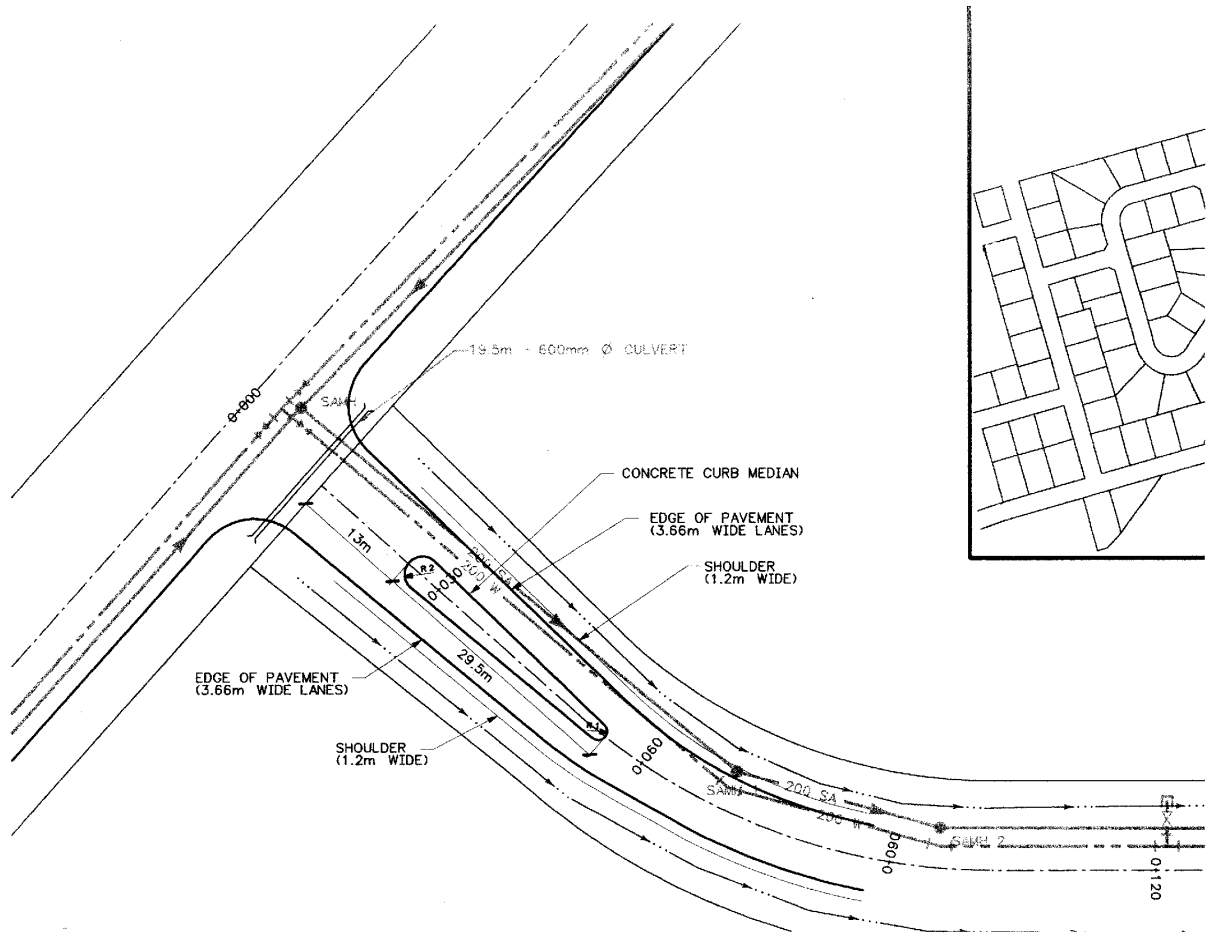


# Subdivision By-Law # 035



## Town of Quispamsis

# Subdivision Specifications and Guidelines



Town of  
**QUISPAMIS**



Department of Engineering and Works

March 15, 2005

Edition 1.0

{As amended 2007/09/04}

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## **PART I: INTRODUCTION**



## SUBDIVISION SPECIFICATIONS & GUIDELINES

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## 1.0 INTRODUCTION

Land development that supports economic growth and maintains or enhances the quality of life in the community is strongly supported by the Town of Quispamsis. However, these developments and their associated infrastructure shall adhere to the overall planning, design and construction objectives and standards in the Town.

These guidelines and specifications have been prepared to:

- Guide the process of land development with respect to obligations, standards and requirements for development and acceptance,
- Set forth the minimum standards and requirements to be met in the design and construction of standard subdivision (municipal) infrastructure services and facilities within the Town of Quispamsis,
- Set forth limiting values for items upon which an evaluation of subdivision design and construction will be made by the reviewing and inspection authorities,
- Establish practical uniformity of subdivision development and construction within the Town of Quispamsis.

The Town of Quispamsis Subdivision Specifications and Guidelines may be referred to as the “*Subdivision Specifications and Guidelines*” in this document

## 1.1 Contents and Scope

The Subdivision Specifications and Guidelines comprises the following parts:

**Part I: Introduction:** provides a description of the purpose for the document, the scope and content of the document, and the relationship to other municipal By-laws and other standards.

**Part II: Development Procedures and General Conditions:** outlines the requirements to undertake subdivision development within the Town of Quispamsis, and the process and conditions to adhere during the construction and installation of the subdivision infrastructure and facilities, in their entirety.

**Part III: Design Guidelines and Construction Specification:** provides general design guidelines and detailed information on materials and construction methods in the provision of standard municipal Works and Services within the subdivision development. Part III contains a specific division for each type of Work and Service (e.g., Division A – Street Networks, Division C- Sanitary Sewer System, etc.).

**Part IV: Typical Detail Drawings:** consists of drawings, text and figures as necessary to provide engineering standards, criteria and guidelines to be used in the layout and construction of subdivision.

The Subdivision Specifications and Guidelines apply to the overall design and complete installation of street networks, water distribution systems, sanitary sewerage systems, storm drainage control systems, and other facilities and services within and servicing new subdivisions in the Town, and within municipal road allowances, municipal right-of-ways or municipal properties.



## SUBDIVISION SPECIFICATIONS & GUIDELINES

Although this document is comprehensive in regards to subdivision development design concepts and construction methods, this document does not eliminate the necessity for detailed design by a registered and licensed professional engineer, and the use of consulting engineering expertise throughout the entire subdivision development process.

The Town of Quispamsis will not accept any subdivision development until it is in complete compliance with the specifications and guidelines in this document and the Town Subdivision By-law.

When citing specific contents from this document for the purpose of correspondence it is recommended that the Part identifier (e.g., Part I, Part II, etc.) or Divisions be stated at the beginning of the reference for ease of use. For example, a reference to this specific section of this document would be *Part I Subsection 1.1*.

### 1.2 Relationship to Other Specifications, Standards and By-Laws

The specifications and guidelines in this document as adopted from time-to-time by the Town of Quispamsis Council form part of the Town Subdivision By-law.

No departure from the Subdivision Specifications and Guidelines shall be permitted without the prior written approval from the Town, or their designated authorities.

### 1.3 Additional Standards, Codes and Guides

The experience of other agencies, authorities, and commissions has been freely referred to in preparation of these subdivision development specifications and guidelines. The following standard specifications shall apply as if written out in full:

- *A Guide to the Minimum Standards for the Construction of Subdivision Roads & Streets*, Planning and Land Management Branch, New Brunswick Department of Transportation (NBDOT).
- American Society For Testing Materials (A.S.T.M.)
- *American Water Works Association Standards*, American Water Works Association (A.W.W.A.)
- Canadian Standards Association (C.S.A)
- *Canadian Guide to Neighbourhood Traffic Calming* published by the Transportation Association of Canada (TAC)
- *Geometric Design Standards*, published by the Transportation Association of Canada (TAC)
- *Standard Specifications for Highway Construction*, New Brunswick Department of Transportation (NBDOT)
- New Brunswick Department of Environment and Local Government (NBDOELG) Guidelines for the Collection and Treatment of Wastewater
- *Recommended Standards Water & Sewer Projects*, Association of Professional Engineers and Geoscientists of New Brunswick (APEGNB)

References to standards, codes, specifications and recommendations with this document shall mean the latest edition of such publications adopted and published at the date of signing of the Developer's Agreement, unless otherwise specified.



## 1.4 Conflicts

Within the context of this entire document, in the event of conflicts in the cited codes, regulations, standards or specifications the one requiring the better grade of work or material shall govern.





## SUBDIVISION SPECIFICATIONS & GUIDELINES

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## **PART II: Development Procedures and General Conditions**



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## 1.0 DEVELOPMENT PROCEDURES AND OBLIGATIONS

### 1.1 Definitions

Unless otherwise defined in this document, any word or expression in this document shall have the meaning assigned to it as in the **Subdivision By-law**, the **Zoning By-law**, the **Community Planning Act** or the **Municipalities Act**, in that order of precedence.

**“Abut”** includes having access thereto directly;

**“Act”** means the Community Planning Act of New Brunswick, Chapter C-12, R.S.N.B. 1973 and amendments thereto;

**“Blaster”** means a person who holds a valid certificate of qualification in the blaster occupation or powderman trade issued under the Apprenticeship and Occupational Certification Act of New Brunswick;

**“Building”** means any structure, either temporary or permanent, that has a roof supported by columns or walls and is used, or capable of being used for the shelter, housing or enclosure of persons, animals or chattels; and includes mobile home, mini home and modular dwellings as defined in the *Town Zoning By-law*;

**“Building Inspector”** means such person as may be appointed by Council of the town of Quispamsis to act as Building Inspector and such person designated to act in the capacity of Building Inspector in their absence;

**“Complete”** means the required works comply with the Town specifications to the satisfaction of the Town Engineer as certified in writing by the same;

**“Completion, Final”** means completion as accepted by resolution of Council;

**“Consolidation”** means the combining or assembling of two or more parcels into one parcel;

**“Consulting Engineer”** means a Professional Engineer who is a member or licensee of the Association of Professional Engineers and Geoscientists of New Brunswick, experienced in the field of Municipal Engineering, or their authorized representative;

**“Contractor”** means a person or entity, as part of an independent business, or a business, whether incorporated or unincorporated, which provides goods or services to the Developer under terms of an expressed or implied agreement;

**“Council”** means the Council of the town of Quispamsis;

**“Developer”** means a person seeking to obtain approval of a subdivision plan, or who enters into a subdivision agreement with the Town;

**“Developer’s Agreement”** means a legally binding agreement by a Developer with the Town which clearly establishes the Developer’s responsibility regarding project phasing, the provision of public and private facilities and improvement and any other mutually agreed to terms and requirements adopted by the Town.

**“Development”** means:

- a) the erecting, placing, relocating, removing, demolishing, altering, repairing or replacing of a building or structure other than utility or telephone poles and wires, traffic control devices, pipelines defined in the Gas Distribution Act of New Brunswick except for buildings and structures remote from the pipeline used for management and administration or housing or storing of moveable equipment or statutory notices;



## SUBDIVISION SPECIFICATIONS & GUIDELINES

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- b) where the purposes for which land, buildings and structures may be used are set out in the Municipal Plan, Development Scheme or Zoning By-law or regulation, any change in the purpose for which any land, building or structure is used;
- c) any excavation of sand, gravel, clay, shale, limestone or other deposit for a development mentioned in paragraph (a) or for purposes of the sale or other commercial use of the material excavated; or
- d) the making of land by cutting or filling to a depth in excess of one (1) meter except in the case of laying pipelines defined in the Gas Distribution Act of New Brunswick;

**“Development Officer”** means the municipal planning officer appointed pursuant to Subsection 16(1) of the Act;

**“Drainage System”** means a system of works designed and constructed to control the flow of storm water, groundwater or both;

**“Dwelling”** means a main building or a portion thereof containing one or more dwelling units;

**“Gradient or Grade”** expressed as a percentage, is determined by dividing the vertical height from the lowest to highest elevation on the parcel by the horizontal distance between the lowest and highest point;

**“Highway”** includes a street, road, lane, bridge, viaduct and any other way open to public use, but does not include a private right-of-way on private property;

**“Lot”** means a parcel of land used or intended to be used as the site for a building or structure or an appurtenance thereto;

**“Pedestrian Walkway”** means a multi-use trail network reserved for the primary use of pedestrian movement and non-motorized traffic;

**“Person”** means any individual, firm, company, association, institution, society, corporation or group;

**“Planning Advisory Committee”** means the Planning Advisory Committee established by the Council in accordance with Section 12, Chapter C-12 of the Act and the *Planning Advisory Committee By-law* of the Town;

**“Potable Water”** means water that is approved for drinking purposes by the Chief Medical Health Officer appointed under the Health Act of New Brunswick;

**“Right-of-Way”** includes land or any interest in land acquired for any public purpose, including, but not limited to:

- a) public rights of passage with or without vehicles;
- b) constructing, maintaining, or operating any railway;
- c) erecting and maintaining any pole-line;
- d) laying, placing, and maintaining drains, ditches, pipes, transmission lines or wires for the conveyance, transmission or transportation of water, electric power, communication, or for the disposal of sewage;

**“Roadway”** means the portion of the highway that is improved, designed or ordinarily used for vehicular traffic;

**“Storm Drainage System”** means systems of works designed and constructed to receive, convey, and controls the discharge flow of storm water, groundwater or both. Such systems



consist of ditches, culverts, swales, subsurface interceptor drains, roadways, curb and gutters, catchbasins, manholes, pipes, and service lateral lines.

**“Street”** means a public highway that affords the principal means of access to abutting parcels;

**“Subdivide”** means to divide a parcel of land into two (2) or more parcels;

**“Subdivision Specifications and Guidelines”** means the latest edition of the Town of Quispamsis *Subdivision Specifications and Guidelines* has adopted from time-to-time by Council as the minimum standards to adhere in the development and installation of infrastructure services and facilities within the Town;

**“Town”** means the municipality of Quispamsis, a municipality in the county of Kings and the Province of New Brunswick;

**“Town Engineer”** means that person holding the position of Director of Engineering and Works for the Town of Quispamsis duly appointed by Council as per Section 82 of the *Municipalities Act* of New Brunswick, requiring a registered Professional Engineer;

**“Utilities”** means the use of land whereby water, sanitary sewer, storm sewer, electrical, telephone, cablevision, gas and similar public services are provided and maintained;

**“Watercourse”** means any natural or man-made drainage course or source of water, whether usually containing water or not, and includes any lake, river, creek, spring, ravine, swamp, gulch, or source of ground water, whether enclosed in a conduit or not;

**“Works” or “Works and Services”** means any public service, facility or utility which is required or regulated by the Subdivision By-law, and without restricting the generality of the foregoing includes: access roadways, streets, the supply and distribution of water; collection and disposal of sanitary sewage and storm drainage water; street lighting; curbs, gutters, walkways, electrical power, and telephone services.

## **1.1.1 “Shall”, “Must”, “Is Required” and “May”**

The words **“shall”** and **“must”** and **“is required”** is construed as **“mandatory”**. The word **“should”** indicates the desired or intended result without being mandatory. The word **“may”**, and like expressions, indicate a choice, an election, or a permitted procedure, according to the context.

## **1.1.2 Document Headings**

The headings and sub-headings in this document are for the convenience of the reader only. The intent of each part shall be as stated in the text.

## **1.2 Responsibilities of the Developer**

The Developer shall be responsible for the design and complete construction of all Works and Services required in completing the subdivision development, which shall include but is not limited to:

- i. Obtaining all required approvals from regulatory agencies and payment of all fees – The Developer shall be responsible to obtain and pay for all licenses and permits which may be required to comply fully with laws, ordinances and regulations of the proper public authorities and agencies, in connection with performance of the subdivision development. The Developer shall be responsible for all damages and shall indemnify and save the Town harmless from and against all damages and liability, which may arise out of the



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- failure of the Developer or their Contractors to obtain and pay for such licenses and permits and to comply fully with any and all applicable laws, ordinances and regulations.
- ii. Design of all Works and Services (municipal infrastructure services) required for the subdivision, as set forth in the Developer's Agreement. As the Developer is responsible for all engineering designs of Work and Services, they shall retain the services of a Consulting Professional Engineer for all engineering, which will involve preliminary and final design and drawings, sufficient resident inspection of the Works to certify that such have been completed to Town standards. The Developer is responsible to retain and pay for the services of a Land Surveyor where needed, who shall be registered by and license to practice within the Province of New Brunswick.
  - iii. Submit to the Town, and the Town shall review, Engineering Drawings for all municipal Works and Services. The drawings must be stamped by a Registered Professional Engineer license to practice in the Province of New Brunswick.
  - iv. Supply and installation of all Works and Services, including electric power and telecommunications infrastructure, within the approved subdivision plan in accordance with all relevant Town By-laws, these Specifications and Guidelines, the Developer's Agreement and any additional conditions stipulated by the Town. The Developer must provide a minimum of two (2) working days notice to the Town prior to commencing the construction of subdivision services.
  - v. All testing and certification of completed Works and Services, and the submission of such supporting documentation to the Town.
  - vi. Provide "As-Constructed" Record Drawings, in both digital and paper format, to the Town.
  - vii. Adhere to Regulatory Acts - The Developer shall be responsible for carrying out the installation of the Works and Services in strict accordance with all Federal, Provincial and Municipal Laws, Acts, Regulations, By-laws, Codes, etc. These requirements may affect the methods of installation, construction methods, disposal of materials and may require written notifications or permits from the appropriate authority prior to commencement of the work. Such written notification or permit shall be submitted to the Town Engineer, prior to commencement of the work. The Developer and their contractors shall execute all work strictly in accordance with the subdivision specifications, and with any supplementary directions or modifications ordered by the Consulting Engineer, as approved by the Development Officer or Town Engineer, as required for final completion of the subdivision. Alterations in plans or drawings, however made, shall not have effect unless supported by written approval of both the Consulting Engineer and Town Engineer.
  - viii. Enter into a Developer's Agreement with the Town, which sets forth the terms and conditions for Development, and establishes the required Works and Services.

### 1.3 Responsibilities of the Consulting Engineer

As required by the Subdivision By-law, all infrastructure services and facilities shall be designed and inspected during construction by a Consulting Engineer. The Consulting Engineer shall be responsible for, but not limited to, the:

- i. the engineered design and overseeing the layout of all required Works and Services;
- ii. examination and approval of all construction materials and methods or workmanship to be used;
- iii. sufficient field inspections of all Works and Services installation and workmanship;



- iv. supervision of all materials and installation testing;
- v. communication with the Developer and their contractors,
- vi. preparation of As-constructed record drawings for all Works and Services that are the responsibility of the Developer.

Approval of the design drawing by the Town is only to ensure general conformance with the Subdivision By-law and the Subdivision Specifications and Guidelines. The Consulting Engineer is solely responsible for the appropriateness of the design in all aspects.

**Engineering Field Reviews** shall consist of general and sufficient resident (on-site) inspection to ensure that the infrastructure services are constructed in accordance with the approved design drawings, and any terms and conditions established by the Province of New Brunswick through the *Approval to Construct*.

"Sufficient inspection" shall range from a minimum of one site visit per day during construction to full time resident inspection for major developments. The Consulting Engineer shall submit copies of inspection reports, when requested, to the Development Officer, or Town Engineer or their designated alternate authority.

In addition to the Consulting Engineer carrying out field inspections, the Town Engineer, or designated representative, will periodically inspect the work for general conformance to these specifications, and will assist in coordinating subdivision construction with any related works to be done by the Town. Inspection by the Town of any aspect of the Works and Services will not relieve the Developer or the Consulting Engineer of the responsibility to ensure that the Works undertaken by their contractors are in accordance with recognized good practice and the Town Subdivision Specifications and Guidelines.

The Town Engineer or designated representative may bring to the attention of the Consulting Engineer the use of unacceptable materials or practices. If satisfactory remedial action is not taken, the Town Engineer may issue instructions to the Consulting Engineer to have the Developer and their contractors cease construction until remedial action is taken.

If the Consulting Engineer wishes to make any changes to an approved Works and Services design, either before or during the execution of the work, they shall first submit a marked drawing showing proposed revisions to the Town Engineer. If approval is granted for the revision, the original drawing shall be immediately revised by the Consulting Engineer and signed by the Town Engineer, and new prints issued. These two operations may be carried out simultaneously.

Amendments to an approved final Subdivision plan shall be conducted in accordance with Section 57 of the Act, and the Town Subdivision By-law.

## 1.4 Submission Requirements

### **1.4.1 Written Application**

Any person seeking to subdivide land within the Town must submit a letter of application in a form satisfactory to the Town, together with a *Tentative Plan*, in accordance with the requirements established in this document and the Town Subdivision By-law, in addition to any required further supporting documentation to the Development Officer. For the Developer's convenience, a *Tentative Plan Checklist* is available in Appendix A.

### **1.4.2 Tentative Plan**

A tentative plan shall be marked "Tentative Plan" and, unless exempted by the Development Officer, shall show:





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- i. the proposed name of the proposed subdivision;
- ii. the boundaries of that part of the plan sought to be approved marked by a black line of greater weight than all other lines on the diagram of the plan;
- iii. the locations, widths and names of existing streets on which the proposed subdivision abuts, and the locations, widths and proposed names of the proposed streets therein;
- iv. the design speeds of all streets and corners therein;
- v. the approximate dimensions and layouts of the proposed lots, blocks, land for public purposes and other parcels of land, and the purposes for which they are to be used;
- vi. the nature, location and dimensions of any existing restrictive covenant, easement or right-of-way affecting the land proposed to be subdivided, and of any easement intended to be granted within the proposed subdivision;
- vii. the natural and artificial features such as buildings, railways, highways, watercourses, drainage ditches, swamps and wooded areas within or adjacent to the land proposed to be subdivided;
- viii. the availability and nature of domestic water supplies;
- ix. the nature and porosity of the soil;
- x. such contours or elevations as may be necessary to determine the grade of the streets and the drainage of the land;
- xi. the municipal services available or to be available to the land proposed to be subdivided;
- xii. a small key plan sufficient to locate the proposed subdivision in relation to existing streets and prominent natural features, where necessary;
- xiii. any further information required by the Development Officer to assure compliance with the Town Subdivision By-law and the Act.

### **1.4.3 Final Subdivision Plan and Engineering Design Drawings**

The submission requirements presented in this section outline the requirements of the Engineering and Works Department for the purposes of engineering design only. This section pertains to Developers who have obtained approval of their tentative subdivision plan.

Any person seeking final approval to subdivide land must submit to the Engineering and Works Department for approval all required complete plans and design drawings, technical briefs, and supplementary calculations. Final Plan approval will not be granted based on conceptual designs or partial design drawings.

A final subdivision plan must be submitted within six (6) months of the date of tentative approval, otherwise tentative approval is considered null and void.

Subsequent to tentative approval and prior to the signing of a Developer's Agreement, the Developer shall submit for approval by the Town plans of sufficiently large scale (e.g., 1:500 or 1:1000) to indicate clearly the following:

- i. location and dimensions of each lot with existing and proposed elevations related to geodetic datum;
- ii. street network design detailing the elevations, grades, widths proposed names, along with the location of drainage ditches and, if required in the design, the location of proposed curb and gutter, sidewalks and traffic calming structures;



- iii. proposed design of Sanitary Sewer Works and Services, stamped by a Professional Engineer registered or licensed to practice in New Brunswick;
- iv. proposed design of a Potable Water Distribution Works and Services, stamped by a Professional Engineer registered or licensed to practice in New Brunswick;
- v. Site Drainage Plan that shall include such contours and elevations as may be necessary to determine the grade of the streets and the drainage of the land.
- vi. proposed design of a Storm Drainage (Sewer) Works and Services, stamped by a Professional Engineer registered or licensed to practice in New Brunswick;
- vii. Municipal Service easements as required for the sanitary sewer service and storm drainage system, as well as utility easements;
- viii. Wooded areas, ponds, streams, recreational areas, right-of-ways and green belts;

Where alterations to the final subdivision plan or relating documents are required following submission to the Town, such alterations shall not have effect unless supported by written approval by the Consulting Engineer and/or certified New Brunswick Land Surveyor.

