.1 The minimum size for storm sewer mains shall be 300 mm inside diameter.

.2 Minimum depth of cover shall be 1.2 metres to obvert.

E3.2 Catch Basin Leads

.1 The minimum size of catch basin leads shall be 250 mm inside diameter.

.2 A catch basin manhole shall be required at the upper end of a catch basin lead if the lead exceeds 30 metres.

.3 The minimum grade on a catch basin lead shall be 1.00%.

.4 Minimum depth of cover shall be 1.2 metres to obvert.

.5 All leads shall be connected to a main line manhole or a catch basin manhole.

E3.3 Catch Basins

.1 The maximum distance between catch basins shall be 200 metres.

.2 Spacing and capacity of catch basins shall be such that ponding shall not occur during a 1:5 year storm. Road gutter flows shall not exceed 0.04 cubic metres per second per gutter between catch basins during a 1:5 year storm.

.3 The minimum inside diameter for a catch basin barrel shall be 600 mm.

.4 The minimum sump depth in a catch basin shall be 600 mm.

E3.4 Manholes

.1 The minimum size of storm manholes shall be 1,200 mm inside diameter.

.2 Manhole bases shall be precast slabs, concrete poured bases, vaults or precast tees.

.3 Tee riser manholes shall be used when the mains are over 1,050 mm inside diameter unless otherwise approved by the Town of Millet.

E3.5 Compaction in Trench

.1 Class "B" bedding material shall be compacted to a minimum 95% Standard Proctor Density.

.2 In all new subdivisions, it shall be the Developer's responsibility to make sure that utility trenches are adequately compacted. In existing subdivisions, the utility companies shall be responsible to ensure adequate compaction in utility trenches for any new installations or modification of existing lines.

Required Compaction	Backfill Zone
A. Under proposed road, lane, walk, streetlight or similar structure and within a distance from such structure equal to trench depth:	
100% of one-mould	From designated subgrade elevation or existing ground level, whichever is lower, to 1.5 m below.
97% of one-mould	More than 1.5 m below.
B. Under existing improved road, lane, walk or similar structure or proposed widening thereof:	
95% of standard	From existing subgrade elevation to 1.5 m below.
97% of one-mould	More than 1.5 m below.
C. Adjacent to existing improved road, lane, walk, streetlight or similar structure and within a distance from the improvement equal to trench depth:	
92% of standard	Through full depth of trench.
D. Under existing or proposed underground sewer, water, gas or pressure pipeline or other utilities:	
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The maximum permitted moisture contents for compacting backfill, based on one mold proctor test, are shown below:

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Plastic Limit + $\frac{\text{Plasticity Index}}{3}$ to a maximum of 10% above Plastic Limit	More than 1.5 m below.
B. Uniform Backfill:	
Plastic Limit + $\frac{\text{Plasticity Index}}{2}$ to a maximum of 10% above Plastic Limit	From designated subgrade elevation, or existing ground level, whichever is lower, to 1.5 m below.
Plastic Limit + $\frac{\text{Plasticity Index}}{2}$ to a maximum of 10% above Plastic Limit	More than 1.5 m below.

.3 Backfilling shall be carried out using selected material compacted in 150 mm layers.

E3.6 Inspection and Testing

.1 Refer to Section C3.5.

END OF SECTION

F GAS, POWER AND TELEPHONE SERVICES

F1 Gas, Power and Telephone

.1 The gas, power, cable TV and telephone services to be installed shall be arranged between the Developer and respective utility companies and shall be installed underground. Any cost for these services by the respective utility companies shall be paid by the Developer.

.2 Each utility company shall submit plans of the proposed works to the Town of Millet for approval prior to construction. All gas, power, cable TV and telephone utilities shall conform to the same standards for trench compaction and clean up as sewer and water utilities.

F2 Streetlighting

.1 Streetlighting shall be arranged by the Developer to a standard of lighting comparable to existing standards within the Town of Millet and specifications currently used by the local power franchise company within the Town of Millet.