Approval by the Town does not relieve the Consult Engineer of the responsibility of proper design, nor does it imply that the Town Engineering and Works Department has checked the plans, technical briefs, and supplementary calculations for compliance with this document.

#### **1.4.4 Quantity of Municipal Infrastructure Drawings**

If the subdivision requires the installation or upgrading of any municipal infrastructure, the following additional information must be provided,

- i. Two (2) copies of the Sanitary Sewer Servicing Plan
- ii. Two (2) copies of the Water Distribution Servicing Plan
- iii. Two (2) copies of a Storm Drainage Report, including an overall Site Drainage Plan for the subdivision and a engineered design Storm Drainage System.
- iv. Two (2) copies of the Engineering Design Drawings
- v. Two (2) copies of the Grading Plans.

#### **1.4.5 Drawing Requirements**

All Schematic Servicing Plans, Engineering Design Drawings, Grading Plans, and As-Constructed Drawings must be prepared under the direct supervision of, and be signed and sealed by a member, or a License to Practice member, of the Association of Professional Engineers and Geoscientists of New Brunswick (APEGNB).

All final subdivision plans shall be certified as to correctness and sealed by a New Brunswick Land Surveyor.

All Subdivision Plans, Schematic Servicing Plans, Engineering Design Drawings, Grading Plans, and As-Constructed Drawings must be submitted in SI units on standard size drawing sheets.

The Town reserves the right to define the content, marginalia, presentation style and layout, and sheet sizes of Engineering Design Drawings.



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### **1.4.6 Digital Submission Requirements**

The Town uses a Geographic Information System (GIS) to manage and maintain geo-spatial data and associated attribute information, and municipal infrastructure information. Unless exempt by the Development Officer, the Town requires digital submissions of all or a selection of the following as determined by the Development Officer:

- i. **Subdivision Plan** – a digital copy of the final subdivision plan in CARIS® NTX Interchange format, or AutoCAD® DXF or DWG (Release 14 or later), or ESRI Shape (SHP) format, and Adobe® Portable Document Format (PDF).
- ii. **As-Constructed Drawings** – a digital copy of Water, Sanitary and Storm Sewer System As-Constructed Drawings in AutoCAD® DXF or DWG format.
- iii. **Digital Coordinate Database** - In addition to the Engineering As-Constructed (Record) Drawing set requirements outlined above, the Developer shall provide a digital coordinate database of all key features to the Engineering and Works Department. The coordinate database will contain point number, northing, easting, elevation, and description information in an electronic format. Acceptable electronic formats include space-delimited ASCII files, tab-delimited ASCII files, or comma-delimited ASCII files with the following electronic structure:

#### **Point Number, Northing, Easting, Elevation, Description**

If abbreviated feature codes are used, a feature code legend with full descriptions must also be provided.

Key features to be located and included in the coordinate database include, but are not limited to, the following:

- a) corner property pins
- b) municipal service and utility easement pins
- c) all pre-cast concrete structure grate locations
- d) sanitary sewer and storm drainage service connections
- e) valve box locations
- f) curb stop locations
- g) hydrant locations
- h) power pole locations

#### **1.4.6.1 Storage Media**

Digital data (i.e., drawings, attribute data, imagery) shall be submitted on Multi Speed or Ultra Speed Compact Disk (CD) or Digital Versatile Disc (DVD). As-Constructed (Record) Drawings shall be submitted in complete sets on Multi Speed or Ultra Speed Compact Disk (CD) or Digital Versatile Disc (DVD). The submission of digital drawings via 3.5" floppy diskette must be approved from the Town Engineer or their authorized representative prior to submission.

#### **1.4.6.2 Electronic File Transfer**

Electronic file transfer through e-mail or Internet will be considered on a case-by-case basis.

#### **1.4.6.3 Spatial Reference Framework**

All coordinates values shall be reference to the New Brunswick Grid Coordinate System (Adjusted Network), and shall be based on the New Brunswick Stereographic Double



Projection and the NAD83 (CSRS) Ellipsoid. Coordinate values shall be to the Millimetre precision.

#### **1.4.7 Supporting Documentation**

Prior to approval of final Subdivision Plan and Engineering Design Drawings, the Developer shall file with the Town:

- i. All "Approval to Construct" documentation as issued by the Province of New Brunswick Department of Environment and Local Government (NBDOELG).
- ii. A valid certificate of liability insurance that specifically relates to damages that may ensue from blasting operations or blasting.
- iii. A sample of the standard deed covenant document that will be issued to purchasers of lots within that subdivision or phase thereof.

## **1.5 Subdivision Approval Procedure**

Upon receipt of a satisfactory written application, along with the tentative plan, the Development Officer will assess the application and route to appropriate municipal departments, the Planning Advisory Committee and Council, as required.

The applicant is encouraged to discuss the basic concept of their development proposal with the Development Officer prior to preparation of their application and tentative plan. Should the Development Officer consider the approval doubtful or uncertain, the applicant may be encouraged to apply for approval in principle based on the general concept prior to submission of tentative plans.

Upon notification of an approved tentative plan, the applicant shall proceed with the preparation of a Final subdivision plan and Engineering Design Drawings for any required Works and Services. A final subdivision plan may be all or a portion of the tentative plan. Where the applicant chooses carryout the Development in phases, it is imperative that the engineering design of all Works and Services be based on development of the entire tentative plan as a whole.

The Engineering Drawings for required Works and Services must be stamped by a Registered Professional Engineer licensed to practice in the Province of New Brunswick. The drawings will be stamped as "Reviewed" by the Town. The "Reviewed" drawings, or subsequent revisions thereof that must be reviewed by the Town, will be the design to which the subdivision Works and Services shall be constructed.

No construction of Works and Services shall commence until all required Engineering Drawings have been submitted and Reviewed by the Town.

Upon approval of a tentative subdivision plan the Town shall draft a Developer's Agreement for execution by the Town and the Developer, which is part of the final approval.

Following the Developer's compliance with all subdivision approval procedures, including any additional conditions stipulated during the approval process, and the execution of the Developer's Agreement complete with the required performance guarantees, the Development Officer will affix their seal to the plan for registration in the registry office. If new streets are involved, Council shall pass a resolution approving the streets prior to the Development Officer affixing the seal. Once such resolution is passed both the Development Officer and Clerk shall sign the plan for registration in the registry office.

Upon the filing of a subdivision plan in the provincial land titles registry office, the Developer may sell building lots. Building permits **shall not** be issued for individual lots until all conditions and



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requirements established under *Part II Section 2.6 - Building Permits* of these Specifications and Guidelines and within the Subdivision By-law for the lot in question have been completely satisfied according to the Town Engineer and the Town Building Inspector.

The Developer may layout the subdivision upon approval of a tentative plan. However, should the Developer proceed with actual construction of Works and Services prior to final subdivision plan approval, it is at their own risk.

### **1.5.1 Eligibility for Cost Sharing**

Upon approval of the tentative plan and “Review” stamping of the Engineering Drawings for required Works and Services, the Developer becomes eligible to submit a written application to the Town, under the terms of the Town Local Improvement By-law and *Division E Subsection 1.1.5* of this document, for cost sharing assistance with the installation of required Storm Drainage System Works.

## **1.6 Authority of the Town Engineer and Representatives**

The Town Engineer shall have full authority to define the meaning of the drawings and other development documents. The Town Engineer, either personally or through delegation of authority to representatives such as a Consultant Engineer, Engineering Technologist, Works Superintendent, Building Inspector, etc., shall be the sole judge of all workmanship and materials, in respect to both quality and quantity, and shall have full powers to examine, inspect and approve or reject materials, methods of procedure and workmanship furnished or used in execution of the subdivision development and Works, and to determine whether or not materials and workmanship are of the character required by the intent and meaning of the drawings and other development documents.

In case of any actual or alleged disagreement or discrepancy between the Developer's Agreement and the approved plans of the required subdivision Works on file with the Town and these Specifications and Guidelines to the true intent and meaning thereof, the disagreement shall be referred to the Town Engineer, whose decision shall be final.

The Town Engineer's decision of all questions in dispute with regard to the foregoing matters shall be final and binding on both the Developer and their contractors, and the Town.

## **1.7 Measurements, Precedence and Discrepancies**

Figured dimensions shown on the drawings will take precedence over scaled measurements. The Developer and their contractors shall report any discrepancy to the Town Engineer.

These specifications are intended to indicate the qualitative aspects of the work and will take precedence in this respect. The drawings are intended to show the location and quantitative aspects of the work and will take precedence in this respect.

## **1.8 Subdivision Inspection**

The Town Engineer or authorized representatives shall have access to the Works and Services for inspection wherever it is in preparation or progress. If the Developer covers or permits to be covered any of the Work that is subject to inspection or special tests before receiving approval, the Developer shall uncover the Work, have the inspections satisfactorily completed and make good the Work at their own expense.



Examination of any questioned Work may be ordered. If such Work is found in accordance with the Developer's Agreement and these Specifications, the Town shall pay the cost of examination and replacement. If such Work is not in accordance with the Agreement, the Developer shall pay the cost of examination, repair and replacement.

The duties of the Town Engineer's authorized representative are to will periodically inspect the Works for general conformance to these specifications and the conditions set forth in the Developer's Agreement, and to be on-site, when possible, during the testing of any installations or materials or workmanship employed in connection with the provision of the Works. The representative shall have no authority to relieve the Developer of any of their duties or obligations under the Developer's Agreement or, except as expressly provided in the Agreement, to make any variations of or in the Works.

The approval or disapproval of any Works by the Town Engineer's representative, shall not prejudice the power of the Town Engineer thereafter to approve or disapprove such Works, and in the case of disapproval, to order the removal or breaking up of such Works or materials and require the Developer to bring such into compliance with these specifications.

If the Developer is dissatisfied because of any decision of the Town Engineer's Representative, they shall be entitled to refer the matter to the Town Engineer who shall thereupon confirm, reverse or vary such decision.

## 1.9 Disputes – Arbitration Process

Where a difference arises between the Town and the Developer, as:

- i. to the completion of all or any portion of the Works and Services undertaken, or;
- ii. as to the interpretation of any clause within the Developer's Agreement, or;
- iii. to any difference of opinion;

Either of the parties may notify the other party in writing of its desire to submit the difference to arbitration. The notice shall contain the name of the person appointed to the Arbitration Board by the party giving the notice. The party to whom the notice is given shall, within **ten (10) days** of receiving the notice, name the person whom it appoints to the Arbitration Board and shall advise the other party of the name of its appointee to the Arbitration Board. If either party fails to appoint an arbitrator to be its representative and to notify the other party of such appointment, the appointed arbitrator may apply to a Judge of the Court of Queen's Bench of the Province of New Brunswick to appoint an arbitrator to be the representative of the other party. The two appointees selected shall, within **five (5) days** of the appointment of the second of them, appoint a third person who shall be the Chairman and, where they shall fail to agree on such third arbitrator, such person be appointed by a Judge of the Court of Queen's Bench of New Brunswick on application of either party. The Arbitration Board shall hear and determine the difference and shall issue a decision and the decision is final and binding on the Town and the Developer. The decision of a majority is the decision of the Arbitration Board, but, if there is not a majority, the decision of the Chairman shall be the decision of the Arbitration Board.

The Town and the Developer shall each bear the cost of the party whom they appoint to the Arbitration Board, together with fifty percent (50%) of those of the Chairman.

Should the Arbitration Board find in favour of the Town as to the failure of the Developer to complete all or any portion of the Works and Services undertaken, the Developer will be entitled to complete said Works in a time period to be set by the board. If the Developer does not complete the Works within the time-period, the Town shall be entitled to complete the same using the proceeds from the guarantee or other security provided pursuant to conditions set forth and agreed to in the Developer's Agreement.





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Should the Arbitration Board find in favour of the Developer as to the Works and Services undertaken, rectification period referred to in the Developer's Agreement shall commence as of the date set by the Arbitration Board.

Upon completion of the Works and Services by the Developer to the satisfaction of the Town, or upon a decision in favour of the Developer by the Arbitration Board, the Town shall release to the Developer at the end of the rectification period the cash or guarantees or security posted in accordance with Developer's Agreement. The security will be released as set out in the Developer's Agreement.

### 1.10 Insurance and Indemnity

The Developer shall indemnify and save harmless the Town from all manner of claims or actions by third parties out of the work performed, except claims or actions resulting from the negligence of the Town. The Developer shall file with the Town prior to commencement of any work, standard policies of liability insurance to a limit of five million dollars (\$5,000,000.00) per incident.

### 1.11 Performance Bonds

Upon execution of a Developer's Agreement, the Developer shall file with the Town a Performance Bond security in the form of cash, a Bond, letter of guarantee or letter of credit, in the amount as determined by the Town Engineer. This security shall cover the cost of completing the required Works and Services set forth in the Developer's Agreement, and any additional work deemed necessary by the Town.

This security shall be kept in force until the Town has released the same in accordance with the terms stated in these Specifications and the Developer's Agreement. Should the security provided be for a term ending prior to its release by the Town in accordance with Developer's Agreement, the failure of the Developer to renew the same, thirty (30) days prior to its expiry date shall be deemed a breach of the Agreement, entitling the Town to claim under said security.

The value of the Performance Bond calculated by the Town Engineer is based on the approved final plan, and any additional Works and Services or stipulations deemed necessary by the Town.

### 1.12 Maintenance Period

Prior to final completion, employees or representatives of the Town may enter the land at any time for the purpose of making any emergency repairs to any of the Works, or for the purpose of snow removal. Such work shall not be deemed an acceptance of the Works, nor any assumption by the Town of any liability in connection therein nor a release of the Developer from any of the obligations under the Developer's Agreement. The Developer agrees to fully indemnify the Town for the cost of any such emergency repairs, and for any liability, the Town may incur to members of the public for damages resulting from the faulty Works and Services or arising from the repair of the same.

When the Town has, by resolution or by a decision of the Arbitration Board, accepted final completion of the Works as set forth in Developer's Agreement, the Works shall automatically vest in the Town. Prior to the time of such resolution, the Developer shall agree to maintain all the services and works for a period of one (1) year. If any defect or faulty material, or bad workmanship shall be discovered during the one (1) year maintenance period, the Developer shall repair such defects and make good such faulty material and bad workmanship within thirty (30) days after written notice from the Town. Upon failure to do so, the Town may perform such



work and the incurred cost shall be borne by the Developer. If a defect in any of the work described in the Developer's Agreement is discovered within one (1) year, the Town Engineer, or appointed representative, shall re-inspect. If approved, the Town shall issue a certificate with respect to the repair of the defective work only and such work shall be deemed guaranteed by the Developer for a further period of one (1) year from the date of the new certificate.

### **1.12.1 Snow Removal**

The Town will not be responsible for the removal of snow from streets within a subdivision until:

- a) streets are complete to finished aggregate base standards as established under these specifications;
- b) pre-cast structure covers and frames located within the street conform to the street base crown and set to the base grade elevation or fifteen (15) millimetres below base grade.

### **1.13 Release of Bonds**

Upon completion of the Works by the Developer to the satisfaction of the Town within the time period agreed upon as the completion date, the Town shall release to the Developer eighty-five percent (85%) of the cash, securities or bond posted in accordance with security requirements set forth and agreed upon in the Developer's Agreement. If no defects occur or are found in the Works and Services as provided for in Maintenance Period set forth in these specifications and/or the Developer's Agreement, the remaining fifteen percent (15%) of the security posted will be released at the end of one (1) year from the date of final completion.

### **1.14 Use of Performance Bonds / Monies Retained**

Upon final completion of the Works by the Developer to the satisfaction of the Town within the time period agreed upon as the completion date, or during the "Maintenance Period", if works are found to be in an unsatisfactory condition and the Developer fails to remedy the work, the Town may use the security retained as is found necessary to remedy the Works and Services. The balance, if any, will be paid to the Developer in accordance with Release of Bonds specifications established herein and/or the Developer's Agreement.

### **1.15 Developer's Deed Covenants**

The Developer shall insert a covenant in the deed to transfer to each purchaser of a lot or dwelling, requiring such purchaser to carry out the following landscaping works within twenty-four (24) months after occupancy of the dwelling. Failure to comply with such a covenant shall render the purchaser liable to having the work carried out at their expense by Town forces.

- i. The lot purchaser is required to repair any damage that may have resulted as a result of building construction and to maintain the landscape drainage ditches to the facing edge of street gravel shoulder, taking care not to interfere with the drainage pattern of the open channel culvert system;





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- ii. Removal of all dead trees, stumps, major broken limbs and any limbs or trees likely to interfere with utility company services, buried sewer services, sidewalks, ditches or street lighting;
- iii. Removal of unsightly or dense underbrush likely to present a fire hazard;
- iv. The provision of a gravelled or paved pathway, driveway, or car parking space within the lot;
- v. Landscaping by mowed lawns, flower beds or gravelled or paved driveway between the building and streetward property line(s);
- vi. Maintenance of all lot corner pins which must be established by the Developer before a building permit is obtained;
- vii. Any proposed fences or walls require Town consent prior to construction.

Refer to *Part II Subsection 1.4.7* of this document regarding the requirement to submit a sample of Deed Covenants to the Town.

### 1.16 Completion Date

The Developer shall undertake to complete the Works and Services set out in the Developer's Agreement for the subdivision or each agreed phase thereof in an orderly progressive manner within a period of two (2) years following signature of the Developer's Agreement.

In the event that the Developer is unable to carry out and complete all required Works and Services in accordance with the Developer's Agreement and these Specifications and Guidelines, the Developer shall give written notice to the Town within ninety (90) days prior to proposed completion date. The written notice shall clearly state:

- i. a just cause for the failure to complete the Development within the agreed upon timeframe as set forth in the Developer's Agreement;
- ii. the quantity of completed Work, with supporting evidence from the Consulting Engineer that such Work is acceptable;
- iii. a proposed completion date for approval, and the quantity of time required to complete the development.

Only Council may grant approval to a request for the extension of an expiring completion date as set forth within a Developer's Agreement.

### 1.17 Acceptance of the Subdivision

The Town will accept the subdivision when all Works and Services have been completed in accordance with the requirements of the Subdivision By-law, these Specifications and Guidelines, the Developer's Agreement and upon receipt and approval of the following documentation (both digital and paper format):

- i. Subdivision Plan as per Town standards (paper and digital)
- ii. Municipal Infrastructure Works and Services Engineering Design Drawings;
- iii. copies of all necessary Department of Environment *Approvals to Construct* for applicable Works which include, but may not be limited to:
  - a) Sanitary Sewer;



- b) Potable Water System;
- c) Watercourse Alteration
- iv. As-Constructed Engineering Drawings as per Town standards (in both digital and paper) for the Sanitary Sewer system, Storm Sewer system, and Potable Water Distribution system, where applicable, and all Service Connection Reports.
- v. test results as required for the Water, Sanitary and Storm Sewer systems.
- vi. Certificate of Final Inspection of the Road system (inclusive of the sub-base to seal asphalt), Water Supply and Distribution system, Sanitary Sewer system and Storm Sewer system by the Consulting Engineer;
- vii. Concrete test results for curb and gutter works, where applicable;
- viii. Asphalt test results for base course and seal asphalt;
- ix. complete record of video inspection of sanitary sewers and storm sewers, when requested;
- x. Remediation report of all noted deficiencies;
- xi. Cash deposit to the Town for driveway culvert and headwall installation works at each non-serviced lot.

The Town may request other pertinent data prior to final acceptance and if possible, the Town will inform the Developer prior to signing the Developer's Agreement.

The Town Engineer or designated representative will conduct a final inspection of the subdivision and provide a written report to Council.



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### 2.0 General Conditions

#### 2.1 Impact Assessment - Existing Infrastructure

It is a requirement of the Developer to assess the impact of the development on all existing infrastructure. This may involve traffic analysis, storm run-off and drainage control analysis, flow monitoring and pressure testing, or other investigations, which may be described by the Town at the time of the application for Development.

The Town will be the sole judge of the impact that the Development may have on the Town's infrastructure.

Overloading, damaging or destroying existing infrastructure shall not be permitted. The developer may be required to upgrade existing infrastructure if it is demonstrated through an engineering design brief that adverse effects are predicted due to the Development. Additions to existing infrastructure systems shall not cause any adverse effect to or overload of existing systems.

Where a phased development is being proposed, the developer shall provide a master plan and design and construct all infrastructure to accommodate full build out of the development.

In addition, infrastructure shall be oversized where required to accommodate future development on adjacent parcels of land.

#### 2.2 Subdivision Block and Lot Design

The subdivision shall be designed to allow:

- i. convenient access to the proposed subdivision and to lots within;
- ii. sufficient circulation of vehicular traffic to ensure public safety;
- iii. convenient further subdividing of the land or adjoining land.

With reference to Typical Detail Drawing *PII – 1A Block Size Easements*, every block in a subdivision shall be at least one hundred twenty-two (122) metres and not more than three hundred five (305) metres in length, wherein:

- i. the width or depth of blocks is to design to allow two tier of lots;
- ii. irregularly shaped blocks are acceptable only when properly designed and fitted to the overall subdivision;
- iii. the width, depth and area of a lot shall be in accordance with the minimum requirements established in the Town Zoning By-law for the zone in which it lies.
- iv. easements shall be provided for utilities and services, when necessary, and shall be a width deemed necessary by the appropriate Public Utility.

In addition to the foregoing requirements, each block, lot and other parcel of land shall be in accordance with the conditions contained within the Town Subdivision By-law



## 2.3 Easements

All easements for underground services or drainage shall be a minimum width of six (6) metres, unless the Planning Advisory Committee or the Town Engineer due to special conditions requests a width of ten (10) metres. In addition:

- i. the Developer shall show all easements within the subdivision on the registered subdivision plan.
- ii. easements that are required outside of the subdivision boundaries shall be obtained by and registered by the Developer.
- iii. drainage easements that run between lots in a subdivision and which pose problems with respect to drainage safety and aesthetics shall be piped by the Developer in accordance with the Storm Sewer standards herein and any additional requirements set forth by the Town. The Town prior to final subdivision plan approval shall indicate the easements.
- iv. when installing underground utilities or ditching on easements they shall be installed such that a minimum of two (2) metres exists between the edge of the easement and the centreline of the pipe or ditch.
- v. Municipal service easements shall be sufficient width to allow safe access in accordance with the requirements of the Occupational Health and Safety Act of New Brunswick and Regulations thereto.

## 2.4 Pedestrian Walkways

The Town may require pedestrian walkways to be constructed within the subdivision for shorter walking distances to schools, shopping areas, green spaces and other focal points in or near the subdivision. These walkways are to be designed and installed by the Developer in accordance with the adopted Town Trail Network Scheme in affect at the time of development.

## 2.5 Subdivision Layout

Survey stakeout to indicate line and grade for the Work shall be performed by the Consulting Engineer or certified Land Surveyor. Preservation and necessary replacement of such stakes shall be the responsibility of the Developer and their contractor. Any additional reference points or control marks necessary for proper location of any part of the work shall be provided by the Developer or their contractor.

The Developer is solely responsible for procuring and use of licensed professionals for the layout of the subdivision and all required infrastructure, and such services shall be employed throughout the duration of the work should modifications to the original design be required.

All lot pins and references shall be carefully protected and preserved by the Developer and their contractor, and if destroyed, shall be replaced at their expense prior to acceptance of the subdivision by the Town.

As part of the layout, the Developer shall install lot identification signage on each lot. The sign shall clearly identify the lot number and remain visible from the street on which the lot fronts until such time as the correct Civic Address number, has issued by the Town, can be affixed to the lot or structure thereon in accordance with the Town *Numbering of Buildings By-law*.



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### 2.6 Building Permits

In accordance with the Subdivision By-law, the Town will not issue a building permit for the construction of any dwelling or structure on a lot until such time as:

- i. the entire limits of the street fronting the lot, which will provide the principal means of access all lots and/or dwellings contained within that phase of the subdivision development, has been constructed to the granular sub-base street standard in accordance with these Subdivision Specifications and Guidelines and any further conditions specified by the Town;
- ii. finished street grades are staked and available to determine basement elevations prior to commencing construction of dwellings or structures;
- iii. the required potable water and/or sewerage facilities servicing all lots and/or dwellings contained within that phase of the subdivision development, pursuant to the final subdivision plan as approved by the Development Officer, have been installed in accordance with these Subdivision Specifications and Guidelines and the requirements of any other By-laws relating to water and sewerage facilities. The Town must receive conformation from the Consulting Engineering firm that all required services and facilities have been constructed and installed in accordance with the approved Engineering Design drawings and to their satisfaction.

### 2.7 Subdivisions Where Servicing Requirements May Be Waived

Servicing requirements given herein and the Subdivision By-law may not apply (at the discretion of the Development Officer) where a one (1) lot parcel created is to be used solely for the unattended equipment necessary for the operation of:

- i. a community water system;
- ii. a community sewer system;
- iii. a community radio or television receiving antennas;
- iv. a radio or television broadcasting antenna;
- v. a telecommunications relay station;
- vi. an automatic telephone exchange;
- vii. an air or marine navigational aid;
- viii. electrical substations or generating stations; or
- ix. any other similar public service or quasi public service facility or utility.

### 2.8 Environmental Protection Measures

It shall be the responsibility of the Developer and their contractors to be knowledge and implement the environmental protection measures, which may be required as a part of the work, in order to carry out the development in compliance with the various Federal and Provincial Acts, Regulations and Policies, and Municipal By-laws, and any issued conditions, permits or approvals.



## **2.8.1 Watercourses**

The contractor shall take all precautions necessary as determined by the appropriate regulating authorities for the protection of watercourses affected directly or indirectly by work associated with the subdivision development.

In accordance with the provisions of other relevant Provincial regulations and Municipal By-laws, there shall be no development within thirty (30) meters of the bank of a stream or watercourse without approval from the Planning Advisory Committee. During the tentative plan approval stage, the Development Officer shall ensure that any such developments are referred to the Provincial Department of the Environment for review and approval under the Watercourse Alteration Regulation under the Clean Water Act of New Brunswick.

## **2.8.2 Sediment and Erosion Control**

The Developer shall supply, install and maintain such environmental protection measures as required to adequately protect the environment to a degree acceptable to the New Brunswick Department of Environment and Local Government and other Federal, Provincial and Municipal Agencies.

Such protection measures shall include but not limited to the supply and installation of sediment control fence and erosion control structures and shall also include any additional environmental protection measures required as a condition of the Approval to Construct.

Sediment and Erosion Control Structures shall be material installed and maintained in compliance with the NBDOT Standard Specifications *Item No. 602 Sediment Control Fence and Item No. 605 Erosion Control Structures*, Typical Detail Drawings *PII – 2A: Sediment Control Fence*, and in accordance with the Clean Environment Act of New Brunswick.

When deemed by the Consulting Engineer to be no longer required, the Developer shall remove the erosion and sediment control measures and restore the area as directed.

The Developer and their contractors shall take all precautions necessary to prevent undue damage to trees that act as a buffer and natural erosion control along the boundaries of adjacent subdivisions, or along the entrance to the subdivision.

## **2.8.3 Historical or Archaeological Items**

If at any time during construction, objects of potential historical or archaeological value are uncovered by the Developer or contractor, all work shall cease and shall not continue until the site has been reviewed by the appropriate representatives and the Town Engineer has approved resumption of the work.

## **2.9 Dust Control and Street Cleaning**

### **2.9.1 Dust Control**

The Developer and their contractors shall provide for and maintain dust control at times wherever:

- i. the operation of any equipment necessary to execute the work of subdivision development causes dust that may cause a nuisance to residents of the area;
- ii. bare soil conditions are created in performing work included in, or pertaining to this project.



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The Town Engineer's decision as to what provisions are required to maintain adequate dust control shall be final. There shall be no compensation for water, sprinkling equipment, or any other dust control measures taken.

The application of water shall be the primary means of dust control. The water used shall be contaminant-free and obtained from a source approved by the Town Engineer and any other regulatory agency. The Developer shall be responsible for obtaining the necessary approvals for retrieval of water from a source and the method use.

Water shall be applied by equipment capable of applying the water at a uniform and evenly distributed rate in amounts as required and/or as directed.

Calcium Chloride may be used but is limited to off hours and weekends. The use of Calcium Chloride must be approved by the Town Engineer, and its application shall be as directed by the Town Engineer.

### **2.9.2 Street Cleaning**

The Developer and their contractors shall take all necessary precautions to prevent the depositing of mud or debris on public or private roadways adjacent to the work site, and roadways accessing off-site areas used for disposal of excess materials or retrieval of borrow material.

Prompt clean-up of such debris is required, otherwise the Town Engineer will direct necessary cleanup with all costs borne by the Developer.

### **2.9.3 Noise Control**

Perform the work in conformity with all municipal By-laws with respect to noise, hours of work, night work, and holiday work.

## **2.10 Operation or Use of Town Hydrants and Valves**

The operation or use or the tampering of Town fire hydrants and water main valves by the Developer, the Consulting Engineer or their representatives, or their contractors is strictly prohibited unless prior arrangements have been made with the Town Engineering and Utility Departments and written approval has been granted.

**Failure to comply with these requirements may result in prosecution by the Town.**

## **2.11 Protection of Existing Road Surfaces**

Existing road surfaces are to be protected during all construction activities to ensure damage is kept to an absolute minimum and of a minor nature.

Any areas receiving gouges, scratches, chips, scraping, indentations or other damage, to an extent that, in the opinion of the Town Engineer, detracts from their appearance or would cause a premature deterioration or failure of the asphalt or base, will require a general seal overlay of the entire block. The Developer, at no cost to the Town, shall provide this seal.

At the discretion of the Town Engineer, major surface damage may require removal and replacement of the asphalt surface or base.

If, because of construction operations, travelled roads become dusty, muddy, rough, and in poor condition for the use by the public, the Developer shall rectify the problem and keep the





inconvenience or nuisance to a minimum. If, in the opinion of the Town Engineer, the time over which the nuisance factor continues is excessive, arrangements shall be made for others to restore the road to a satisfactory condition, the cost for which work shall be borne by the Developer.

## 2.12 Protection of Property and the Public

The Developer and their contractors shall protect property adjacent to the construction site, the public and public utilities from damage because of their operations.

It is the responsibility of the Developer and their contractors to locate all underground and above ground utility structures. The Developer shall be responsible to contact the appropriate representative or authority (e.g., Town, New Brunswick Power Commission, Aliant, etc.) to notify them prior to commencing any work. This notification shall be given to allow sufficient time for the authority to identify and locate any utility that may be affected by, damaged or distributed by construction activities. No work shall commence near such utility structures, or the possible existences of, until the appropriate authorities have advised the Developer to proceed.

The Developer and their contractors shall be responsible to adhere to any conditions that may be placed by the authority responsible for the utility during excavation in the area.

If any damage should occur to property or utilities the Developer shall immediately repair the damage, in a manner satisfactory to the Town. The Developer will bear the cost of all repairs to any items that is shown on the drawings or is readily visible or marked out on site.

The Developer and their contractors shall maintain safe and passable traffic accommodations for public travel, preventing dust nuisance, furnishing, erecting and maintaining construction signs, barricades, lights, flashers and other warning devices required to protect the site and the public.

The Developer and their contractors shall carry on the Work in such a manner as to not prevent the passage of traffic on the public streets. However, should it be necessary in the performance of the Work to close streets to traffic, the Developer shall obtain the necessary permission from the responsible authority and make all necessary arrangements.

If the Developer fails to protect, repair, rebuild or otherwise restore such property as may be deemed necessary, the Town or the appropriate authority after giving notice may proceed to protect or to have repairs made by others and the cost thereof will be deducted from the development performance guarantee.

## 2.13 Blasting

In the event, the subdivision development requires the use of explosive agents (blasting) the following provisions shall apply:

- i. no blasting operations or related activities may be undertaken until the Developer provides to the Town a certificate of insurance, with the Town as an additionally named insured, on a form acceptable to the issuing authority in an amount of not less than two million dollars (\$2,000,000.00) per incident which specifically relates to damages caused by blasting or blasting operations.
- ii. proof of compliance with the provisions of the insurance coverage stated in Subsection 2.13(i) shall be provided to the Town prior to blasting.
- iii. the Developer shall indemnify and save harmless the Town from any legal actions or claims of any kind and description whatsoever brought against the Town for or on





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account of any injury or damage to persons or property received or sustained by any person or persons on account of blasting or related activities.

- iv. there shall be compliance with all provisions of Provincial laws relating to blasting and without limiting the foregoing provisions Occupational Health and Safety Act of New Brunswick and Regulations thereto.
- v. the Developer shall conduct pre and post-blast inspections of all structures, including asphalt or concrete driveways, *within three hundred (300) metres of the blasting operations {AMENDED 2007-09-04}* and record conditions with special reference to size and location of any cracks or existing structural damage. In areas where private wells are the source of potable water, the inspection shall also include the pre-blast condition of wells, a comprehensive water quality report, and flow rate. The inspections shall be completed by a Registered or Licensed Professional Engineer qualified and experienced in the area of pre and post-blast inspection surveys. A copy of the inspection report shall be filed with the property owner.
- vi. prior to carrying out blasting operations the Developer shall provide to the Town the following:
  - a) description of the scope of the work, including the purpose for which the blasting operation is required;
  - b) a blasting plan prepared by the certified Blaster which consist of:
    - i) a sketch showing the location of the work site, all structures and Utilities surrounding the site or blasting area;
    - ii) the blasting pattern, the depth to which it is proposed to drill or blast, the maximum Charge Weight per Delay, the distance to the nearest structure, utility or transportation infrastructure and affected area(s) of blasting and blasting operations;
    - iii) blasting agent (name of explosive and type) to be used;
    - iv) the name, address, telephone, Province of New Brunswick Certificate Number, and employer of each Blaster in charge of the blasting operations;
    - v) provide a contact person's name, title and telephone number who will be on-site at all times during blasting operations;
- vii. the local police, local fire department and the Town shall be given twenty-four (24) hours prior notification when explosives are to be used and the contractor involved shall ensure that adequate emergency procedures as approved by the said local emergency authorities are in place.
- viii. *Subject to Section 8.F of Subdivision By-law No.035, blasting operations within a radius of one hundred (100) metres of any building is prohibited , and no person shall carry out blasting operations within a radius of two hundred (200) metres of any building without written approval of Council, and shall comply with any additional terms and conditions as imposed by Council. {AMENDED 2007-09-04}*
- ix. no person shall carry out or cause to be carried out blasting or blasting operations within three hundred (300) metres of a school or any place of public congregation unless such notice as required has been given to the senior administrator of the school or the senior authority in the case of a public facility.
- x. all precautions necessary to protect neighbouring buildings, residents, vehicular and pedestrian traffic shall be taken, which includes the posting of flagpersons at all access



locations immediately prior to executing the blast, who shall stop and prevent pedestrian and vehicular from entering the work area until the blast has been conducted.

- xi. no person shall blast, carry on blasting operations, or use an explosive agent or operate drills, compressors or other equipment used to prepare land for blasting unless and until steps have been taken to suppress dust which may occur of the said activity.
- xii. no blast shall be discharged by any person unless and until the material to be blasted shall first have been covered with suitable blasting mat or some material or device sufficient to provide every precaution for adequately safeguarding life and property.
- xiii. a person may carry on blasting operations, use an explosive agent, or operate drills, compressors or other equipment used to prepare for blasting only in accordance with Subsection 3(A)(v) of the Town By-Law Respecting Disturbance By Noise.
- xiv. visible spent detonators shall be removed from the work site.
- xv. The Developer shall be responsible for any repair that is necessary to restore the municipal or private property to their original condition due to damage caused by blasting.
- xvi. there shall be compliance with such additional provisions as Council may require in conjunction with approval of a final subdivision agreement.

## 2.14 Traffic Signing and Control

The work shall be done in a manner that creates the least interference with traffic, consistent with safe performance of the work. The Developer shall install and maintain such barriers, signs, lights and signallers as may be necessary for the safety and convenience of the public and work area. Stop signs shall be erected at all intersections within the work site and at access points from municipal streets.

All barricades and signage on municipal streets, at access points to the work site, and within the work site shall be in conformance with NBDOT signage requirements and the *Manual of Uniform Traffic Control Devices for Canada* for temporary conditions.

The Developer or their contractor shall supply, in addition to required signage and barricades, the necessary number of flag persons at all times when:

- i. there to be less than two (2) lanes of traffic; or
- ii. closure of a street or portion of a street to traffic; or
- iii. the Rothesay Regional Police Force so request; or
- iv. heavy equipment is operating on or adjacent to a roadway open to public travel.

The flag persons shall be supplied with standard six hundred (600) millimetre “Stop/Slow” paddles and reflective clothing. The Developer and their contractors shall be responsible for ensuring the flag persons have successfully completed a Traffic Signallers course and shall be responsible for the actions of all flag persons. Flagging shall be carried in accordance with the *Work Area Traffic Control Manual (Transportation)*.

## 2.15 Truck Routes

All heavy equipment, including trucks hauling borrowed or excavated material or additional heavy equipment shall proceed to and from the work site by taking the shortest route to and from the



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nearest Town Truck Route and then the shortest route to and from the origins and destination of the required trip.

The Truck Routes are those as listed in Schedule G of the Town Traffic By-law.

The Town shall be informed of any streets being used to access the subdivision work site that are not part of the designated Town Truck routes to ensure that proper weigh restrictions are adhered to and damage to the existing streets is minimum.

The Developer and their contractors shall adhere to Spring Weight Restrictions that shall be enforced by the Town in accordance with such sections in the Town Traffic By-law. The Town reserves the right to periodically and randomly spot check truck weights by use of the New Brunswick Department of Public Safety Commercial Vehicle Enforcement.

Trucks shall be clean of excess material and debris prior to hauling material on designated Truck Routes or alternated routes to and from the work site. The Town may enforce covering of materials during the transporting of the materials to and from the work site.

### 2.16 Excess Excavated Material

Unless a disposal site is designated, all excess materials found upon or excavated from the work site shall become the property of the Developer and shall be disposed of in accordance with all Federal, Provincial and Municipal regulations, including the acquisition of permits and disposal approvals. The excess material shall be considered in the custody and the sole responsibility of Developer and their contractor until disposal at the designated site, including hauling of the material.

When sufficient space is not available to allow placing of excavated material within the boundary of work site, such excavated material shall be hauled and stockpiled at an off-site location arranged for by the Developer. When all excavation is complete, the Developer or their contractor shall retrieve as much acceptable material as required from the disposal site to properly refill all excavations or trenches or general backfilling purposes.

Disposal of excess material, whether temporary or permanent, on any Municipal property or right-of-way without written approval is strictly prohibited, and the Developer shall be responsible for the removal and cleanup of such material immediately at no cost to the Town.

### 2.17 Work Site Cleanup

During construction operations, the development site must be kept clean, orderly, and free of excess materials, as much as possible, in the interest of the public and workers safety. Upon completion of all Works, the Developer and their contractors shall remove all surplus construction materials, tools and equipment, and temporary structures from the work site.

It is the Developer's and their contractor's sole responsibility to be knowledgeable of and comply with all Federal, Provincial and Municipal regulations regarding the removal and disposal of all rubbish, trash and excess material from the work site. Rubbish, trash and unsalvageable excess material shall be disposed of in the approved Fundy Solid Waste Commission Landfill at Crane Mountain.

The Town reserves the right to cleanup the work site at cost should the Developer or their contractors fail to complete cleanup operations within an acceptable timeframe as deemed by the Town Engineer.

Without limiting any foregoing regulations, the Town does not permit:



- i. the disposal of waste materials and rubbish by burning, burial on-site or on any publicly vested property, dumping into watercourses or storm drainage systems;
- ii. the disposal of volatile wastes such as mineral spirits, oil, gas, or paint thinner into storm or sanitary sewer drains.



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## **Part III: Design Guidelines and Construction Specifications**



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### **PART III Divisions**

**Division A:** Street Network

**Division B:** Trenching, Bedding and Backfilling

**Division C:** Sanitary Sewer System

**Division D:** Water Distribution System

**Division E:** Storm Drainage Control System

**Division F:** Green Space and Open Space Development





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## DIVISION A: STREET NETWORK

### CONTENTS

Item 1.0: General System Information and Design Guidelines

Item 2.0: Construction Specifications



## SUBDIVISION SPECIFICATIONS & GUIDELINES

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## 1.0 STREET NETWORK - SYSTEM INFORMATION AND DESIGN GUIDELINES

This section governs the design and supply of all materials and methods necessary for the development and installation of street networks within the subdivision development plan.

### 1.1 General System Information

#### 1.1.1 Developer's Obligations

The Developer is to ensure that the subdivision development is serviced by an approved roadway and street system. The Developer shall, but is not limited to, provide the following roadway and street Works and subsequent information to the Town:

- i. clearing, grubbing and excavation of development area;
- ii. supply and install granular sub-base and base materials, and construction of the roadways to lines and grades approved by the Town in accordance with requirements in these Specifications;
- iii. supply and install asphalt concrete base course, asphalt concrete surface course on subdivision streets in accordance with requirements in these Specifications;
- iv. supply and install of granular materials necessary for the construction of roadway and street shoulders in accordance with requirements in these Specifications;
- v. supply and install of topsoil and seed to grass areas from street shoulder edge to limit of right-of-way.
- vi. supply and install materials necessary for the construction of concrete curb and gutter, where required by the Town;
- vii. supply and install sufficient street lighting at all intersections;
- viii. supply and install of materials necessary for the construction of those Storm Drainage Control System elements in accordance with *Part III Division E* in this document;
- ix. supply to the Town As-Constructed Record Drawings in both paper and digital format upon completion of the street Works.
- x. supply to the Town compaction test results for Aggregate Sub-base, Aggregate Base and Asphalt.

The Developer is responsible for maintaining all streets until the time of final acceptance of the subdivision development by the Town.

#### 1.1.2 Regulatory Standards

All subdivisions shall be serviced with a roadway and street network designed and constructed in accordance with the *Geometric Design Standards* published by Transportation Association of Canada (TAC), the Town Subdivision By-law, these Specifications and Guidelines, and *Standard Specifications for Highway Construction*, New Brunswick Department of Transportation (NBDOT).



## SUBDIVISION SPECIFICATIONS & GUIDELINES

### **1.1.3 Approvals**

The Developer shall be responsible for obtaining all necessary approvals required to construct the subdivision streets including but not be limited to:

- i. New Brunswick Department of Environment and Local Government (NBDOELG) - if a Watercourse Alteration Permit is required.
- ii. New Brunswick Department of Transportation (NBDOT) - if the subdivision has access from a provincial designated highway.
- iii. Canadian Transport Commission - if construction of the street system requires crossing a railroad right-of-way.

## **1.2 Design Guidelines**

The design of the street system shall consider, but is not limited to, the following items.

### **1.2.1 Location**

The location and design of a street network shall give consideration to:

- i. the topography of the land;
- ii. the provision of lots suitable for the intended use, Without limiting the foregoing, such matters as slope, topography, soils and drainage shall be considered;
- iii. street intersections and intersections being as nearly as possible at right angles, and in no case shall one street intersect another at an angle of less than sixty (60) degrees;
- iv. Intersections of more than two (2) streets shall be prohibited;
- v. convenient access to the proposed subdivision and to lots within it, and circulation of vehicular traffic to ensure the public safety;
- vi. convenient further subdividing of the land as well as subdivision of, or access to, adjoining land;
- vii. appropriate connections are provided to adjacent properties or development, especially where adjacent development contains dead end streets that exceed the maximum length for cul-de-sacs as outlined in these specifications and the Town Subdivision By-law;
- viii. a Crescent street layout is preferred over Cul-de-Sac layout.

### **1.2.2 Typical Detail Drawing Reference**

The following typical detail drawings shall be reference:

- i. DIV. A – 1A: Angle Of Street Intersections
- ii. DIV. A – 1B: Cul-de-Sac Layout
- iii. DIV. A – 2A: Street Detail

### **1.2.3 Minimum Standards for Roadway and Street Design**

The Developer shall design and construct the street network to meet or exceed the following:

#### **A. Right-of-Way and Street Dimensions**

- i) Minimum right-of-way widths shall be:



- a. Local Streets – twenty decimal zero (20.0) metres;
- b. Collector Streets - twenty-four decimal zero (24.0) metres.

The determination as to whether a street is local or collector shall be based on the typical characteristics of same as identified in the Town Municipal Plan By-law. The right-of-way width of a local street shall be increased to a maximum of twenty-four (24) metres should the design incorporate a median or adjacent pedestrian walkways.

- ii) Driving surface of streets shall be constructed to a minimum width of:
  - a. Local Streets - nine decimal seven five (9.75) metres shoulder-to-shoulder;
  - b. Collector Streets – twelve decimal seven five (12.8) metres shoulder-to-shoulder.
- iii) No Street shall exceed three hundred (300) metres in length, unless provision is made for an alternate emergency access by way of an intersecting street from another subdivision or the provision of a temporary access satisfactory to the Town Engineer.

## **B. Gradient**

- i) No street in a subdivision may have a gradient in excess of eight percent (8%), except that the Planning Advisory Committee may in exceptional cases made necessary by the topography of the land in the subdivision, increase the maximum gradient allowable to ten percent (10%);
- ii) Minimum gradient shall not be less than zero decimal five percent (0.5%);
- iii) All streets shall be crowned plus/minus three percent ( $\pm 3\%$ ).

## **C. Intersections**

- i) Street intersections on the same or opposite sides of a street are not closer than sixty (60) metres between limits of street rights-of-way, unless warranted by exceptional site conditions;
- ii) Streets are to be laid out to intersect as nearly as possible at right angles and a minimum standard of sixty (60) degrees to ninety (90) degrees must be maintained;
- iii) Jogged intersections shall not be permitted.

## **D. Traffic Calming**

Where a street design or layout may have the potential for increase traffic volumes, increase vehicle speeds or inappropriate vehicle operations that conflict with the intended land uses in the area, pedestrian movement or other residential activities that occur along the street, the Development officer may request the design and construction of Traffic Calming measures.

The traffic calming measures used shall address, and achieve through construction, the following:

- i) Reduce vehicular speeds



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- ii) Discourage through traffic
- iii) Minimize conflict between street users
- iv) Improve the neighbourhood environment

The traffic calming measures shall be incorporated into the final plan, and approved by the Town Engineer prior to commencement of street construction.

### **E. Cul-de-Sacs**

A dead end street shall be constructed as a cul-de-sac designed to suit conditions of the subdivision. As shown in Typical Detail Drawing *DIV. A – 1B: Cul-de-Sac Layout*, the following minimum standards shall be incorporated:

- i) The cul-de-sac is to have a maximum length of one hundred eighty three (183) metres. This distance may be increased to two hundred twenty-five (225) metres upon approval by the Planning Advisory Committee where there is an emergency vehicular access or pedestrian walkway with a clear travel path of at least three (3) metres in width from or near the head of the turnabout, giving access to an adjacent street;
- ii) The right of way circle is to have a minimum diameter of thirty-seven (37) metres, with the paved turning circle being a minimum of twenty-seven decimal five (27.5) metres in diameter, shoulder to shoulder;
- iii) Where a traffic island is present in the circle, a paved single lane shall be a minimum width of five decimal five (5.5) metres. There shall also be an inside shoulder with a minimum width of one (1) metre.