.2 Streetlight cables shall be installed underground and an acceptable type of steel post with fixture shall be used.

.3 The Town of Millet will pay rental charges to the utility company for the operation of streetlights after the development construction has been accepted by the Town.

.4 The Town of Millet shall approve the streetlighting layout and fixture type prior to installation.

.5 Streetlights shall be placed at locations not interfering with the proposed driveways and in general shall be located in line with the extension of the common property line between two lots.

.6 The face of the posts shall be at least 0.6 metres clear of the face of the curb or the back of sidewalk.

.7 Streetlights shall be provided for each internal park area that does not abut onto a lighted street. Additional streetlights may be required, depending on the size of the park. A streetlight shall be located at the point where each walkway opens onto the park area.

END OF SECTION

TOWN OF MILLET
REQUEST FOR DECISION (RFD)

Meeting: Regular Council Meeting

Meeting Date: April 27, 2022

Originated By: Lisa Novotny, Director of Development and Infrastructure

Agenda Item: **Millet Civic Centre Parking Lot Re-habilitation and Sewer Repairs**

BACKGROUND/PROPOSAL

As part of the 2022 capital budget, Council approved funds for the parking lot re-development and sewer repairs at the Millet Civic Centre.

DISCUSSION/OPTIONS/BENEFITS/DISADVANTAGES

See attached signed CAO Contract Award Report.

COSTS/SOURCE OF FUNDING

$285,000 was approved as part of the 2022 budget. Based on the tender results and the engineering fees, this project should be within budget. Updates on budget will be presented as available.

RECOMMENDED ACTION:

That Council accept the CAO Contract Award Report for the Millet Civic Centre parking lot re-habilitation and sanitary sewer repairs.

CAO CONTRACT AWARD REPORT

Subject: MCC Parking Lot and Sewer Line Repairs

Recommendation(s):That the tender from Kantrax Contractors Ltd in the amount of the revised tender price bid of $254,056.11.

Type of Contract:

☐ professional services
☒ construction/renovation
☐ goods/services

Total Contract Value:

☐ Up to $25,000
☐ $25,000 to $50,000
☐ $50,000 to $100,000
☒ over $100,000

Multi-Year Contract yes☐ no ☒ Contract Length: Total Value - $254,056.11

Competitive Bid Process

yes ☒ no (sole source) □ (if 'no', contract value cannot exceed $100,000)

Type of Competitive Bid Process Evaluation

Lowest Bid Price (Substantially Compliant) ☒ Price Plus Other Criteria ☐

Award to Lowest Compliant or Highest Evaluated Bid

yes ☒ no☐

Funds For Current Year of Contract Within an Approved Budget (if a Multi-Year Contract)

yes ☒ no ☐

Report:

McElhanney Ltd acting as the Town's engineers offered the opportunity to bid on the Millet Civic Centre Parking Lot and Sewer Repairs to pre-qualified contractors with 9 submissions received. The bids received are as follows:

Prime Contractor	Tender Bid Price without Provisional Items
Knelsen Sand & Gravel Ltd	$313,694.84
DeFord Contracting Inc	$297,970.00
Kantrax Contractors Ltd	$248,480.05
St. Albert Parking Lot Maintenance Ltd	$273,546.11
Alfresco Contractors Inc	$316,045.50
Border Paving	$277,791.75
O'Hanlon Paving Ltd	$338,050.00
Central Civil Solutions Inc	$307,523.38
E Construction	$406,764.00

The prices received were +/-10.5% higher than estimated in fall of 2021 due to increased material cost and inflation. McElhanney is recommending the inclusion of some provisional items proposed by the Geotechnical Engineer for a total cost of $254,056.11.

CAO CONTRACT AWARD REPORT

Financial and/or Legal Implications:

Provided there are no unexpected conditions or issues encountered, the project should be completed within the approved budget.

Attachments:

Report Date:	April 21, 2021
Author:	Lisa Novotny
Originating Department:	Development and Infrastructure
CAO Approval:	L Schoening
Financial Review (if applicable):	N\A
Legal Review (if applicable):	N\A