### **F. Street Names and Traffic Control Signs**

The proposed street names within the subdivision must be shown on the tentative plan. Street names will be subject to the approval of the Development Officer and comply with the New Brunswick 911 Civic Addressing Standards. As such, street names that will duplicate or may be confused with existing street names in the area (i.e., adjacent municipalities) shall not be approved.

The Developer is responsible for the costs associated with the manufacture and installation of all street name and traffic control signs within their development. The Town may supply such signs to the Developer at a cost arrangement as set for in the Developer's Agreement.

At all intersections within the subdivision, the street name signage design and installation shall include the name of both streets.

### **G. Street Lighting**

Street lighting must be installed at all entrances to the subdivision and at all intersections within the subdivision. The design and installation of such lighting shall be to the satisfaction of the New Brunswick Electric Power Commission (NB Power) and the Town.



## 2.0 STREET NETWORK - CONSTRUCTION SPECIFICATIONS

### 2.1 Description

The Developer is required to construct all streets in accordance with these Specifications and Guidelines and, where applicable, the latest edition of New Brunswick Department of Transportation's Standard Specification, unless these specifications provide otherwise. The Developer must also comply with any additional or unique requirements as contained in the Developer's Agreement.

The work covered by this section includes clearing and grubbing, initial cuts and fills and shaping of roadbed to sub-grade, gravel sub-base, crushed gravel base, asphalt base and surface, and driveways.

### 2.2 Materials

#### 2.2.1 Common Excavation & Borrow Fill

Materials covered in this section refer to those material types required to construct the roadbed in accordance with the design sub-grade elevations.

Excavated material may be common excavation or solid rock excavation.

Suitable excavated materials from road cuts or trenches shall be used as fill to bring the roads to sub-grade where required. This material shall be capable of being moved and re-compacted within the roadbed and embankments, free from roots and organic materials and rocks larger than one hundred fifty (150) millimetres.

Borrow material not originating from roadway cuts must be approved as to source and suitability by the Town Engineer or the Consulting Engineer. The approval for use of such borrowed materials shall be obtained prior to commencing construction of the roadbed.

It is the responsibility of the Developer to conduct sufficient soil investigations, prior to submission of final plans, to determine the quantity and quality of material within the development site for road construction, including the extent of solid rock excavation.

#### 2.2.2 Aggregate Sub-base

Aggregate sub-base material for roadway construction shall be pit run gravel, crushed gravel or quarried rock. All aggregate sub-base material and their source shall require approval by the Town Engineer or Consulting Engineer prior to its use, and shall be composed of clean, hard, uncoated particles free of lumps of clay or other deleterious material.

All materials used in sub-base construction shall be supplied by the Developer and must undergo the sufficient number of sieve analysis, crush count analysis and other aggregate test in accordance with the latest edition of the New Brunswick Department of Transportation General Standard Specifications, and shall meet or exceed these requirements, unless specified otherwise within this Specifications and Guidelines document.

The Developer shall maintain a detailed list of all materials used and analysis and test results, shall make it available to the Town upon request. The Developer must retain this materials list and analysis and test results until the expiry of the warranty period for the subdivision street Works and Services.





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**Pit Run Sub-base** shall be gravel that conforms to the grading limits and property requirements set out under Item 201 in the latest edition of New Brunswick Department of Transportation's Standard Specification, that is listed in the table below, when tested in accordance with ASTM C136 and C117.

ASTM Sieve Size (mm)	%-Passing
125	100
100	95 - 100
75.0	82 - 100
50.0	62 - 100
37.5	52 - 100
19.0	30 - 90
9.50	22 - 79
4.75	16 - 66
2.36	12 - 55
1.18	9 - 44
0.300	4 - 25
0.075	0 - 7

**Table 1: Grading Limits and Property Requirements - Pit Run Sub-base.**

Oversize rocks in the pit run material shall be removed from the work site.

**Crushed Gravel Sub-base** shall be gravel processed to conform with the grading limits and property requirements set out under Item 201 in the New Brunswick Department of Transportation's Standard Specification, that is listed in the table below, when tested in accordance with ASTM C136 and C117.

ASTM Sieve Size (mm)	75 mm % passing	100 mm % passing
100.0		100
90.0	100	95 - 100
75.0	95 - 100	80 - 100
63.0	86 - 100	
50.0	75 - 95	60 - 87
37.5	61 - 87	50 - 81
31.5		
25.0		
19.0	38 - 70	34 - 68
12.5		
9.50	28 - 56	25 - 58
4.75	19 - 46	17 - 48
2.36	13 - 37	13 - 39
1.18	9 - 30	9 - 30
0.300	4 - 16	4 - 17
0.075	0 - 7	0 - 7

**Table 2: Grading Limits and Property Requirements of Crushed Gravel Sub-base.**



**Crushed Rock Sub-base** shall be rock processed to conform with the grading limits and property requirements set out under Item 201 in the New Brunswick Department of Transportation's Standard Specification, that is listed in the table below, when tested in accordance with ASTM C136 and C117.

ASTM Sieve Size (mm)	50 mm % passing	75 mm % passing
90.0		100
75.0		95 - 100
63.0	100	85 - 100
50.0	95 - 100	73 - 95
37.5	76 - 100	58 - 87
31.5		
25.0	60 - 84	
19.0	50 - 76	35 - 69
12.5		
9.5	32 - 61	25 - 54
4.75	21 - 49	17 - 43
2.36	15 - 40	12 - 35
1.18	10 - 32	8 - 28
0.300	4 - 18	4 - 16
0.075	0 - 9	0 - 9

**Table 3: Grading Limits and Property Requirements - Crushed Rock Sub-base.**

Where multiple gradations are listed for sub-base material, the use and correct placement of the appropriate gradation based on the sub-grade conditions shall be the responsibility of the Consulting Engineer and shall be approved by the Town Engineer.

### **2.2.3 Aggregate Base**

All streets shall have an aggregate base layer composed of a one hundred fifty (150) millimetres minimum layer of thirty-one decimal five (31.5) millimetres crushed gravel material or crushed quarried rock. All aggregate base material and their source shall require approval by the Town Engineer or Consulting Engineer prior to its use, and shall be composed of clean, hard, uncoated particles free of lumps of clay or other deleterious material.

All materials used in aggregate base construction shall be supplied by the Developer and must undergo the sufficient number of sieve analysis, crush count analysis and other aggregate test in accordance with the latest edition of the New Brunswick Department of Transportation Standard Specifications, and shall meet or exceed these requirements, unless specified otherwise in these Specifications and Guidelines.

The Developer shall maintain a detailed list of all materials used and analysis and test results, shall make it available to the Town upon request. The Developer must retain this materials list and analysis and test results until the expiry of the warranty period for the subdivision street Works and Services



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**Crushed Gravel Base** shall be produced by the processing of gravel to conform to the grading limits set out under Item 201 in the New Brunswick Department of Transportation's Standard Specification, that is listed in the table below, when tested in accordance with ASTM C136 and C117.

ASTM Sieve Size (mm)	31.5 mm % passing
37.5	100
31.5	95 - 100
25.0	83 - 100
19.0	70 - 90
12.5	55 - 78
9.50	45 - 72
4.75	30 - 57
2.36	20 - 46
1.18	14 - 35
0.300	5 - 19
0.075	0 - 6

**Table 4: Grading Limits and Property Requirements - Crushed Rock Base**

**Crushed Quarried Rock Base** shall be rock processed to conform with the grading limits and property requirements set out under Item 201 in the New Brunswick Department of Transportation's Standard Specification, that is listed in the table below, when tested in accordance with ASTM C136 and C117.

ASTM Sieve Size (mm)	31.5 mm % passing
37.5	100
31.5	95 - 100
25.0	81 - 100
19.0	66 - 90
12.5	50 - 77
9.50	41 - 70
4.75	27 - 54
2.36	17 - 43
1.18	11 - 32
0.300	4 - 19
0.075	0 - 8

**Table 5: Grading Limits and Property Requirements - Quarried Rock Base**

### **2.2.4 Road Shoulder Materials**

Road Shoulder materials shall be approved crushed gravel conforming to the requirements for thirty-one decimal five (31.5) millimetre minus crushed granular base established under *Division A Subsection 2.2.3* of this document.

### **2.2.5 Asphalt Concrete Paving**

All materials used in asphalt concrete paving shall be supplied by the Developer and must meet or exceed all requirements of the latest edition of the New Brunswick Department of



Transportation Standard Specifications, unless specified otherwise in these Specifications and Guidelines document.

The Developer shall maintain a detailed list of all materials used and all test results and shall make it available to the Town upon request. The Developer shall retain the materials list and any analysis reports until as the expiry of the warranty period for the subdivision street Works and Services.

**Asphalt Concrete Pavement** shall be a dense graded hot-mix hot-laid plant mix conforming to the latest requirements of the New Brunswick Department of Transportation Standard Specifications for Type “B” Base Course, and Type “D” Surface Course.

**Asphalt Cement (Liquid Asphalt)** shall be penetration graded 150 – 200, or as approved by the Town Engineer, and conforming to ASTM Standard D946.

## **2.2.6 Drainage Ditching – Open Channel Flows**

**Aggregated Sub-base:** shall be a sub-base material as described in *Division A Subsection 2.2.2 – Aggregate Sub-base* of this document.

**Topsoil:** shall be friable soil of loamy character; reasonably free from subsoil, clay lumps, stones large larger than twelve (12) millimetres, shrubs, tree roots, weeds, and other objectionable materials; a composition containing two percent (2%) to ten percent (10%) organic matter by weight; pH value in the range of five decimal five (5.5) to seven decimal zero (7.0). Such material may be salvaged and stockpiled during the common excavation for the roadbed construction, as described in *Division A Subsection 2.2.1 – Common Excavation & Borrow Fill* of this document. If additional material is required beyond what is available on the Work site, the developer shall obtain borrow material from outside the Work site and it shall comply with the foregoing requirements.

**Hydroseed Mixture:** to be used for hydroseeding shall contain the following elements:

- i. **Seed mix** shall be:

Species	% By Mass
Kentucky Bluegrass [minimum three (3) varieties equal % by weight]	50
Fescues (80% Creeping Red & 20% Tall)	30
Nurse Grasses (100% Perennial Rye)	20

The seed mixes shall meet or exceed the requirements of the Canada Seeds Act for Canada No. 1 Ground Cover Mixture and Canada No. 1 Lawn Grass Mixture, respectively.

- ii. **Fertilizer** shall be a 15-25-15 (N-P-K) mix for seeding done May 1<sup>st</sup> to Labour Day and 10-20-20 (N-P-K) thereafter, and sufficient to promote a densely matted growth;
- iii. **Approved mulch:** Hydraulic mulch shall be a product made primarily for use in hydroseeding, and shall consist of shredded wood fibres, shredded newsprint coloured green with an environmentally acceptable dye, or shredded straw mixed with raw cotton fibres and/or shredded newsprint. The hydraulic mulch shall form



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homogeneous slurry when agitated or mixed in water with the other specified materials and shall contain no growth-inhibiting ingredients, and forming a blotter-like ground cover allowing absorption and percolation of water.

- iv. **Organic base adhesive:** as approved by the Town Engineer.

Water shall be free of any impurities that would inhibit germination of the seed.

The hydroseeding mix shall be capable of forming an absorptive mat during application, which will allow moisture to percolate into the underlying soil

### 2.3 Construction Methods

#### **2.3.1 Clearing and Grubbing**

Clearing means and consists of the cutting and removal of trees, bushes and brush within the entire width of the right-of-way and easements, including satisfactory disposal of such cut materials by removal from the site or, where suitable conditions exist and upon approval from the Town Engineer, wood chipping for on-site use. Should any conditions become unfavourable for wood chipping operations after approval has been granted, the Town may require the physical removal of the debris from clearing operation from the site.

Woodchips from the chipping operations shall not be piled in mounds but dispersed evenly within the limits of the area to be subdivided. Wood chipping operations shall not be performed in wind speeds over 20km/hr, unless approval is obtained from the Town Engineer.

All salvaged merchantable timber shall be removed from the right-of-way before completion of the street.

All trees, stumps, brush and other perishable material shall be close cut within three hundred (300) millimetres of the ground surface and shall be disposed of in a satisfactory manner.

All materials resulting from the clearing operations become the property of the Developer, who is responsible for the disposal of such materials from the subdivision site prior to the completion of the development and accepted of the subdivision by the Town.

Grubbing means and consists of removal of stumps, roots, logs, branches and other organic matter within the entire right-of-way and easements, including satisfactory disposal of such grubbed material.

All roots, stumps and other objectionable material shall be excavated and removed to a depth of not less than two hundred (200) millimetres below the original ground surface.

Under no circumstances shall material resulting from grubbing operations be disposed of under fill or embankments, nor shall excavation be combined with the grubbing operations. Grubbing shall be completed in advance of the excavation and grading operations unless otherwise approved.

Upon completion of clearing and grubbing operations, the site will be left in such a condition that grading operations and installation of services can be undertaken immediately.

The Developer shall be responsible, at their own expense, to carry out any remedial measures necessary to redress any areas grubbed beyond the specified limits, including but not limited extra shaping, hydroseeding and/or mulching of the exposed ground, and removal of trees that have fallen because of root severance.



## **2.3.2 Roadbed Construction – Common Excavation & Grading**

Excavation and grading consists of removal and placement of approved material within the limits of the right-of-way, or satisfactory disposal of excavated materials outside of the right-of-way, including the preparation and construction of the roadbed, drainage swales, and ditches and backslope slopes within the right-of-way limits.

Roadways and ditches shall be excavated to the lines and grades on the design drawings or as staked in the field.

Rock extraction shall be done in accordance with the requirements established in Trenching, Division B of these specifications. If blasting operations are required, such operations shall be performed in accordance with the requirements established in *Part II Section 2.13 – Blasting* of this document.

Major changes in roadway design will not be permitted after final approval of the subdivision development plan solely because of solid rock encountered during construction.

Top layer of all road cut sections shall be scarified to a depth of one hundred fifty (150) millimetres, below sub-grade level, moistened if necessary, and re-compacted to ninety-five percent (95%) maximum dry density as determined by ASTM D698. Moisture content during compaction shall not exceed optimum moisture content as determined by ASTM D698.

Excavated material or borrowed material, as approved by the Town Engineer, for fill sections shall be placed in layers having a maximum thickness of three hundred (300) millimetres and shall be compacted to a minimum ninety-five percent (95%) of ASTM D-698 or D-4253 maximum dry density, as determined by one of the following ASTM tests: D-1556, D-2167, or D-2922.

Embankment fills shall be shaped during construction to provide adequate drainage at all times.

In non-grubbed areas, swampy areas or rough terrain, special procedures may be permitted or required to shape and place the initial sub-grade of the roadbed. These procedures shall be approved by the Town Engineer and agreed upon prior to the signing of the Developer's Agreement.

## **2.3.3 Roadbed Construction – Aggregate Sub-base**

This section governs construction methods necessary for the completion of the road sub-base and base layers in roadways in accordance with these specifications and standard drawings.

Upon completion of roadway excavation and embankments, and the initial shaping of the roadbed and ditches, a layer of approved aggregate sub-base having a minimum depth of three hundred (300) millimetres shall be placed over the roadbed sub-grade. The aggregate sub-base may be placed in one lift.

This material shall be shaped to the required grades as it is placed and compacted to a minimum of ninety-five percent (95%) maximum dry density as determined by ASTM D-698 or D-4253. Gravel sub-base may be placed in one lift and shall not be placed on wet or muddy surfaces.

Prior to placing of aggregate sub-base, the sub-grade shall be properly shaped and compacted to be firm and able to support the construction equipment without displacement. Soft or yielding sub-grade shall be corrected and made stable before sub-base construction proceeds. All pooled water shall be removed from the sub-grade area prior to placing any aggregate materials, and sub-grade material shall not be muddy.



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Where the gradation of sub-grade soil and the sub-base are such that mixing of the two materials may occur, an approved geotextile fabric shall be used.

If the aggregate sub-base material incorporated into the Work does not conform to the specified properties and/or gradation, the Developer and their contractors shall cease hauling from the source of supply and shall immediately rectify the problem to the satisfaction of the Consulting Engineer and Town Engineer.

Any materials found to be non-conforming to the specified material shall be removed from the Work.

The Developer or their contractors shall advise the Consulting Engineer or Town Engineer of any changes in the source materials, at any time during the course of the Work and sufficiently in advance so that random samples may be taken and tests conducted to determine the effects of the change.

### **2.3.4 Roadbed Construction – Aggregate Base**

This section governs the construction methods necessary for the completion of the road granular base layers in roadways according to these specifications and standard drawings.

Both the sub-base and base shall be placed no later than September 30<sup>th</sup> in the year of the start of construction. Thus grading, dust control, drainage control and so forth, will be the responsibility of the Developer until the roads are accepted and assumed by the Town and all bonds returned.

Prior to placing of the crushed aggregate base material, the sub-base shall be properly shaped to required line, grade and cross-section, and compacted to a minimum of ninety-five percent (95%) dry density as determined by ASTM D698, to be firm and able to support the construction equipment without displacement. Soft or yielding sub-base shall be corrected and made stable before the placing of the base construction proceeds. Any pooled water shall be removed from the sub-base area prior to placing the crushed granular base materials.

A layer of approved aggregate base having a minimum depth of one hundred fifty (150) millimetres shall be placed over the roadway sub-base. The granular base material shall be spread with a road motor grader only and compacted immediately following the spreading of the material. The base shall be placed to provide a minimum surface width of nine decimal seven five (9.75) metres, and the entire granular base surface area shall be compacted as described for the Aggregate Sub-base.

Following compaction the surface shall be smooth, dense and free from ridges and loose material. The surface shall not vary more than ten (10) millimetres in three (3) metres in conformance with the roadway cross-section as shown on the detail drawings.

If the aggregate base material incorporated into the Work does not conform to the specified properties and/or gradation, the Developer and their contractors shall cease hauling from the source of supply and shall immediately rectify the problem to the satisfaction of the Consulting Engineer and Town Engineer.

Any materials found to be non-conforming to the specified material shall be removed from the Work.

Periodically throughout construction prior to asphalt paving, the road surface shall be graded to prevent excessive accumulation of ruts and potholes. The periodic grading shall be performed using a road motor grader only. In cases where new material needs to be applied to the granular road base surface to eliminate ruts and holes, the material applied shall be of the same type as the existing granular road base material, and spread and compacted to the same standard as the initial construction of the granular road base. It is imperative for the





Developer and their contractors to maintain finished base conditions until asphalt concrete pavement layers are constructed.

### **2.3.5 Proof Rolling**

For proof rolling of the sub-base and base coarse, use a fully loaded tandem truck. Make sufficient passes of proof rolling equipment to make sure that every point on the surface has been subjected to at least one pass of loaded tire and to determine that no greater than a five (5) millimetres deflection occurs.

Where proof rolling reveals areas of defective sub-base or base material remove of the defective material and replace to depth and extent as directed by the Town Engineer shall be performed.

### **2.3.6 Pre-Asphalt Concrete Pavement Requirements**

Immediately prior to asphalt paving of the road surface the crushed gravel surface shall be fine graded to within thirty (30) millimetres of design grade and compacted to a minimum ninety-five percent (95%) maximum dry density as determined by ASTM D698. Sufficient new material shall be added during fine grading to bring surface to the required grades as stated on the design drawings or staked in the field. The base must free from standing water prior placement of asphalt concrete.

Surplus materials not required for shoulders shall be removed and disposed in accordance with the requirements established in *Part II Section 2.16 - Excess Excavated Material and Section 2.17- Work Site Cleanup* of this document.

### **2.3.7 Road Shoulder Construction**

This section shall govern construction methods of roadway shoulders according to these specifications and standard drawings.

Shoulders shall be a minimum of one decimal two (1.2) metres wide, as shown in Typical Detail Drawing *DIV. A - 2A: Street Detail*. The initial shoulder portion of the road shall be formed during spreading and construction of granular road base.

Following the asphalt paving operation, the shoulder shall be graded and compacted, to a minimum of ninety-five percent (95%) maximum dry density as determined by ASTM D698, so that the finished surface is flush with the edge of the pavement and has a cross slope matching that of the adjacent driving lane.

Sufficient new material shall be added to any portion of the road shoulder where the minimum width is not maintained.

### **2.3.8 Driveway Construction**

The Developer shall be responsible for the construction of access driveways to the property line of all lots within the subdivision development.

The Developer shall access each lot by a driveway having a minimum finished width of six (6) metres. The top surface shall be graded with a layer of approved aggregate base material having a minimum depth of one hundred fifty (150) millimetres.

Final vertical driveway alignment shall match the abutting street grades at the edge of shoulder line.





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Driveway culverts and headwalls shall be installed by the Developer in accordance with the requirements established in the Storm Drainage Control System division of these specifications.

### **2.3.9 Asphalt Concrete Paving**

This section governs construction methods necessary for the installation of asphalt concrete pavement in accordance with these specifications and detailed drawings or as directed by the Town Engineer.

Streets shall be surfaced in accordance with these Subdivision Specifications and Guidelines and the latest edition of NBDOT Standards Specifications for highway construction, to the minimum width seven decimal three (7.3) metres, as shown in Typical Detail Drawing *DIV. A – 2A: Street Detail*.

Pavement operations shall not commence in the spring until weight restrictions have been lifted.

The Consulting Engineer or a delegated representative shall be on-site prior to and during paving operations. Prior to paving operations, they shall review and inspect site conditions to ensure that all pre-asphalting preparation requirements have been satisfied. During paving operations, they shall monitor all aspects of the paving operations and testing. Should problems arise, they shall cease operations immediately and resume operation only when any problems have been rectified to their satisfaction and in accordance with aforementioned standards.

Prior to placing of asphalt concrete base course, the aggregate base course shall conform to Pre-Asphalt Concrete Pavement Requirements established in these specifications. In addition to pre-asphalting requirements, asphalt concrete shall not be placed when weather conditions of fog or rain prevail, or when the pavement surface shows any signs of moisture.

Fifty (50) millimetres thickness of hot-mix asphalt concrete base course shall be placed before October 15<sup>th</sup> in the year of the start of construction and a minimum of forty (40) millimetres thickness of asphalt concrete surface course shall be placed in the early summer, but not later than July 31<sup>st</sup>, following the year in which the original pavement was placed. Any depressions of more than fifty (50) millimetres in the original pavement will be filled with hot-mix asphalt concrete before the surface course is placed.

Roadbed and trenches shall be permitted to settle for one winter season prior to application of the asphalt concrete surface course.

#### **2.3.9.1 Asphalt Testing**

The Developer shall engage a qualified Materials Testing Firm to test the Asphalt. The testing firm shall be approved by the Town, and perform a complete set of Marshall tests at the asphalt plant daily. These tests shall include but not be limited to:

- i. stability,
- ii. flow,
- iii. V.M.A.,
- iv. air voids,
- v. extracted liquid content
- vi. grading extracted aggregate.

In addition to asphalt plant testing, the testing firm shall take a minimum of two (2) field compaction samples daily and the core holes shall be patched immediately with hot mix



asphalt concrete. No samples shall be cut from the pavement after paving operations have ceased.

A copy of all test reports shall be mailed directly to the Town by the testing firm. The testing firm shall also provide a letter signed and sealed by an Engineer registered in the Province of New Brunswick stating that the materials supplied met or exceeded the materials specified.

## **2.3.9.2 Surface Defects**

The finished surface on any pavement course shall have a uniform texture and be free of surface defects.

Surface defects shall include, but are not limited to:

- i. Individual bumps and dips that exceed 13.4 millimetres in the vertical direction;
- ii. Segregated areas;
- iii. Areas of excess or insufficient asphalt cement;
- iv. Roller marks;
- v. Cracking or tearing;
- vi. Improper matching of longitudinal and transverse joints;
- vii. Tire marks;
- viii. Sampling location not properly reinstated;
- ix. Improperly constructed patches;
- x. Improper cross slope; and
- xi. Fuel spills

Surface defects shall be removed and replaced or otherwise repaired to the satisfaction of the Town Engineer.

## **2.3.9.3 Warranty Adjustment and Rejection Criteria**

The following Percent of Theoretical Maximum Relative Density shall be used as the basis for the necessity to adjust the warranty or fully reject the asphalt concrete Works.

Percent (%) of Theoretical Maximum Relative Density	Remedial Action
$\geq 92.5\%$	Min Acceptable Compaction Density - no warranty adjustment required.
89.5% – 92.4%	Warranty Adjustment – the asphalt concrete works warranty shall be increased to a minimum of two years, with further increase at the discretion of the Town.
$< 89.5\%$	Rejection – Developer shall remove and replace asphalt Works to acceptable standard.



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### **2.3.10 Drainage Ditching – Open Channel Flows**

This section governs construction methods necessary for the completion of that road right-of-way area from the road shoulder edge to the limits to the abutting lot property line or road right-of-way, in accordance with these specifications and detailed drawings or as directed by the Town Engineer.

All areas from the road shoulder edge (road shoulder edge is determined by measuring four decimal eight eight (4.88) metres from road centreline) to the abutting property line shall have topsoil and hydro-seed applied.

Prior to placement of topsoil, the sub-grade material shall be graded to eliminate any uneven areas and rough spots and to ensure proper drainage. All debris, roots, branches, and stones in excess of 50mm shall be removed.

If the area does not require topsoil, the area shall be cultivated to a depth of twenty-five (25) millimetres.

Topsoil shall not be spread until the Consulting or Town Engineer inspects the sub-grade material. The topsoil shall be spread in uniform layer over dry sub-grade to a minimum depth of one hundred twenty-five (125) millimetres to the lines and elevations indicated on the design drawings. Approval of topsoil grade and depth shall be obtained before proceeding with hydroseeding.

In areas with open ditch drainage, the foreslopes and backslopes shall be sloped and graded to the values indicated on the detail drawings, to a maximum slope ratio of three to one (3:1), and with a minimum bottom width of six hundred ten (610) millimetres prior to the placement of topsoil. The maximum depth of the ditch shall be zero decimal seven five (0.75) metres.

Once the topsoil has been placed and approved by the Consulting Engineer or Town Engineer, the Developer shall be responsible to hydroseed all the designated areas as follows:

<b>Slurry Application (Kilograms per Hectare – kg/ha)</b>	
Grass Seed	135 <sup>1</sup>
Fertilizer	375* <sup>1</sup>
Mulch	1350 <sup>1</sup>
Organic Base Adhesive	45 <sup>1</sup>

**Table 6: Slurry application properties for hydroseeding**

\* sufficient to promote densely matted growth

<sup>1</sup> or as recommended by manufacturer

Work shall not be performed under adverse field conditions, such as ground covered with snow, saturated with water or frozen, without prior approval. In addition, hydroseeding will not be permitted on hardened, crusted or rutted soil.

No hydroseeding shall be carried out after the week of September 30<sup>th</sup> without the prior approval of the Engineer. When hydroseeding is performed after October 15, the Developer will be required to fertilize the hydroseeded area the following spring. The area shall be maintained and/or repaired by the Developer until the end of the Guarantee Maintenance Period.



Hydroseeding done between May 1<sup>st</sup> and Labour Day must produce a satisfactory growth over at least ninety-five percent (95%) of the area hydroseeded in the growing season of that year. Areas of poor or no growth that exceed five percent (5%) as measured cumulatively of the area hydroseeded shall undergo reseeding.

The hydraulic mulch, seed, fertilizer and binder shall be thoroughly mixed with water in a hydroseeding tank capable of continually agitating the mixture during the hydroseeding operation to ensure that homogeneous slurry is produced.

When hydroseeding, reasonable care shall be taken to prevent spraying items such as structures, signs and utilities. Hydroseeding shall not be performed in wind speeds over 20km/hr, unless approved by the Town Engineer.

### **2.3.11 Storm Drainage System**

The Storm Drainage System comprises two systems, a **Major** and **Minor** System.

The major storm drainage system shall consist of, but is not limited to, the following components:

- ditches, open flow drainage channels, swales, pipe culverts and roadways.

The minor storm drainage system shall consist of the following components:

- swales, subsurface interceptor drains, curb and gutters (where required), catchbasins, manholes, pipes or conduits and service lateral lines in those areas where a closed (piped) storm drainage system is required.

All of these components are normally constructed in conjunction with the installation of the roadway. With exception to the roadway design and construction, the design and construction of the above components shall be in accordance with the requirements established under Division E - Storm Drainage System of these Specifications and Guidelines.

### **2.3.12 Concrete Curb and Gutter**

The Town reserves the right to request the design and installation of complete curb and gutter system as part of the subdivision development. The Town prior to construction shall approve the design, materials and construction methods.





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## SUBDIVISION SPECIFICATIONS & GUIDELINES

### 1.0 TRENCHING, BEDDING AND BACKFILLING - CONSTRUCTION SPECIFICATIONS

#### 1.1 Description

This division governs construction methods necessary for the trenching, bedding and backfilling of all sewer and water main, service laterals and appurtenances in accordance with these specifications and detailed drawings, or as directed by the Town Engineer.

##### 1.1.1 Typical Detail Drawing Reference

The following typical detail drawings shall be reference:

- i. DIV. B – 1A: Typical Trench Detail
- ii. DIV. B – 1B: Double Pipe Trench Detail
- iii. DIV. B – 1C: Triple Pipe Trench Detail

#### 1.2 Materials

##### 1.2.1 Trenching

Materials are not applicable to this item.

##### 1.2.2 Bedding

**Bedding:** shall be approved well graded sand or clean screened stone material free of clay, frozen lumps, organic, or deleterious matter conforming to the gradation limits under *Screened Sand* and *Screened Stone* in the Table 7.

*(Note: Screened Stone material used within the Pipe Zone for Bedding, Haunching and Initial backfill shall be of a nominal maximum size of 31.5mm.)*

ASTM Sieve Size (mm)	Pit Run Gravel %-Passing	Crushed Gravel	Screened Stone	Screened Sand
125	100			
100	95 - 100			
75.0	82 - 100			
50.0	62 - 100			
37.5	52 - 100	100	100	100
31.5		95 - 100	80 - 100	
25.0		83 - 100	35 - 100	95 - 100
19.0	30 - 90	70 - 90		90 - 100
12.5		55 - 78	20 - 60	
9.50	22 - 79	45 - 72	1	60 - 100
4.75	16 - 66	30 - 57	0	35 - 80
2.36	12 - 55	20 - 46		15 - 60
1.18	9 - 44	14 - 35		
0.300	4 - 25	5 - 19		0 - 30
0.075	0 - 7	0 - 6		0 - 10

Table 7: Grading Limits and Property Requirements - Bedding and Backfill Material



**Common Backfill:** shall be approved material from excavation or borrow material free of roots, brush, organic material, frozen lumps, or other objectionable matter, and shall be free of boulders or broken rock larger than over three hundred (300) millimetres in greatest dimension.

**Pit Run Gravel:** shall be natural bank run material conforming to the gradation limits under *Pit Run Gravel* in the Table 7.

**Crushed Gravel:** shall be sound durable crushed granular material free of clay, frozen lumps, organic, or deleterious matter; abrasion loss (ASTM C131) maximum forty percent (40%), minimum fifty percent (50%) by weight of particulars retained on a four decimal seven five (4.75) millimetre sieve, having two or more fractured faces; gradation to be in conformance with limits under *Crushed Gravel* in the Table 7.

## 1.3 Construction Methods

### 1.3.1 Trenching

#### 1.3.1.1 Safety

All trenches shall be excavated using methods that safeguard public and private property and executed in strict compliance with the Occupational Health and Safety Act of New Brunswick and Regulations thereto.

Trenches shall be open cut and excavated only so far in advance of the laying of the pipe as safety requirements and soil conditions permit. The centreline of the trench shall follow the line of the pipe as shown on the detailed drawings unless otherwise directed.

#### 1.3.1.2 Trench Conditions

The Developer shall be responsible for the condition of all excavations, and shall be held solely responsible for damages that may be caused through lack of proper sheeting, bracing, water control, etc., and for any damage to person or property resulting from the same.

The excavation shall be dewatered and kept continuously dewatered, especially during placement of bedding and installation of piping.

#### 1.3.1.3 Unstable Sub-grade

The trench shall be excavated to the depth required for placing of the pipe bedding material. Where any part of the trench is excavated below the specified grade it shall be corrected with approved granular fill material thoroughly compacted. Where the sub-grade is considered unstable or unsatisfactory to support the pipe or structure, then deeper excavation will be required to permit removal of such material to the width and depth directed, and for the installation of additional thoroughly compacted granular base material.

#### 1.3.1.4 Excavated Material

Excavated material when approved shall be used to backfill excavations. Compaction of this material shall be in accordance with requirements established in *Division B Subsection 1.3.2 – Bedding and Backfilling* in this document.





## SUBDIVISION SPECIFICATIONS & GUIDELINES

Material deemed by the Consulting Engineer to be unsatisfactory for trench backfilling, including rock fragments exceeding three hundred (300) millimetres in greatest dimension, or any other required construction activity on the work site, shall be disposed of in accordance with the requirements established under *Part II Section 2.16 - Excess Excavated Material* of this document.

### **1.3.1.5 Rock-Blasting**

The blasting of rock material shall be conducted in accordance with the provision of the Town Subdivision By-law. In addition to these provisions the following are in affect:

- i. in excavations requiring blasting, the mouth of the pipe and any portion not backfilled shall be adequately protected.
- ii. no blasting will be allowed within five (5) metres of any installed pipe.

### **1.3.1.6 Existing Street Infrastructure**

When existing street infrastructure must be removed as part of the trenching operations, prior to excavating, the asphalt, curb or sidewalk to be removed shall be cut along neat, straight lines using saw, air drill, cutting wheel or equivalent equipment. **Under no circumstances will ripping of existing asphalt, curb or sidewalk by excavation machinery be allowed.**

The Developer is solely responsible to restore removed infrastructure to a minimum of pre-trenching conditions.

### **1.3.1.7 Trench Width and Pipe Separation**

The width of the trench at pipe depth shall be in accordance with Typical Detail Drawing *DIV. B – 1A* for a single pipe trench.

The width of the trench at pipe depth, and vertical and horizontal separation widths for multiple pipe trench shall be in accordance with Typical Detail Drawing *DIV. B – 1B* for a double pipe trench, and Typical Detail Drawing *DIV. B – 1C* for a triple pipe trench.

## **1.3.2 Bedding and Backfilling**

Bedding methods and materials must conform to the pipe manufacturer's requirements for all materials that are being bedded.

**The use of excavated materials for bedding is strictly forbidden, unless otherwise directed and approved in writing by the Consulting or town Engineer.**

### **1.3.2.1 Pipe Zone (Bedding, Haunching and Initial Backfill)**

Once the trench has been excavated to the required grade, bedding shall be placed in layers to a minimum of one hundred fifty (150) millimetres below the pipe in common excavation or three hundred (300) millimetres below the pipe in rock excavation, and compacted to a density of ninety-five percent (95%) of maximum dry density as determined by ASTM D698.

Once the pipe is laid, bedding shall be placed in one hundred fifty (150) millimetres lifts to a minimum height of three hundred (300) millimetres over the top of the pipe. The bedding shall be placed to the spring line and tamped by hand under the haunches of the pipe. Succeeding layers above the spring line shall then be placed at a compacted



density of ninety-five percent (95%) of maximum dry density as determined by ASTM D698 to the minimum compacted height of three hundred (300) millimetres.

Pipe bedding material shall not be placed in water or trenches having a soft and unstable bottom or sub-grade conditions. In unstable sub-grade conditions, the unstable material shall be excavated to a depth of three hundred (300) millimetres below the bottom of the pipe. A layer of "Screened Stone" shall be placed below the pipe zone material, and provide a minimum one hundred fifty (150) millimetres layer of sub-bedding, as shown in the Typical Detail Drawing *DIV. B – 1A*.

Compacting equipment for pipe bedding material shall be suitably sized so as not to cause damage to the pipe or movement of the pipe due to impact and vibration and of ample size to provide the degree of compaction specified.

Pipe zone material for a single pipe, perforated drainpipe or for the lowest pipe in a multiple pipe trench shall be Screened Stone, unless otherwise ordered. The pipe zone material for a multiple pipe trench other than the lowest pipe or perforated drain pipe shall be crushed gravel for Polyvinyl chloride (PVC) pipes, and Pit Run Gravel for reinforced concrete pipes, unless otherwise ordered.

With reference to Typical Detail Drawing *DIV. B – 1B: Two Pipe Trench Detail* and Typical Detail Drawing *DIV. B – 1C: Three Pipe Trench Detail*, in a multiple pipe trench all material between the pipe zones shall be pit run gravel or crushed gravel and shall be full trench width from the top of the lower pipe zone material to the bottom of the upper pipe zone material.

Pipe zone material may be machine placed and shall be uniformly compacted before the pipe is installed. Bell holes shall be provided in the bedding at each bell joint to permit proper assembly while maintaining uniform pipe support.

Bedding for structures shall be a minimum of three hundred (300) millimetres deep and conforming in all respect to the requirements for pipe bedding.

### **1.3.3 Foundation Backfill**

Foundation backfill shall consist of backfilling trenches and foundations as shown on the detail drawings. Backfilling shall be placed in such a manner as to not cause undue stress or damage the structures. If the material is to be placed otherwise than by hand, the method must be approved. In general, the height of dump shall not exceed the depth of fill then over the structure. Excavated material when approved may be used as foundation backfill.

Once the pipe bedding material has been placed to the required depth and degree of compaction, the remaining trench depth shall be backfilled with common backfill. This material shall be placed in layers not exceeding four hundred fifty (450) millimetres in thickness (before compaction) and shall be compacted. Foundation backfilling without compaction shall only be conducted with approval from the Consulting Engineer. The Developer shall be responsible for maintaining all trenches and restoration of affect ground until acceptance of the subdivision by the Town.

Backfilling operations shall not be carried out in freezing weather except by special permission of the Town Engineer. When backfilling is done in freezing weather neither the material nor the area being filled shall be frozen.

In areas where trenching operations has affected existing transportation infrastructure, the foundation backfill placed under roadway, driveways, railroads, or other similar infrastructure, shall be placed and uniformly compacted to ninety-five percent (95%) of the standard maximum dry density as determined by ASTM D698. Approved pneumatic tampers, vibrating compactors or other approved methods will be used to consolidate the material.



## SUBDIVISION SPECIFICATIONS & GUIDELINES

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Trenches in traveled roadways shall be maintained with granular base course as specified in *Division A Subsection 2.2.2 Roadbed Construction – Aggregate Base* of this document, until such time as asphalt can be placed to allow a smooth travel surface. Trenches that have settled, washed out or become rutted or displaced by traffic shall be refilled, re-compacted and graded smooth with existing street.

Trenches adjacent to roadways that have affected the road shoulders and drainage ditching shall be restored, at minimum, to pre-trenching conditions as part of the backfilling operations. The Town reserves the right to require restoration to better than pre-trenching conditions.

Where excavated material is unsuitable for ordinary or common backfill, the Developer or their contractors shall dispose of such material as in accordance with the requirements under Part II *Section 2.16 Excess Excavated Material* of this document.



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### **DIVISION C: SANITARY SEWER SYSTEM**

#### CONTENTS

Item 1: General System Information and Design Guidelines

Item 2: Construction Specifications



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## SUBDIVISION SPECIFICATIONS & GUIDELINES

### 1.0 SANITARY SEWER - SYSTEM INFORMATION AND DESIGN GUIDELINES

This section governs all the design and supply of all labour, materials and construction methods necessary for the complete installation and testing of all sanitary sewer mains, sanitary manholes (including frames and covers or grates) and, sanitary sewer service connections, in accordance with these specifications, and as shown on the detailed drawings, or as directed by the Town Engineer.

#### 1.1 General System Information

##### **1.1.1 Developer's Obligation**

Where the proposed subdivision is required to be serviced by a sanitary sewer system, the Developer shall be responsible for the installation of a complete sanitary sewer system including sewer mains, manholes, and sanitary service lines to the property line of each lot. If the existing municipal sanitary sewer system requires extension to service the proposed subdivision, the Developer shall complete the extension as part of the subdivision development.

The design and construction of the sanitary sewer system shall include, but not limited to, the following items:

- i. all sewer mains complete with pre-cast concrete structures.
- ii. a service line from the sewer main to the property line at each lot.
- iii. high pressure cleaning and video inspection of one hundred percent (100%) of all sewer mains.
- iv. air testing of one hundred percent (100%) of all sewer mains and visual inspections of all manholes.
- v. all sewage lift stations if required including force mains and testing, check valve chambers and electric utility extensions.
- vi. site restoration of any existing lawns, asphalt pavement, easements, etc.
- vii. upon completion of the sanitary sewer system, the Developer shall provide the Town with "As-Constructed" Record drawings in both digital and paper format shall include, but not limit to, the following:
  - a) location, grade and geodetic elevation of all sewer mains and manholes.
  - b) the location of each service pipe at the sewer main.
  - c) the location and depth of each service pipe at the property line with three separate measurements between the end of the service line and a permanent structure or lot pin

##### **1.1.2 Regulatory Standards**

The sanitary sewer system shall be designed and constructed in accordance with these Specifications and Guidelines, the Town Sewerage Utility By-law, National Plumbing Code of Canada, the latest requirements stipulated by the New Brunswick Department of the Environment. The system shall meet or exceed any conditions set forth in the Approval to Construction issued by the Province of New Brunswick, and any additional requirements stipulated by the Town at the time of approval of the subdivision.



In accordance with the Subdivision By-law, any sewerage facilities required for a subdivision that are not connected to the sewerage facilities of the Town shall obtain approval of the Department of Health for the Province of New Brunswick.

### **1.1.3 Approvals**

The Developer shall be responsible for obtaining all necessary approvals required for construction of the sanitary sewer system. This shall include but not be limited to:

- i. New Brunswick Department of Environment and Local Government (NBDOELG) - Sanitary Sewer Approval to Construct and, if required, a Watercourse Alteration Permit.
- ii. New Brunswick Electric Power Commission (NB Power) - if required for extension of power lines for sewage lift stations or trenching across underground utilities.
- iii. Aliant Telecom Inc. (Aliant) - if required for trenching across underground utilities.
- iv. New Brunswick Department of Transportation (NBDOT) - If sewers are installed across or along a provincial designated highway.
- v. Canadian National Railway (CNR) - if sewers are installed on a railroad right-of-way.

## **1.2 Design Guidelines**

The design of the sanitary sewer system shall consider, but is not limited to, the following items. The design shall meet or exceed any minimum design criteria set forth by the Town.

### **1.2.1 Typical Detail Drawing Reference**

The following typical detail drawings shall be reference:

- i. DIV. B – 1A: Typical Trench Detail
- ii. DIV. C – 1A: Sanitary Sewer Service Connection
- iii. APEGNB, *“Recommended Standards – Water and Sewer Projects Detailed Drawing No. 4 Sanitary and Storm Manhole Detail”*.

### **1.2.2 Sewage Lift Stations**

If the sanitary sewer system requires the construction of a sewage lift station, the type of station, manufacturer, size and features shall be subject to review and approval by the Town.

### **1.2.3 Gradients**

Sewer gradients shall be such that a recommended minimum velocity of zero decimal six (0.6) metres per second (m/s) and a recommended maximum velocity of three decimal three (3.3) metres per second (m/s) shall not be exceeded.

The recommended minimum grade for pipe two hundred (200) millimetres in diameter is zero decimal four percent (0.4%); and the recommended minimum grade for pipe greater than two hundred (200) millimetres is zero decimal three percent (0.3%).





## SUBDIVISION SPECIFICATIONS & GUIDELINES

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### **1.2.4 Manholes**

Whenever possible, all manholes shall be located on the road shoulder off the asphalt concrete surface.

Manhole structures shall be located on sewer lines no further apart than one hundred (100) metres.

### **1.2.5 Depth of Cover**

The recommended minimum depth of cover over pipe in residential areas shall be one decimal eight (1.8) metres.

### **1.2.6 Sewer Service Connections**

Each property shall be serviced by a sanitary sewer service connection lateral having a minimum diameter of one hundred (100) millimetres in residential zones, and minimum diameter of one hundred fifty (150) millimetres in commercial and industrial zones. The service shall be installed having a recommended minimum grade of two percent (2%) with a recommended depth of one decimal eight (1.8) metres.

Service connections at the main shall be watertight and made at the time the sewer main is being installed. The connection shall be installed using pre-moulded fittings, bends shall be of long radius type only and vertical orientation of connection shall be as detailed in Typical Detail Drawing *DIV. C – 1A: Sanitary Sewer Service Connection*.

Connections shall be located on the centreline of the lot and at right angles to the main, unless otherwise permitted by the Town.

**Connection of any form of storm drainage control to the sanitary sewer is strictly prohibited.**

**Sanitary Sewer Service Connections are to be connected to and used by the dwelling occupying the lot. Providing any means of access to sanitary sewer lines for the purpose of waste disposal from Recreational Vehicles or similar units is strictly prohibited.**



## 2.0 SANITARY SEWER - CONSTRUCTION SPECIFICATIONS

### 2.1 Description

The Developer shall construct the sanitary sewer system in accordance with these Subdivision Specifications, and Guidelines, Town Sewerage By-law, and shall meet or exceed all requirements of the New Brunswick Department of the Environment, Department of Health, and any other regulating agency.

### 2.2 Materials

Unless otherwise specified approved materials shall meet or exceed the following specifications:

- i. **Gravity Sewer - Polyvinyl Chloride 1120 Pipe and Fittings:** shall be conforming to CSA Standard B182.2-M and ASTM D3034, with a pipe Standard Dimensional Ratio (SDR) of 35 and shall be colour coded green and sized in accordance with the flow requirements. The bell will be an integral and homogeneous part of the pipe barrel. The pipe shall be marked to show the manufacturer, DR and CSA certification.
- ii. **Joints for sanitary sewer pipe:** shall be bell and spigot type with a rubber gasket, as recommended by the manufacturer. All sanitary sewer pipe joints must be water tight within the test limits set by the New Brunswick Department of the Environment.
- iii. **Lubricants:** shall be non-toxic, water-soluble solution as listed by the National Sanitation Foundation (NSF).
- iv. **Tees, Wyes and Saddles:** shall be as supplied and/or recommended by the pipe manufacturer or approved equal.
- v. **Flexible Couplings:** shall be as manufactured by Fernco Joint Sealer Co., certified by CSA to B602 or approved equal.
- vi. **Concrete:** shall be in accordance with the Canadian Standards Association Specification A23.1 for Concrete and reinforced Concrete. Concrete shall be air-entrained with twenty (20) millimetres maximum aggregate and have a minimum compressive strength of 25 MPa after twenty-eight (28) days curing time.
- vii. **Manholes - Precast Concrete Sections:** shall be ASTM Standard C-478 for concrete manhole sections. Joints between sections will rubber gasket.
- viii. **Manholes – Base Sections:** shall be of precast concrete reinforced concrete slabs within. Manhole bases will have cast in rubber gaskets to suit inlet and outlet pipes and factory installed benching.
- ix. **Manholes – Riser Sections:** units for final height shall be with 150mm and 300mm concrete riser sections.
- x. **Cast Iron Frames and Covers:** shall be in conformance with Typical Detail Drawing *DIV. C – 2A: Grates and Covers Round*, and Typical Detail Drawing *DIV. C – 2B: Grates & Covers Square*.
- xi. **Plugs, Caps:** to prevent infiltration or exfiltration at a pressure of 50 kPa shall be PVC.
- xii. **Marker Stakes:** minimum 50mm x 100mm x 2400mm rough lumber.



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- xiii. **Forcemain—Polyvinyl Chloride Pipe:** shall be AWWA Standard C-900 for Polyvinyl Chloride (PVC) Pressure Pipe with a Standard Dimensional Ratio (SDR) and Class acceptable for the engineered design and meeting or exceeding the manufacturer's recommendations.
- xiv. **Forcemain—Polyvinyl Chloride Fittings:** shall be AWWA Standard C-907 for Polyvinyl Chloride (PVC) Pressure Fittings and certified to CSA 137.2.
- xv. **Sanitary Service Lateral Pipe and Fittings:** shall be polyvinyl chloride (PVC) sewer pipe with Standard Dimensional Ratio (SDR) 35, color coded green and meeting the requirements of the latest CSA B182.1 and ASTM D3034 and shall be a minimum 100mm diameter. Joints will be bell and spigot type with locked rubber gasket. The bell will be an integral and homogeneous part of the pipe barrel. The pipe shall be marked to show the manufacturer, DR and CSA certification.
  - a) The following shall also apply Service Lateral Pipe:
    - i) Depth of bell on PVC fittings shall be as required for pipe.
    - ii) Bends shall be of long radius type only, unless otherwise approved.

### **2.2.1 Equipment**

Approved laser alignment equipment must be used to control line and grade during all pipe installation.

Laser beam equipment shall be installed in the pipe, just above the pipe, or in the bottom of the manhole. Installation of the laser equipment contrary to these methods shall obtain approval from the Consulting Engineer.

## **2.3 Works Under Other Sections**

Relevant specifications under other sections in this document:

- i. **Trenching** – Part III Division B Subsection 1.3.1;
- ii. **Bedding and Backfilling** – Part III Division B Subsection 1.3.2;
- iii. **Typical Detail Drawing** –
  - a) DIV. B – 1A: Typical Trench Detail
  - b) DIV. B – 1B: Double Pipe Trench Detail
  - c) DIV. B – 1C: Triple Pipe Trench Detail
  - d) DIV. C – 1A: Sanitary Sewer Service Connection
  - e) DIV. C – 2A: Grates and Covers Round
  - f) DIV. C – 2B: Grates & Covers Square
  - g) APEGNB, "Recommended Standards – Water and Sewer Projects: *Detailed Drawing No. 4 Sanitary and Storm Manhole Detail.*"



## 2.4 Construction Methods

### **2.4.1 Trenching Excavation, Bedding and Backfilling**

All trench excavating, bedding and backfilling, including the pipe zone, shall be carried out in accordance with *Division B Subsections 1.3.1 – 1.3.2* of this document.

Sanitary sewer mains shall be installed according to the sizes and in locations as indicated on the design drawings. Any modifications shall be made known to the Town must obtain approval from the Consulting Engineer and the Town.

### **2.4.2 Pipe Installation**

#### **2.4.2.1 Laying**

All pipes shall be laid and jointed conforming with the manufacturer's instructions and recommendations and in accordance with recognized good practice. Joints between dissimilar pipes shall be made in accordance with the recommendation of the manufacturer of one or the other of the pipes.

Pipe and fittings shall be thoroughly inspected in the field before and after installation. Any defective or damaged pipe shall be not be used and there shall be no attempts to repair a defective item. Such defective items shall be removed from the work site and replaced with sound material free of defects.

Laying of pipe in prepared trenches shall be to correct line and grade as shown on the design drawings, or as directed, commencing at lowest point with bell of pipe pointing upgrade, unless otherwise approved, with uniform bearing under full length of the barrel of the pipe. Any pipe which is not in true alignment, or which shows settlement after laying, shall be taken out and re-laid.

Trenches where pipe laying is in progress shall be kept dry and no pipe shall be laid in water or upon wet bedding. No length of pipe shall be laid until the preceding length has been thoroughly embedded and secured in place to prevent any movement or disturbance of the pipe.

#### **2.4.2.2 Curve Deflection**

Where sewer mains are to be laid on a curve or curved alignment to avoid obstructions, the amount of deflection shall not exceed that require for satisfactory connection of the joint. Maximum deflections in pipe joints shall be according to recommendations of pipe manufacturer.

#### **2.4.2.3 Jointing**

The bell and spigot shall be free of contaminants or any foreign matter before jointing. Any time pipe installation is not in progress; a watertight plug shall close the open ends of the pipe. To assist with pipe jointing, use only lubricant approved by gasket supplier. **Under no circumstances shall household detergents or motor oils be used.** Form joints as recommended by pipe manufacturer.

Pipe shall not be jointed, under any circumstances, by pushing the pipe together using mechanical force from any heavy equipment (e.g. Excavator, backhoe, etc).



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### **2.4.3 Sanitary Manholes**

#### **2.4.3.1 Pre-cast Manhole Structures**

All pre-cast concrete structures shall be installed according to the sizes and in the locations indicated on the approved design drawing, unless otherwise specified by the Town Engineer.

All pre-cast concrete structures shall be constructed as shown on the detail drawings, APEGNB, *“Recommended Standards – Water and Sewer Projects: Detailed Drawing No. 4 Sanitary and Storm Manhole Detail.”*

#### **2.4.3.2 Non-Roadway Location**

Manhole located off traveled roadways shall be set flush with finished grade, unless otherwise specified and accessible by means of an unobstructed path, and be complete with marker posts. Marker posts shall be one hundred (100) millimetres by one hundred (100) millimetre wooden post, clearly identifiable and free from obstructions.

#### **2.4.3.3 Manhole Within Roadway**

Manhole covers and frames located in paved roadways shall conform to the crown of the street and be set to the base asphalt grade initially, unless otherwise directed by the Town Engineer, then re-adjusted to finished grade and street crown prior to commencing seal coat asphalt operations.

#### **2.4.3.4 Manhole Sectional Joints**

All joints between sanitary manhole sections will be installed with both a rubber gasket and an approved bituminous compound and must be watertight. Sanitary manholes must be watertight within the limits established under *Division C Subsection 2.4.7 Sanitary Manholes- Leakage Test* in this document.

Lifting holes in pre-cast sections shall be plugged with cement mortar for the full depth and made watertight.

#### **2.4.3.5 Height of Structures**

All manholes will be constructed to between one hundred fifty (150) millimetres and three hundred (300) millimetres of the proposed finished grade by means of one thousand fifty (1050) millimetre diameter or one thousand two hundred (1200) millimetre sections. The cast iron frame and cover or grates will be set as shown on the drawings as ordered or flush with the finished grade using a grade ring and six hundred (600) millimetre diameter sections. All non-tongue and groove joints shall have a cement mortar joint. One course only of concrete brick in a full mortar bed shall be permitted for height adjustments.

#### **2.4.3.6 Connections**

All joints and connections between concrete structures and sewer pipe shall be made watertight using a method recommended by the manufacturer.



## **2.4.3.7 Cleaning**

Upon completion, each structure shall be cleaned of silt, debris or other matter of any kind and shall be kept clean until final acceptance of the Sanitary Sewer Works and Services.

## **2.4.4 Sanitary Sewer Service Connections**

### **2.4.4.1 Trenching, Bedding and Backfilling**

Trench excavation, bedding and backfilling for the sanitary service connection shall be in accordance with requirements established in *Division B Subsections 1.3.1 – 1.3.2* of this document, or as detailed in the manufacturer's installation instructions, and the Town Sewerage Utility By-law.

The laying of the sanitary service connection pipe shall be in accordance with specifications established under *Division C Subsection 2.4.2 – Pipe Installation* of this document, and the Town Sewerage Utility By-law.

### **2.4.4.2 Service Connections**

Provision for service connections shall be made at the time the main line pipe is installed using approved pre-moulded fittings and shall be watertight.

Saddles are permitted only if the Developer is directed to install a service after the main line has been installed. When connecting a saddle, appropriate circular hole shall be cut into the main in a neat and skilful manner without seriously damaging the main pipe.

Service laterals shall be extended from the sewer main to the property line and terminate with a PVC watertight cap installed in the bell end as shown in Typical Detail Drawing *DIV. C – 1A: Sanitary Sewer Service Connection*. Service connection piping shall be laid on a recommended minimum grade of two percent (2%) for all new development. The recommended minimum depth shall be one decimal eight (1.8) metres, unless existing ground elevations are a restricting factor. If sufficient depth cannot be achieved to eliminate the possibility of freezing, other acceptable measures must be installed to prevent freezing.

Service connections must be placed and bedded in dewatered trenches.

### **2.4.4.3 Plugged Ends**

Wherever provision is made for future connections either to mains or building services, the ends of the installed lengths of the pipe or the opening in the fittings shall be plugged with a water tight plug adequately blocked to safely withstand the pressure developed during leakage tests. All laterals shall end with a bell end.

### **2.4.4.4 Markers**

Each service connection lateral shall be stake by a 50mm x 100mm x 2400mm long marker extending vertically from the plugged end of the pipe to a minimum of six hundred (600) millimetres above the ground surface so that the property owner can easily locate the end of the installed service.



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### **2.4.4.5 Insulation**

If sufficient ground cover cannot be achieved to eliminate the possibility of freezing, other mitigating measures acceptable to the Town, must be installed to prevent freezing. Such measures may include the placement of fifty (50) millimetres thick “Styrofoam – SM” rigid insulation board or approved equal around the service connection lateral.

### **2.4.4.6 Service Connection Report**

A completed “Service Connection Report” shall be filed with the Town for each service connection lateral installed. The report shall include such information as the depth of all service pipes at the property line with three separate measurements from the end of the service pipe to permanent structures such as a lot pin or utility pole, and geographic coordinates values spatially reference in accordance with *Part II Subsection 1.4.6.3 – Spatial Reference Framework*. A Service Connection Report template is available in Appendix B.

### **2.4.5 Cleaning and Video Inspection**

The Developer is responsible for the cleaning one hundred percent (100%) of all sanitary sewers that are one hundred fifty (150) millimetres in diameter or large, and the cleaning and video inspection of one hundred percent (100%) of sanitary sewers that are two hundred (200) millimetres in diameter or large. Cleaning and video inspection must be done, with any deficiencies corrected, prior to acceptance of such Works by the Town.

The Town reserves the right to require the cleaning and video inspection of Sanitary Service Connections.

#### **2.4.5.1 Cleaning**

The sewers, manholes and all related appurtenances shall be cleaned of all foreign material. The interior of all sanitary sewers shall be cleaned with approved high pressure flushing system equipped with a suction device capable of removing debris from the system. Flushing shall begin at the uppermost manhole and the direction of flushing shall be toward the lowest structure.

The sewer shall be inspected for alignment and obstructions. Water pooling in gravity sewers that cannot be eliminated by flushing and cleaning will be considered as evidence of pipe settlement. One hundred percent (100%) of the sewers will be video inspected by the Developer. Any and all defects such as water ponding, leaking joints, sags, improper grade or alignment, excessive deflection, obstructions, etc., shall be caused for rejection and such defects must be repaired by the Developer before acceptance of the subdivision by the Town.

#### **2.4.5.2 Video Inspection**

The sewers shall be inspected using a closed circuit video camera with pivoting head capabilities. The maximum speed of the camera through the pipe shall be zero decimal three zero (0.30) metres per second (m/s) with a minimum five (5) second minimum stop at each defective location and a minimum fifteen (15) second stop at each service connection showing a view directly up the service lateral and flow discharging into the pipe.

The inspection shall be recorded on a medium and format satisfactory to the Town (e.g., VHS, DVD, or equal quality). The audio part shall include the recording of distances at a





maximum interval of three (3) metres and a brief description of every defective location and of each service connection. A photograph shall be taken at each defective location and at each lateral location. The photograph and the distance the photograph was taken at shall be placed in a report to the Town.

The complete record of the inspection and original tape shall be the property of the Town.

The Town shall be notified forty-eighty (48) hours in advance of the cleaning and video inspection.

## **2.4.6 Sanitary Sewer Leakage Test**

### **2.4.6.1 Sewer Mains - Preliminary Test**

A preliminary test may be required within the first one hundred (100) metres of each size and type of pipe installed to confirm the acceptability of the pipe laying, jointing and the workmanship of the crew.

This test will normally be an air test. If it is impractical to conduct an air test because existing infrastructure, a video inspection shall be completed. A successful test or video inspection and acceptance by the Town shall be a prerequisite for further installation.

### **2.4.6.2 Sewer Mains – Required Test**

All gravity sanitary sewers installed shall be tested for leakage using air or water testing in accordance with these guidelines. Testing will be done with water only upon approval by the Consulting Engineer.

The Town shall be notified forty-eight (48) hours in advance of the schedule for testing and shall not commence until a Town representative is present, unless otherwise deemed unnecessary by the Town.

The Developer shall supply all approved materials necessary to complete the test, including approved specially fabricated airtight plugs and caps, and air or water in sufficient quantities. Test gauges used shall be in five (5) kilopascal (Kpa) [zero decimal five (0.5) psig] maximum increments and have been recently calibrated

The testing shall be conducted only after installation and capping of service connections and a minimum of five hundred (500) millimetres compacted backfill is in place.

All tests, unless otherwise ordered, shall be:

- i. for exfiltration;
- ii. carried out after backfilling;
- iii. conducted on sections of pipe lines between adjacent manholes;
- iv. carried out in the presence of the Town Engineer or representative, and,
- v. carried out on all sanitary mains.

### **2.4.6.3 Testing Methodology – Air Testing**

#### **A. Seal Section for Testing**

The Developer shall notify the Town Engineer prior to commencing a leakage test on a section of the pipeline.





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The Developer shall check that all relevant open ends are blocked off with airtight plugs and caps; and that all elbows, bends, etc., are adequately blocked to safely withstand the pressure developed under the test.

An approved airtight plug shall be placed in the inlet and outlet of the downstream and upstream manholes respectively. In both cases, the plug shall be securely blocked to prevent movement.

### **B. Pressurize Pipeline for Test**

Using an approved air blower or similar pressure regulated apparatus, supply low pressure air to the plugged pipe section and slowly fill until the internal air pressure is to twenty-eight (28) kilopascals (Kpa) [four decimal zero (4.0) psig]. The fill valve is then closed and the injected air is permitted to stabilize for a period of not less than two minutes. Following this waiting period, the pressure is increased or decreased to twenty-four (24) Kilopascals (Kpa) [three decimal five (3.5) psig] and the time is measured for the pressure drop to seventeen (17) kilopascals (Kpa) [two decimal five (2.5) psig]. The time required for this pressure drop shall not be less than indicated by Table 8.

**CAUTION: DO NOT EXCEED 28 KPa (4 PSIG.) - compressed air can be potentially dangerous if plugs are not properly secured**

Pipe Diameter (mm)	Minimum Time (min:sec)	Length for Minimum Time (metres)	Time for Longer Length (sec)
100	1:53	182	0.623 x length (m)
150	2:50	121	1.40 x length (m)
200	3:47	91	2.49 x length (m)
250	4:43	73	3.89 x length (m)
300	5:40	61	5.61 x length (m)
375	7:05	48	8.76 x length (m)
450	8:30	41	12.6 x length (m)
525	9:55	35	17.2 x length (m)
600	11:20	30	22.4 x length (m)

**Table 8: Leakage Test Minimum Time Limits**

The required time for the pressure to drop from twenty-four (24) kilopascals [three decimal five (3.5) PSIG] to seventeen (17) kilopascals [two decimal five (2.5) PSIG] shall not exceed the values in the above table.

### **C. Unacceptable Sections**

When the result of the air testing indicate leakage greater than the amount permissible, the Developer shall locate and repair the defective pipe or joints, and additional tests must be conducted to determine the effectiveness of remedial measures. These tests and any required remedial action must be repeated until the test results shown that the section is acceptable.

#### **2.4.6.4 Testing Methodology – Water Testing**

When testing with water, the pipe entering the lower manhole shall be suitably capped and sewer main and upper manhole filled with water to at least two (2) metres above the outlet invert of the upper manhole. Test shall be maintained for a minimum of two (2) hours.



Allowable loss during this testing shall not exceed twenty-five (25) litres per millimetre of pipe diameter per kilometre per day. When the test results show leakage beyond allowable limits, the Developer shall locate the defect, make any necessary repairs to the section, and retest to determine the effectiveness of remedial measures. Such action shall continue until test results shown that the section is acceptable.

### **2.4.7 Sanitary Manholes - Leakage Testing**

The Consulting Engineer shall visually inspect all installed manholes for infiltration. The schedule for manhole inspection and testing shall be at the Town Engineer's discretion, but preferably in the spring when groundwater tables are traditionally highest.

#### **2.4.7.1 Unacceptable Manholes**

Any manhole exhibiting signs of infiltration (leakage) during the testing phase and before the end of the subdivision development guarantee period will be considered unacceptable, and shall be repaired by the Developer.

Manholes deemed unacceptable shall be repaired by pressure grouting or shall be excavated and repaired on the outside using an approved caulking (bituminous) compound.

Manholes that have undergone remedial measures shall be retested/re-inspected to determine the effectiveness of the remedial measures. These inspections shall be repeated, until the results show that the remedial measures have been successful and the manhole is acceptable.



## SUBDIVISION SPECIFICATIONS & GUIDELINES

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## **DIVISION D: WATER DISTRIBUTION SYSTEM (WATERWORKS)**

### **CONTENTS**

Item 1: General System Information and Design Guidelines

Item 2: Construction Specifications



## SUBDIVISION SPECIFICATIONS & GUIDELINES

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## 1.0 WATERWORKS – SYSTEM INFORMATION AND DESIGN GUIDELINES

This division governs all the materials and construction methods necessary for the complete installation, flushing, testing and disinfecting of all potable water mains and fittings, and the installation of water service connections, in accordance with these specifications and as shown on the detailed drawings, or as directed by the Town Engineer.

### 1.1 General System Information

#### **1.1.1 Developer's Obligation**

Where the proposed subdivision is required to be serviced by a potable water distribution system, the Developer shall be responsible for the installation of a complete and operating potable water distribution system from an approved source including water mains and fittings, fire hydrants, and service lines to the property line of each lot, and if required a booster pumping station.

If the existing municipal water distribution system requires extension outside of the subdivision boundaries to service the proposed subdivision, the Developer shall complete the extension.

The design and construction of the water system shall include, but not limited to, the following items:

- i. all water mains complete with fittings, thrust blocks, fire hydrants and valves.
- ii. a service line from the water main to the property line at each lot.
- iii. swabbing, disinfecting and testing of all water mains.
- iv. pressure testing of one hundred percent (100%) of all water mains.
- v. the complete construction of booster pumping stations and well houses complete with pumps and controls, if required, including all buildings, mechanical, electrical and site work.
- vi. if applicable site restoration of asphalt pavement, easements, etc.
- vii. upon completion of the water system, the Developer shall provide the Town with "As-Constructed" Record drawings in both digital and paper format shall include, but not limit to, the following:
  - a) Location, grade and geodetic elevation of all water mains;
  - b) The location of each service pipe at the water main;
  - c) The location and depth of each service pipe at the property line with three separate measurements between the curb stop box and a permanent structure or lot pin.

#### **1.1.2 Regulatory Standards**

The system shall be design and constructed in accordance with these Subdivision Specifications and Guidelines, the Town Water Utility By-law, AWWA and CSA Standards, National Plumbing Code of Canada, New Brunswick Department of the Environment and Department of Health, additional regulatory agency and any additional requirements stipulated by the Town at the time of approval of the subdivision.



## SUBDIVISION SPECIFICATIONS & GUIDELINES

### **1.1.3 Approvals**

The Developer shall be responsible for obtaining all necessary approvals required for construction of the water system. This shall include but not be limited to:

- New Brunswick Department of Environment and Local Government (NBDOELG) – to obtain an Approval to Construct, and Water System Design and Source Approval.
- New Brunswick Department of Health
- New Brunswick Electric Power Commission (NB Power) - if required for extension of power lines to a booster pumping station or trenching across underground utilities.
- Alant Telecom Inc. (Aliant) - if required for trenching across underground utilities.
- New Brunswick Department of Transportation (NBDOT) - if water lines are installed across or along a provincial designated highway.
- Canadian National Railway (CNR) - if water lines are installed on a railroad right-of-way.

## **1.2 Design Guidelines**

The design of the water distribution system shall consider, but is not limited to, the following items. The design shall meet or exceed any minimum design criteria set forth by the Town.

### **1.2.1 Typical Detail Drawing Reference**

The following typical detail drawings shall be reference:

- i. DIV. D – 1A: Potable Water Service Connection
- ii. DIV. D – 2A: Hydrant Installation

### **1.2.2 Gate Valves**

A gate valve complete with box shall be installed on each branch of the water system at each intersection, and at the end of each water main line to facilitate future extensions.

### **1.2.3 Fire Hydrants**

- i. Fire hydrants to be installed at the end of all dead end lines and at all high points on the system.
- ii. All fire hydrants are to be complete with a gate valve and box.
- iii. Thrust blocks are to be installed at all fittings including fire hydrants.

### **1.2.4 Recommended Pipe Diameter and Cover**

All water mains shall be minimum two hundred (200) millimetre in diameter or larger except for short loops in the system which may be one hundred fifty (150) millimetre in diameter.

The recommended minimum depth of cover shall be one decimal eight (1.8) metres.



### **1.2.5 Water Service Connections**

- i. Each lot shall have a water service connection lateral installed in accordance with the Town Water Utility By-law.
- ii. Each service line shall be complete with a corporation stop and a curb stop complete with box at the property line.

### **1.2.6 Dead-End Lines**

The design and construction of a potable water distribution system shall, wherever possible avoid the installation of dead-end lines. The system shall be looped by connecting to water mains installed as part of the subdivision development Works or existing mains in an adjoining phase of the subdivision.

### **1.2.7 Booster Pumping Stations and Well Houses**

If the water system requires the construction of a booster pumping stations, well house and pumps, the design of the station, well house and pumps, manufacturer, size and features, shall be subject to review and approval by the Town.





### 2.0 WATERWORKS – CONSTRUCTION SPECIFICATIONS

#### 2.1 Description

The Developer shall construct the water distribution system in accordance with these Subdivision Specifications and Guidelines and shall meet or exceed all requirements of the American Water Works Association, the New Brunswick Department of the Environment, Department of Health and any other regulating agency.

#### 2.2 Materials

Unless otherwise specified, approved materials shall meet or exceed the following specifications:

- i. **Polyvinyl Chloride (PVC) Pipe:** shall be PVC water pipe conforming to the latest AWWA C900 and CAN/CSA B137.3M, Class 150, Dimensional ratio (DR) 18, colour coded blue. The pipe shall be marked to show manufacturer, class and CSA certification. The pipe shall have a DR of 18, for pipe sizes one hundred fifty (150) millimetres to three hundred (300) millimetres.
  - a) The minimum size of water mains shall be one hundred fifty (150) millimetres.
- ii. **Joints for Polyvinyl chloride piping:** shall be a bell and spigot type with rubber gasket. This is a push-on joint and must be watertight. The bell will be an integral and homogeneous part of the pipe barrel. Manufacturer and/or AWWA recommended standards must take precedence.
- iii. **Lubricants:** shall be non-toxic, water-soluble as listed by the National Sanitation Foundation (NSF).
- iv. **Fittings:** shall be Class 250 grey cast iron or Class 350 ductile iron or polyvinyl chloride.
  - a) **Cast or ductile iron fittings:** the radius of curvature shall conform with AWWA C-110, cement lining shall be in accordance with AWWA C-104, and mechanical joints shall be in accordance with AWWA C-111.
  - b) **Polyvinyl Chloride:** shall be PVC pressure fittings for water in compliance with AWWA C907 and CSA B137.2M, Class 150, for sizes 100mm – 200mm. The fittings shall be marked to show manufacturer, class and CSA certification.
- v. **Gate Valves:** shall be iron body, bronze mounted with non-rising spindle with mechanical joint and shall meet AWWA C500 with a clockwise closure.
- vi. **Valve Boxes:** shall be cast iron, adjustable slide type for two (2) metre bury.
- vii. **Guide Rings:** All gate valves with valve boxes shall be complete with guide rings.
- viii. **Fire Hydrant:** shall be in compliance with AWWA Standard C502 with mechanical joint connection and safety flange having two (2) hose and one (1) pumper nozzle. The type of hydrant (manufacturer), thread type and body colour shall be subject to approval by the Town.
- ix. **Restrainers:** All shall be FM approved and certified to Unibell B-13-92. As manufactured by Clow series 300, 350, 360 and 390; Uniflange series 1300, 1350, 1360 and 13909; EBBA Iron Megalug 2000PV series or approved equal.
- x. **Thrust Blocks:** shall be cast-in-place concrete; strength 32MPa at 28days



- xi. **Cathodic Protection (Bolted Metal Fittings and Hydrants):** shall be sacrificial zinc anodes by Corrosion Service Company or Duratron Systems Ltd. or approved equal. Each bolted metal fitting and mechanical restraint used with non-metallic water main pipe shall be equipped with one (1) packaged 212-24 zinc anode or approved equal. Each hydrant assembly shall be equipped with one (1) packaged 224-48 zinc anode or approved equal.
- xii. **Caution Zone Tape:** shall be Lineguard Super Tuff III "Caution Striped" caution zone tape or approved equal.

## **2.2.1 Materials - Water Service Connection**

- i) **Copper Service Pipe:** shall be a minimum nineteen (19) millimetres soft copper tubing, conforming to ASTM B88 Type K suitable for underground bury. No couplings will be permitted unless approved by the consulting or Town Engineer.
- ii) **Corporation Main Stop:** For services up to and including fifty (50) millimetres in diameter, shall be full size of the pipe Mueller H-15008 or Cambridge Series 301 or approved equal.
- iii) **Curb Stop:** Shall be full size of the pipe Mueller H-15219 or Cambridge Series 203, complete with drain.
- iv) **Corporation Service Box:** shall be Mueller A-726 for services up to and including 25mm in diameter complete with stainless steel stationary rod with brass or stainless steel pin, adjustable for a depth bury of 1.8m – 2.1m, or approved equal. Services boxes and stems for 38mm and 50mm services shall meet the above requirements except the model shall be Mueller Type A-728 or approved equal.
- v) **Saddles:** shall be Romac 202N double strap ductile iron body with nylon coating and taper threads.
- vi) **Cathodic Protection (Copper Service Pipe):** copper service pipe used with non-metallic watermain pipe shall be corrosion protect with one (1) package Z-24-48 zinc anode as supplied by Corrosion Service Company Limited or approved equal, installed according to the manufacturer's recommendations and connected at the corporation main stop equipped with a grounding tail nut and connected to ensure electrical conductivity.
- vii) **Compression connections** shall be the gripper ring type, having a minimum one thousand (1000) kilogram pull out resistance.
- viii) **Marker Stakes:** minimum 50mm x 100mm x 450mm rough lumber
- ix) **Bedding and Backfilling:** shall be in accordance with requirements in Part III *Division B Subsections 1.3.1- 1.3.2* of this document.

## **2.3 Works Under Other Sections**

Relevant specifications under other sections in this document:

- i. **Trenching** – Part III Division B Subsection 1.3.1
- ii. **Bedding and Backfilling** – Part III Division B Subsection 1.3.2



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### iii. **Typical Detail Drawings:**

- a) DIV. B – 1A: Typical Trench Detail
- b) DIV. B – 1B: Double Pipe Trench Detail
- c) DIV. B – 1C: Triple Pipe Trench Detail
- d) DIV. D – 1A: Potable Water Service Connection
- e) DIV. D – 2A: Hydrant Installation

## 2.4 Construction Methods

### **2.4.1 Trenching Excavation, Bedding and Backfilling**

All trench excavating, bedding and backfilling, including the pipe zone, shall be carried out in accordance with the requirements established under *Division B Subsections 1.3.1 – 1.3.2* of this document.

### **2.4.2 Installation Conformance**

PVC pipe and PVC fittings shall be installed in accordance with AWWA C605 and the manufacturer's instructions.

Ductile Iron Fittings and Cast Iron Fittings shall be installed in accordance with AWWA C600 and the manufacturer's recommendations.

Gate valves shall be installed in accordance with AWWA C500.

Fire Hydrants shall be installed in accordance with AWWA C502.

The installation shall be in accordance with the Town Water Utility By-law, in addition to the installation of the water mains and fittings in accordance with the recommendations of the manufacturer and appropriate AWWA Standards, unless otherwise specified herein.

### **2.4.3 Pipe and Appurtenance Installation**

#### **2.4.3.1 Pipe Laying**

All pipe and fittings shall be thoroughly inspected for defects before and after laying of the pipe. Any defective or damaged pipe or accessory shall be removed from the site and replaced with sound material.

All foreign matter shall be removed from the interior of the pipe before lowering it into the trench. Trenches shall be kept free of water, and the water main shall not be used to carry ground water from the excavation. When the installation is not in progress trench water and other foreign matter shall be kept out of the pipe by inserting an acceptable test plug or watertight cap in the end of the line. The bell and spigot shall be free of any foreign matter before jointing to ensure that the pipe is installed without earth entering the main.

The pipe shall be laid to the grade as indicated on the drawings. All pipes shall be laid with use of a laser beam for maintaining grade and alignment. The Town Engineer shall permit deviations from these grades only upon written approval. The pipe shall be laid with no reverse grades, humps or sags not indicated on the drawings.

The recommended minimum depth of cover shall be one decimal eight (1.8) metres measured from the finished grade to the top of the pipe. If sufficient ground cover cannot



be achieved to eliminate the possibility of freezing, other mitigating measures acceptable to the Town, must be installed to prevent freezing.

Pipe shall be laid with bell ends facing in the direction of laying unless directed otherwise. If it necessary to deflect the pipe from a straight line, either vertically or horizontally, to avoid obstructions or to plumb valve stems or where long-radius curves are permitted, the amount of deflection allowed shall not exceed that recommended by the pipe manufacturer for the particular size and type of pipe.

Mechanical joint connections, tightening, and torquing of bolts shall be in accordance with the manufacturer's instructions. Use only lubricant approved by the gasket manufacturers when joint PVC piping and fittings, and keep the joints free from containments.

Thrust blocks shall be placed in accordance with AWWA C600 at all bends, caps, hydrants, plugs, and tees on water mains in the locations and to the dimensions as indicated on the drawings. Thrust blocks shall extend to bear against stable ground, and piping and fittings shall remain accessible at the thrusts block locations.

Continuous Caution Zone Tape shall be buried along the entire centreline length of the main line water main which is one hundred (100) millimetres or greater in diameter. This continuous tape shall be buried from one hundred (100) millimetres to two hundred (200) millimetres below finished grade in accordance with the manufacturer's instructions.

#### **2.4.3.2 Connecting to Existing Water Mains**

**Under no circumstances whatsoever shall the Developer or their contractors operate existing water main valves or make any connections to existing water main without the prior approval of the Town Utility Department and the Town Engineer.**

The Developer or their contractors shall make all arrangements with the Town Utility Department for the locating of existing water mains for the purpose of making a connection.

Joints between dissimilar pipes shall be made in accordance with the recommendation of the manufacturer on one or the other pipes.

#### **2.4.3.3 Gate Valves**

Gate valves of the indicated size shall be installed at locations shown on the drawings.

Gate valves shall be properly joined to mains with mechanical joint connections according to the requirements of the manufacture and recognized good practice. The valves shall be set so that the valve stems are vertical and plumb.

Valve boxes shall be set so as not to transmit stress to the valve and shall be centred over the wrench nut of the valve and shall be set plumb.

Covers on valve boxes shall be set flush with finished grade.

#### **2.4.3.4 Hydrants**

Hydrants shall be set plumb in all respects and oriented with the Pumper connection facing the street.

Hydrant drain holes, both internal and external, are to be filled with brass plugs. The Developer or their contractor shall be responsible for ensuring these plugs are in place at the time of installation.



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Operations and use of fire hydrants is governed by Part II General Conditions Section 2.10 of this document.

### **2.4.3.5 Restrainers**

In addition to thrust blocks, all bends, tees, plugs, caps and hydrants shall be equipped with mechanical restraint collars as shown in Typical Detail Drawing *DIV. D – 2A: Hydrant Installation*, and *APEGNB Recommended Standards – Water and Sewer Projects Detailed Drawing No. 12 “Thrust Blocks for Pressure Pipe Fittings”*. Restrainers shall be installed in accordance with the manufacturers instructions.

### **2.4.3.6 Cathode Protection**

Sacrificial anodes shall be placed on each metal fitting, mechanical restraint and hydrant assembly in accordance with manufacturer's recommendations.

### **2.4.4 Pressure and Leakage Test**

The Town shall be notified forty-eight (48) hours in advance of any scheduled pressure and leakage test operations.

Pressure and leakage tests shall be applied to all water mains, valves and appurtenances, including hydrant leads and service connection laterals.

The test shall only be conducted after installation of pipe and fittings, capping of service connections, thrust blocks are installed and sufficient backfill is placed to prevent movement of pipe under pressure.

#### **2.4.4.1 PVC Pipe**

The Developer or their contractor shall in the presences of the Consulting Engineer and the Town Engineer, or their authorized representatives, conduct a pressure and leakage test in accordance with AWWA C-605. The test section of the pipe shall be filled slowly, taking care to expel air from the line. When all air has been expelled, the test pressure shall be applied. The applied pressure for the test will be equal to one decimal five (1.5) times the design working pressure of the pipeline at the point of testing but not less than one decimal two five (1.25) times the working pressure at the highest elevation along the line or seven hundred (700) kilopascals at the low point of the pipe. The test pressure shall not exceed the pipe or thrust restraint design pressures and shall not vary by more than thirty-five (35) kilopascals during the test.

The allowable leakage shall be determined by the following formula:

$$L_m = [(ND (P)^{1/2}) / 130,400]$$

where  $L_m$  = Allowable Leakage, in litres per hour

$N$  = Number of joints in the length of pipe section under test

$D$  = Nominal diameter of pipe in millimeters (mm)

$P$  = Average test pressure during the leakage test in kilopascals (kPa)

(Note: 1PSI = 7 kPa)



When testing against closed gate valves, an additional leakage of 0.0012 litres/hr/mm diameter/valve is allowed.

There shall be no extra allowance for service connections.

#### **2.4.4.2 Ductile Iron Pipe**

Pressure and leakage testing for ductile iron pipe shall be accordance with AWWA C-600.

The applied pressure for the test will be equal to one decimal five (1.5) times the design working pressure of the pipeline at the point of testing but not less than one decimal two five (1.25) times the working pressure at the highest elevation along the line or seven hundred (700) kilopascals at the low point of the pipe.

When testing against closed gate valves, an additional leakage of 0.0012 litres/hr/mm diameter/valve is allowed.

#### **2.4.4.3 Unacceptable Sections**

When the result of the testing indicate leakage greater than the amount permissible, the Developer shall locate and repair the defective pipe, fittings or joints, and additional tests shall be conducted to determine the effectiveness of remedial measures. These tests and any required remedial action shall be repeated until the test results shown the section acceptable.

#### **2.4.4.4 Preliminary Test**

The Town may request a preliminary test within the first one hundred and twenty (120) metres of each kind, type and size of pipe installed. This test shall be for the purpose of checking the acceptability of the type of pipe and joint being used and the workmanship of the installation. The ordering of such a preliminary test is at the discretion of the Town Engineer.

#### **2.4.5 Clean and Disinfect Water Main**

Upon successful completion and fulfillment of all pressure and leakage testing, the waterworks shall be cleaned and disinfected. The Town shall be notified forty-eight (48) hours in advance of any scheduled cleaning and disinfecting operations.

A swab shall be installed inside the pipe at the point of connection to the existing water main. Upon completion of water main installation, the swab shall be flushed through the water main. In the case of water mains two hundred (200) millimetres in diameter or smaller, the swab shall be removed at the last fire hydrant on the new line. In the case of water mains larger than two hundred (200) millimetres in diameter, a fitting shall be provided at or near the end of the new line to permit exit of the swab from the line.

All water mains shall be cleaned and disinfected in accordance with the AWWA Standard C651-92 for Disinfecting Water Mains and to the Province of New Brunswick requirements, which includes chlorination of all mains with a minimum chloride concentration of fifty (50) milligrams per litre (mg/L).

In accordance with the requirements of the New Brunswick Department of Environment and Local Government Approval to Construct, the Developer shall be responsible for the de-chlorination of water used in the disinfecting of water mains prior to release into the natural environment.



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Bacteriological testing shall be completed in accordance with the requirements of the New Brunswick Department of Environment and Local Government, and the Department of Health. New water mains may not be put into service or accepted by the Town until acceptable test results are achieved, unless otherwise directed.

### **2.4.6 Potable Water Service Connections**

All potable water service connections pipe and appurtenances shall be installed in accordance with these Subdivision Specifications and Guidelines and the Town Water Utility By-Law.

#### **2.4.6.1 Trenching, Bedding and Backfilling**

All trench excavating, bedding and backfilling shall be carried out in accordance with the requirements established in *Division B Subsections 1.3.1 – 1.3.2* of this document.

#### **2.4.6.2 Pipe Installation**

Provision for service connections shall be made at the time the main line pipe is installed.

Water service connection laterals shall be installed from water main to the limits of the property line of each lot, in a common trench with the sanitary service lateral, and, where applicable, the storm sewer service lateral. The water service connection lateral shall be installed a recommended minimum of three hundred (300) millimetres above and offset a recommended minimum three hundred (300) millimetres from the sanitary and storm sewer laterals. This vertical and horizontal separation of pipes in a common trench shall be achieved by placing approved bedding in accordance with *Division B Subsection 1.3.2* of these specifications.

Tapping of water mains shall be with use of proper tools and equipment and according to recognized good practice and in compliance with pipe manufacturer's specifications and recommendations.

Each water service connection shall have a corporation stop in the main and a gooseneck formed in the pipe. A curb stop and drain complete with service box and cover shall be placed at the street line on each service line as shown in Typical Detail Drawing *DIV. D – 1A: Potable Water Service Connection*.

All new water service connection laterals shall be one continuous section of pipe with no couplings between the corporation stop and the curb stop.

#### **2.4.6.3 Cathodic Protection**

Sacrificial Anodes shall be placed on each copper service pipe in accordance with the supplier's recommendations.

#### **2.4.6.4 Markers**

Wherever provision is made for future connections either to mains or building services, the ends of the installed lengths of the pipe or the opening in the fittings shall be plugged or properly protected by the Developer in such a manner that injury or damage to the pipe or fittings will not occur. Each service connection shall be marked by a 50mm x 100mm x 2400mm long timber uniquely identifiable marker extending vertically from the plugged end of the pipe to a minimum of six hundred (600) millimetres above the ground surface so that the property owner can easily locate the end of the installed service.





### **2.4.6.5 Depth of Cover and Insulation**

The recommended minimum depth shall be one decimal eight (1.8) metres, unless existing ground elevations are a restricting factor. If sufficient ground cover cannot be achieved to eliminate the possibility of freezing, other mitigating measures acceptable to the Town, must be installed to prevent freezing. Such measures may include the placement of fifty (50) millimetres thick “Styrofoam – SM” rigid insulation board or approved equal around the service connection lateral.

### **2.4.6.6 Service Connection Report**

A completed “Service Connection Report” shall be filed with the Town for each service connection lateral installed. The report shall include such information as the depth of all service pipes at the property line with three separate measurements from the end of the service pipe to permanent structures such as a lot pin or utility pole, and geographic coordinates values spatially reference in accordance with *Part II Subsection 1.4.6.3 – Spatial Reference Framework* of this document. A Service Connection Report template is available in Appendix B.





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## **DIVISION E: STORM DRAINAGE SYSTEM (Storm Sewer)**

### **CONTENTS**

- Item 1: General System Information and Design Guidelines
- Item 2: Construction Specifications



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## 1.0 STORM DRAINAGE SYSTEM – System Information and Design Guidelines

This division governs all the materials and construction methods necessary for the complete installation of the storm drainage system consisting of an open channel flow system and/or a closed storm sewer system, in accordance with these specifications and as shown on the detailed drawings, or as directed by the Town Engineer.

### 1.1 General System Information

#### 1.1.1 Developer's Obligation

The proposed subdivision shall be serviced by a storm drainage control system that shall be design and installed satisfactory to the Town. The system may be an open channel flow system, a closed storm sewer system, or a combination of both.

The **open channel flow system** shall consists of swales, open channel ditches, with pipe culverts underneath all driveways, street intersections, subdivision entrances, and any other location deemed necessary to ensure the adequate receiving, conveying and controlling discharge of water.

The **closed storm drainage system** shall consist of swales, subsurface interceptor drains, pre-cast concrete structures (manholes and/or catch basins), storm sewer piping, and service connection laterals, and other element deemed necessary to ensure the adequate receiving, conveying and controlling discharge of water.

The Developer shall be responsible for the design and installation of a complete storm drainage control system that shall include, but not limited to:

- i. Storm Drainage (Storm Sewer) piping;
- ii. Pre-cast concrete structures (manholes and/or catch basins);
- iii. Frames and covers of concrete structures;
- iv. Storm drainage ditch and open channel construction;
- v. Pipe culverts (driveway, street intersections, etc.);
- vi. Storm sewer service connection laterals to the property line of each lot;
- vii. Pipe culvert end stabilization (e.g., headwall, endwall, etc.)

If the existing storm drainage control system requires extension outside of the subdivision boundaries to service the proposed subdivision, the Developer shall complete the extension.

It is the responsibility of the Developer and the Consulting Engineer to ensure that the proposed development does not create downstream flooding problems, or aggravate an existing downstream flooding problem.

It is the responsibility of the Developer and the Consulting Engineer to use innovative solutions to ensure downstream capacity is adequate and to collect and convey storm runoff through the development area without loss of life, protection of structures and without damage to adjacent property, in an aesthetically pleasing manner.

#### 1.1.2 Analysis of Existing Storm Drainage Systems

In the absence of existing Master Planning, it may be necessary to analyze the capacity of existing storm drainage systems, including storm sewer systems within the Town. This may be required because a proposed development is going to increase stormwater runoff to an



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existing system, and the existing system needs to be analyzed to ensure that it will convey the additional flows without any problems. It may also be necessary to analyze an existing system due to complaints of flooding or problems in the system. Where consultants are required to analyze an existing storm drainage system within the Town, the following procedures shall be followed in doing so:

- i. Hydrologic Analysis
- ii. Hydraulic Analysis
- iii. Open Ditches, Channels, and Watercourses
- iv. Culverts

### **1.1.3 Regulatory Standards**

The storm drainage system must be carefully designed, reviewed and approved by the Town in accordance with these Specifications and Guidelines before any construction proceeds. In addition to the design criteria, all storm drainage systems shall conform to any requirements established by the New Brunswick Department of Environment, the TAC Drainage Manual Parts I and II, and any other regulatory agency.

### **1.1.4 Approvals**

The Developer shall be responsible for obtaining all necessary approvals required for construction of the Storm Drainage System. This shall include but not be limited to:

- i. New Brunswick Department of Environment and Local Government (NBDOELG) - Storm Sewer Design and if required a Watercourse Alteration Permit.
- ii. New Brunswick Electric Power Commission (NB Power) - if required for extension of power lines for sewage lift stations or trenching across underground utilities.
- iii. Aliant Telecom Inc. (Aliant) - if required for trenching across underground utilities.
- iv. New Brunswick Department of Transportation (NBDOT) - if sewers are installed across or along a provincial designated highway.
- v. Canadian National Railway (CNR) - if sewers are installed on a railroad right-of-way.

### **1.1.5 Cost-Sharing - Storm Drainage System Works**

It is the Developer's responsibility to apply for cost sharing assistance for the installation of required storm drainage works. The application will be reviewed by the Town before being submitted to Council for approval under the terms of the Local Improvement By-law and the following conditions:

- i. Application was made subsequent to Tentative Plan approval and review of Engineering Design Drawing.
- ii. The Developer's final Subdivision Plan and final Engineering Design of Storm Drainage Works have been approved in writing by the Town Engineer.
- iii. The Subdivision or portion thereof for which cost-sharing assistance is being sought is service by a closed storm drainage system as defined by these Specifications and Guidelines or Town Engineer.
- iv. The Storm Drainage System has been installed at cost to the Developer to the satisfaction of the Consulting Engineer and the Town.



- v. The Town is in receipt of written conformation that the system has been installed in accordance with the reviewed and approved engineer design and any subsequent approved modifications during installation.
- vi. The Storm Drainage System Works have been inspected by the Town Engineer or their representative.
- vii. The Town Engineer or representative has reviewed and verified the Developer's submitted installation cost.
- viii. Application shall be submitted to Council for approval with the re-imbursement payment to the Developer no later than April 30th the following budget year.
- ix. Re-imbursement limits shall be set at twenty-five percent (25%) of total Storm Drainage Works costs has verified by the Town to a maximum of one thousand dollars (\$1,000.00) per lot serviced by a closed storm drainage system.

## 1.2 Design Guidelines

The design criteria contained in this section is included to illustrate the more common aspects encountered in the design of storm drainage systems, and shall not be interpret as the complete list of guidelines.

All storm drainage systems within the Town shall be designed to achieve the following objectives:

- i. to prevent loss of life and to protect structures and property from damage due to storm events;
- ii. to provide safe and convenient use of streets, property, and other improvements during and following precipitation and snow melt events;
- iii. to adequately convey stormwater runoff from upstream sources;
- iv. to mitigate the adverse effects of stormwater runoff, such as flooding and erosion, onto downstream properties;
- v. to preserve natural watercourses and wetland environment;
- vi. to minimize the long-term effects of development on the receiving surface water and groundwater regimes from both a quantity and quality perspective.

The storm drainage works must be design based on sound engineering principles, and shall utilize both hydrology and hydraulic modeling that incorporates relevant data for the Town.

The design of the storm drainage system shall be based on the level of development anticipated to exist for both the subwatershed under design and upstream subwatershed when both areas are completely developed in accordance with the land-use zoning in place at the time of the design.

The design of the storm drainage control system shall take into consideration these objectives, and shall meet or exceed, any minimum design guidelines set by the Town.

### 1.2.1 Detail Drawing Reference

The following typical detail drawings shall be reference:

- i. DIV. A – 2A: Street Detail
- ii. APEGNB, "Recommended Standards – Water and Sewer Projects: *Detailed Drawing No. 4 Sanitary and Storm Manhole Detail.*"



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### iii. APEGNB Detail Drawing No. 8 – Catch Basin Frame and Grate

#### **1.2.2 Storm Drainage Report**

A storm drainage report shall be prepared and included as part of the submission for any subdivision to examine the effect of the development on the receiving watercourses and downstream drainage system.

#### **1.2.3 Storm Frequency Design Requirements**

- i. Open Channel Flow System – 50 year storm frequency; check impacts for 100 year storm;
- ii. Closed Storm Drain System – 10 year storm frequency; check impacts at sag points for a 50 year storm.

The storm drainage systems shall be design based on sound and proven engineering, with preference being given to principles of the “Rational Method”. The designing engineer shall inform the Town Engineer of the principle method to be used prior to design of the system.

#### **1.2.4 Closed Storm Drainage System**

A storm sewer system shall be provided in accordance with the provisions of these Subdivision Specifications and Guidelines in a subdivision located in other than the rural zone, unless the Developer can confirm the following conditions will be met through sound engineering design and construction methods approved by the Town:

- i. streets, or a portion thereof, have a gradient of or less than six percent (6%), or
- ii. the depth of ditches is not in excess of zero decimal seven five (0.75) metres, or
- iii. driveway pipe culverts require inside diameter not larger than three hundred (300) millimetres.

##### **1.2.4.1 Hydraulics**

The Manning Formula shall be used in the design of the gravity closed storm system.

The Municipal Plan should be used, in conjunction with information supplied by the Development Officer, to forecast the land use for the tributary area, and the area shall encompasses all possible future growth.

Storm drains shall be designed on the assumption that each inlet intercepts all runoff that contribute to it, providing the inlet capacity is equal to or greater than the design runoff.

The compatibility of grate capacity, pipe capacity and design flow must be considered in closed system design.

##### **1.2.4.2 Gradient**

The system gradient shall be such that a recommended minimum velocity of zero decimal six (0.6) metres per second (m/s) and a recommended maximum velocity of four decimal zero (4.0) metres per second (m/s) shall not be exceeded under Peak Design Flow (PDF). The minimum slope of closed system pipes shall be not be less than zero decimal four percent (0.4%). Under special conditions, if full justifiable reasons are given, slopes less than zero decimal four percent (0.4%) may be permitted, if self-cleansing velocities under flow conditions are maintained.

##### **1.2.4.3 Storm Drainage Pipe Diameters and Type**



Unless an approved design requires otherwise, the recommended minimum size of storm sewer pipe shall be three hundred seventy five (375) millimetres.

The recommended minimum size for storm sewer service connection laterals or storm drainage outlets shall be one hundred (100) millimetres for residential property lots and one hundred fifty (150) millimetres for commercial property lots.

Acceptable pipe shall be Polyvinyl Chloride (PVC) or Reinforced Concrete.

#### **1.2.4.4 Minimum Cover**

The minimum cover for pipe, measured between the pipe crown and finished grade shall be:

- i. **Paved and Unpaved Roads:** nine hundred fifteen (915) millimetres for all type of pipe
- ii. **Under Driveways:** three hundred (300) millimetres for all type of pipe
- iii. **Under Grassed areas:** six hundred (600) millimetres for all type of pipe

#### **1.2.4.5 Concrete Structures**

Storm sewer pipe diameter must not decrease in the downstream direction. Pre-cast concrete structures shall be placed wherever there is change in pipe diameter, grade or alignment and intersections with cross street culverts.

The recommended maximum spacing of concrete structures shall be ninety (90) metres.

Structures shall be provided at all low points in the road and at intersections. Large intersections or cul-de-sac bulbs may require multiple structures. At intersections, the location shall be dependent upon the slopes on the intersecting streets and the alignment of the streets.

No surface flow shall be allowed across streets or driveways. Where the steepness of side slopes may result in surface flows crossing streets, adequate measures shall be used to mitigate the problem.

#### **1.2.4.6 Pipe Location and Easements**

Wherever possible, all storm sewer pipes and appurtenances shall be located within the street right-of-way or a municipal service easement owned by the Town.

The municipal service easement shall be in accordance with the requirements established in *Part II General Conditions Section 2.3 - Easements* of this document.

#### **1.2.4.7 Inlet and Outlet Grates**

The requirements established under *Division E Subsection 1.2.5.6* of this document shall apply.

#### **1.2.5 Open Channel Flow System**

In the Open Channel Flow system appropriate and adequate soil investigation shall be conducted as a prerequisite to the detailed design of open channels, ditches and culverts. A sample of the computations and analysis to determine open channel flows and adequate culvert pipes shall be documented and shall be submitted to the Town as part of the storm drainage report.





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### **1.2.5.1 Open Channel and Ditch Flow Capacity**

Roadway ditches, where curb and gutter systems are not required, shall be designed to conform to the typical cross section as shown in Typical Detail Drawing *DIV. A – 2A: Street Detail*. Ditches shall be designed with adequate capacity to carry flow expected from the 1 in 100 year return period storm.

All low points in the roadway profile must be designed to collect and convey stormwater runoff off the roadway via a drainage easement designed to convey the overland flow.

Provision shall be made to remove runoff into drainage channels, watercourses, and pipe systems at low points and at intervals that will assure that this criterion is observed.

### **1.2.5.2 Open Channel and Ditch Gradient and Erosion Control**

All open channels and ditches shall be designed with consideration given to erosion and subsequent siltation of streams, rivers or other water bodies, or depositing on roadways or low-lying areas. To prevent erosion, high velocity flows in open channels or ditches that convey stormwater runoff shall incorporate energy dissipation facilities acceptable to the Town.

Acceptable mitigating methods include, but are not limited to, include some acceptable form of matting for erosion control, stone lining of the open channels for erosion control, stone fill and riprap. All forms of erosion control and energy dissipation facilities incorporated into the open channel and ditch design, shall be approved by the Town Engineer prior to construction.

In order to keep the ditch and open channels self-cleaning, a recommended minimum grade of zero decimal five percent (0.5%) is required, however if conditions do not allow such a grade, a sufficient velocity ensuring that no standing water after a reasonable timeframe will be considered.

The minimum grade of the pipe culverts shall not be less than zero decimal four percent (0.4%) or shall be able to maintain a minimum velocity of zero decimal six (0.6) metres per second (m/s) while flowing one-third full.

### **1.2.5.3 Manning Formula**

The Manning Formula shall be used in the design of open channels:

- i. Side slopes for grassed lined channel shall not be steeper than 3:1.
- ii. Full details of open channel design, including energy dissipation structures, where required, shall be submitted to the Town for review and approval.

### **1.2.5.4 Culvert Diameters and Headwalls**

- i. Crossroad culverts shall be a recommended minimum six hundred (600) millimetres in diameter.
- ii. In a resident zone, driveway culverts shall be a recommended maximum three hundred (300) millimetres in diameter, unless otherwise directed by the Town Engineer. In a rural zone, the pipe size shall be as recommended by the Town Engineer.
  - a) All driveway culverts in each subdivision phase shall be of the same manufacture type and style, unless otherwise directed by the Town Engineer.



- iii. All pipe culverts under roadways and driveways are to be equipped with an inlet and outlet headwall, or some other form of embankment stabilization and erosion control. The design and installation of headwalls or stabilization techniques used shall be uniform, both in materials and construction, in each subdivision phase, and where possible throughout the entire subdivision. The Town Engineer, prior to construction, shall approve all headwall and stabilization techniques. The Town reserves the right to specify the type of headwall or stabilization technique to be used.

### **1.2.5.5 Hydraulic Capacity**

Pipe culverts are to be sized for instantaneous peak flows with a headwater depth (HW) to culvert diameter (D) ratio of one (1), accounting for both inlet and outlet controls.

- i. **Outlet Velocity:** The recommended maximum culvert outlet velocity is four decimal zero (4.0) metres per second (m/s). An appropriate and effective splash pad and apron must be designed to transition the culvert velocity to the mean downstream channel velocity.

### **1.2.5.6 Inlet and Outlet Grates**

At the discretion of the Town Engineer, pipe culverts longer than twenty-five (25) metres in an open channel flow system may require some form of inlet and outlet grates. Culverts under driveways and roadways less than twenty-five (25) metres in length shall not normally require inlet and outlet grates.

Inlets to an enclosed storm drainage systems with pipes larger than four hundred fifty (450) millimetres diameter that lead to a Catch Basin system shall require grates to prevent entry.

The design, sizing and installation of inlet and outlet grates must take into consideration the restriction in flow created by the grate and blockage. Under no circumstances shall a culvert be equipped with an outlet grate and no inlet grate.

The Town Engineer, prior to construction, must approve the design, sizing and installation method of inlet and outlet grates.

## **1.2.6 Downstream Effects**

### **1.2.6.1 Other Considerations**

Explicit consideration shall be given to public safety, New Brunswick Department of Environment and Local Government regulations, New Brunswick Department of Transportation regulations, the resulting nuisance and maintenance implications of ditches, open channels, and drainage courses. Attempts shall be made to limit the number of partial enclosures of a ditch, open channel, or drainage course by driveways, roadways, and other crossings.

### **1.2.6.2 Storm Drainage Municipal Service Easement**

No storm drainage is to be carried onto, through, or over private property, within a subdivision, other than by a natural watercourse, excavated ditch, or minor storm drainage system.



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To ensure access to storm drainage systems, a municipal service easement of adequate width shall be deeded to the Town in the following cases:

- i. excavated ditches or storm sewers within the boundary of the subdivision;
- ii. where a need is identified by the Town to accommodate future upstream drainage, a municipal service easement shall be provided from the roadway to the upstream limits of the subdivision;
- iii. a municipal service easement may be required for excavated ditches or minor storm drainage systems that are adjacent to and immediately downstream of the subdivision that are required to ensure the storm drainage system functions properly. A municipal service easement will not normally be required for a natural watercourse;
- iv. where subdivision stormwater runoff flows from the subdivision onto adjacent properties other than in a natural watercourse, a municipal service easement in favour of the Town must be provided by the owners affected;
- v. natural watercourses shall not normally be carried in roadside ditches or minor storm drainage systems.
- vi. in all residential zones, where a drainage easement exists between properties, the storm drainage shall be installed to the rear property line.

### **1.2.6.3 Discharge to Adjacent Properties**

All storm drainage is to be self-contained within the subdivision limits, except for natural drainage associated with runoff from undeveloped areas. However, runoff from within the subdivision may be directed to a natural stream, watercourse, or storm drainage system owned by the Town.

In all cases, concentration and conveyance of stormwater to adjacent properties outside the subdivision limits is prohibited unless the developer obtains permission from the adjacent property owners, and private drainage or service easements are provided.

The grading along the limits of the subdivision shall be carefully controlled to avoid disturbance of adjacent properties or an increase in the discharge of stormwater to those properties.

The lot grading design shall provide for drainage from adjacent properties where no other alternative exists.

The lot grading design shall provide for temporary drainage of all blocks of land within the subdivision that are intended for future development.

During the design of storm drainage systems, provision must be made for accommodating natural drainage from adjacent properties by means of an interceptor swale or other system component.



## 2.0 STORM DRAINAGE SYSTEM - Construction Specifications

### 2.1 Description

The Developer shall construct the storm drainage system in accordance with these Specifications, and shall meet or exceed all requirements of the New Brunswick Department of the Environment, Department of Health, TAC Drainage Manual Parts I and II, and any other regulating agency.

### 2.2 Materials

Unless otherwise specified, approved materials shall meet or exceed the following specifications:

- i. **Pre-cast Concrete Sections:** shall be ASTM C-478 concrete manhole/catch basins sections manufactured in accordance with the system design and detailed drawings and conforming to CAN/CSA A257.4.
  - a) Sections shall be complete with pre-cut holes for connection of storm sewer pipes. Holes for ribbed PVC pipe shall be one hundred (100) millimetres larger in diameter than the outside diameter of the pipe to permit adequate grouting. All concrete structures shall be complete with pre-cast concrete floor.
- ii. **Storm Sewer Pipe:**
  - a) **Polyvinyl Chloride (PVC) Pipe and Fittings:** shall conform to CAN/CSA Standard B182.2-M, ASTM D3034 and/or ASTM F679, with a pipe Standard Dimensional Ratio (SDR) of 35, colour coded green and sized in accordance with the flow requirements. The pipe shall be marked to show manufacturer, DR and CSA certification.  
  
The bell will be an integral and homogeneous part of the pipe barrel. The pipe shall be marked to show the manufacturer, DR and CSA certification.
  - b) **Profile/Ribbed Polyvinyl Chloride (PVC) Pipe and Fittings:** shall be a straight rib design perpendicular to the axis of the pipe conforming to CAN/CSA-B182.4 and ASTM F794. The bell will be an integral and homogeneous part of the pipe barrel.
    - i) **Perforations:** in areas of high groundwater tables, the pipe shall be perforated at the third points along a section of pipe by drilling two (2) twelve (12) millimetre diameter holes, located in a five (5) o'clock and seven (7) o'clock configuration. The perforations shall be wrapped with approved geotextile fabric, such as Mirafi P50 SPW, Terrafix 200R, or approved equal.
  - c) **Reinforced Concrete Pipe:** shall Conform to CAN/CSA-A257.2, Class 65D (ASTM C76).
- iii. **Joints:** Joints for storms sewers may be gasket or non-gasket. The type of jointing shall be as part of the system design.
  - a) Non-gasketed joints are not subject to a leakage test but shall be wrapped with an approved geotextile fabric, such as Mirafi P50 SPW, Terrafix 200R, or approved equal.



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- b) All rubber gaskets must meet the requirements of CAN/CSA A257.3
- iv. **Lubricants:** shall be non-toxic, water-soluble which is listed by the National Sanitation Foundation (NSF).
- v. **Frames and Grates:** shall be cast iron to ASTM A48, Class 30 in accordance with APEGNB Detail Drawing No. 8 – Catch Basin Frame and Grate.
- vi. **Storm Sewer Service Lateral Connection Pipe and Fittings:** shall be polyvinyl chloride (PVC) sewer pipe with Standard Dimensional Ratio (SDR) 28, color coded white and meeting the requirements of the latest CAN/CSA B182.1 and ASTM D3034 and shall be a minimum 100mm diameter. Joints will be bell and spigot type with locked rubber gasket. The bell will be an integral and homogeneous part of the pipe barrel. The pipe shall be marked to show the manufacturer, DR and CSA certification.
  - a) Depth of bell on PVC fittings shall be as required for pipe.
  - b) Bends shall be of long radius type only, unless otherwise approved.
- vii. **Plugs, Caps:** to prevent infiltration shall be PVC
- viii. **Marker Stakes:** minimum 50mm x 50mm x 2400mm rough lumber.
- ix. **Tees, Wyes and Saddles:** shall be PVC material as recommended by the pipe manufacturer.
- x. **Pipe Zone Material:** shall be conform to the limits established in *Division B Subsection 1.3.2.1 Pipe Zone* in these specifications, or as detailed in the manufacturer's installation instructions.
- xi. **Bedding and Backfill:** shall be conform to the limits established in *Division B Subsection 1.3.2* of these specifications, or as detailed in the manufacturer's installation instructions.

### **2.2.1 Equipment**

Approved laser alignment equipment must be used to control line and grade during all pipe installation in constructing of the closed drainage system.

## **2.3 Works Under Other Sections**

Relevant specifications under other sections in this document:

- i. **Trenching** – Part III Division B Subsection 1.3.1;
- ii. **Bedding and Backfilling** – Part III Division B Subsection 1.3.2;
- iii. **Typical Detail Drawings:**
  - a) DIV. A – 2A: Street Detail
  - b) DIV. B – 1A: Typical Trench Detail
  - c) DIV. B – 1B: Double Pipe Trench Detail
  - d) DIV. B – 1C: Triple Pipe Trench Detail
  - e) APEGNB: *“Recommended Standards – Water and Sewer Projects: Detailed Drawing No. 4 Sanitary and Storm Manhole Detail*
  - f) APEGNB: *“Recommended Standards – Water and Sewer Projects: Detailed Drawing No. 5 Catch Basin Detail”*.



## 2.4 Construction Methods

### 2.4.1 Closed Drainage System

#### 2.4.1.1 Trench Excavation, Bedding and Backfilling

All trench excavating, bedding and backfilling, including the pipe zone, shall be carried out in accordance with requirements set established in *Division B Subsections 1.3.1 – 1.3.2* in this document, or as detailed in the manufacturer's installation instructions.

The minimum cover for pipe, measured between the pipe crown and finished grade, as establish in *Division E Subsection 1.2.4.4* in this document shall be apply.

#### 2.4.1.2 Pipe Installation

##### **A. Laying**

All storm sewer piping shall be installed according to the sizes and in the locations indicated on the approved design drawing, unless otherwise specified by the Town Engineer.

All pipes shall be laid and jointed conforming with the manufacturer's instructions and recommendations and in accordance with recognized good practice. Joints between dissimilar pipes shall be made in accordance with the recommendation of the manufacturer of one or the other of the pipes.

Pipe and fittings shall be thoroughly inspected in the field before and after installation. Any defective or damaged pipe shall be not be used and there shall be no attempts to repair a defective item. Such defective items shall be removed from the work site and replaced with sound material free of defects.

Laying of pipe in prepared trenches shall be to correct line and grade as shown on the design drawings, or as directed, commencing at lowest point with bell of pipe pointing upgrade, unless otherwise approved, with uniform bearing under full length of the barrel of the pipe. Any pipe which is not in true alignment, or which shows settlement after laying, shall be taken out and re-laid.

Trenches where pipe laying is in progress shall be kept dry and no pipe shall be laid in water or upon wet bedding. No length of pipe shall be laid until the preceding length has been thoroughly embedded and secured in place to prevent any movement or disturbance of the pipe.

##### **B. Curve Deflection**

Where storm sewer pipes are to be laid on a curve or curved alignment to avoid obstructions, the amount of deflection allowed shall not exceed that require for satisfactory connection of the joint. Maximum deflections in pipe joints shall be according to recommendations of pipe manufacturer.

##### **C. Jointing**

The bell and spigot shall be free of contaminants or any foreign matter before jointing. Any time pipe installation is not in progress; a watertight plug shall close open ends of the pipe. To assist with gasket pipe jointing, use only lubricant approved by gasket supplier. **Under no circumstances shall household**



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**detergents or motor oils be used.** Form joints as recommended by pipe manufacturer.

Pipe materials with non-gasket joints and/or pipe perforations shall be wrapped with an approved geotextile fabric in accordance with the manufacturer's instructions.

Pipes shall be installed such that a pipe joint occurs within one (1) metre of any pre-cast concrete structure.

Pipe shall not be jointed, under any circumstances, by pushing the pipe together using mechanical force from any heavy equipment (e.g. Excavator, backhoe, etc).

### **2.4.1.3 Pre-cast Concrete Structures**

All pre-cast concrete structures shall be installed according to the sizes and in the locations indicated on the approved design drawing, unless otherwise specified by the Town Engineer.

All pre-cast concrete structures shall be constructed as shown on the detail drawings, APEGNB, "Recommended Standards – Water and Sewer Projects: *Detailed Drawing No. 4 Sanitary and Storm Manhole Detail*", and "*Detailed Drawing No. 5 Catch Basin Detail*".

The pre-cast structures shall be installed at all low points and at an elevation to ensure interception capacity handles both road surface and lot drainage.

### **2.4.1.4 Pre-cast Concrete Structures - Sectional Joints**

All joints between pre-cast sections shall be installed with both a rubber gasket and an approved bituminous compound and must be watertight.

Lifting holes in pre-cast sections shall be plugged with cement mortar for the full depth and made watertight.

### **2.4.1.5 Height of Structures**

All structures will be constructed to between one hundred and fifty (150) millimetres and three hundred (300) millimetres of the proposed finished grade by means of one thousand fifty (1050) millimetre diameter or one thousand two hundred (1200) millimetre sections. The cast iron frame and cover or grates will be set as shown on the drawings as ordered or flush with the finished grade using a grade ring and six hundred (600) millimetre diameter sections. All non-tongue and groove joints shall have a cement mortar joint.

### **2.4.1.6 Connections**

Connections between concrete structures and pipe shall be the method recommended by the manufacturer. All concrete structure bases shall be pre-benched by the supplier and pre-cut holes for connection of storm sewer pipes. Holes for ribbed PVC pipe shall be one hundred (100) millimetres larger in diameter than the outside diameter of the pipe to permit adequate grouting.





## **2.4.1.7 Pipe Cleaning and Inspection**

### **A. Cleaning**

Upon completion, each structure shall be cleaned of silt, debris or other matter of any kind and shall be kept clean until final acceptance of the Work.

### **B. Video Inspection**

The interior video inspection of all storm sewers is not mandatory, however at the discretion of the Town Engineer such an inspection may be required. The Town will advise the Consulting Engineer and the Developer in timely manner should this requirement be necessary as part of the final acceptance of the system.

## **2.4.2 Storm Sewer Service Connections**

### **2.4.2.1 Trench Excavation, Bedding and Backfilling**

Trench excavation, bedding and backfilling for the Storm Sewer Service connection shall be in accordance with requirements set established in *Division B Subsections 1.3.1 – 1.3.2* of this document, or as detailed in the manufacturer's installation instructions.

### **2.4.2.2 Pipe Installation – Service Connections Laterals**

Provision for service connections shall be made at the time the main line pipe is installed using Tees or Saddles. Saddles are permitted only if the Developer is directed to install a service after the main line has been installed. When connecting a saddle, appropriate circular hole shall be cut into the main in a neat and workmanlike manner without seriously damaging the main pipe.

Service laterals shall be extended from the storm sewer pipe to the property line and terminate with a PVC watertight cap installed in the bell end as shown in Typical Detail Drawing *DIV. C – 1A: Sanitary Sewer Service Connection*. Service connection piping shall be laid on a recommended minimum grade of two percent (2%) for all new development.

Service connections must be placed and bedded in dewatered trenches.

### **2.4.2.3 Depth of Cover and Insulation**

The recommended minimum depth shall be one decimal eight (1.8) metres, unless existing ground elevations are a restricting factor. If sufficient ground cover cannot be achieved to eliminate the possibility of freezing, other mitigating measures acceptable to the Town, must be installed to prevent freezing. Such measures may include the placement of fifty (50) millimetres thick "Styrofoam – SM" rigid insulation board or approved equal around the service connection lateral.

### **2.4.2.4 Plugged Ends**

Wherever provision is made for future connections either to mains or building services, the ends of the installed lengths of the pipe or the opening in the fittings shall be plugged with a water tight plug adequately blocked to safely withstand the pressure developed during leakage tests. All laterals shall end with a bell end.





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### **2.4.2.5 Markers**

Each service connection lateral shall be stake by a 50mm x 50mm x 2400mm long unique identifiable marker extending vertically from the plugged end of the pipe to a minimum of six hundred (600) millimetres above the ground surface, so that the property owner can easily locate the end of the installed service.

### **2.4.2.6 Service Connection Report**

A completed "Service Connection Report" shall be filed with the Town for each service connection lateral installed. The report shall include such information as the depth of all service pipes at the property line with three separate measurements from the end of the service pipe to permanent structures such as a lot pin or utility pole, and geographic coordinates values spatially reference in accordance with *Part II Subsection 1.4.6.3 – Spatial Reference Framework* of this document. A Service Connection Report template is available in Appendix B.

## **2.4.3 Open Drainage System**

### **2.4.3.1 Ditching**

The open drainage system ditch shaping, compaction, hydroseeding shall be done in accordance with the requirements established in *Division E Subsection 2.3.10 - Drainage Ditching – Open Channel Flows* of this document.

The maximum depth shall be zero decimal seven five (0.75) metres, as measured down from a horizontal plane projected from road shoulder edge to ditch centreline.

### **2.4.3.2 Trench Excavation, Bedding and Backfilling**

Installation of pipe culverts, all trench excavating, bedding and backfilling, including the pipe zone, shall be carried out in accordance with requirements as established in *Division B Subsection 1.3.1 – 1.3.2* of this document, or as detailed in the manufacturer's installation instructions.

The minimum cover for pipe, measured between the pipe crown and finished grade, as establish in *Division E Subsection 1.2.4.4* of this document shall be apply.

### **2.4.3.3 Pipe Laying and Jointing**

Prior to placing the pipe in the ditch, each pipe shall be inspected for defects. Any defective pipe shall be removed from the site and replaced with sound material

All dirt and gravel must be kept out of the joint so that the corrugations fit snugly. Pipe materials with non-gasket joints and/or pipe perforations shall be wrapped with an approved geotextile fabric in accordance with the manufacturer's instructions. To assist with gasket jointing of pipe, use only lubricant approved by gasket supplier.

The pipes shall be laid in the trench so upon completion of pipe installation the interior surface shall conform accurately to the grades and the alignment of the ditch. All adjustments of line and grade of pipes laid directly upon the bottom must be done by scraping away of filling in the backfill under the body of the pipe and not by blocking or wedging of the pipe.



### **2.4.3.4 Driveway Culverts**

During installation the design grade for each culvert as part of the open drainage system must be maintained. The pipe culvert invert grade shall be verified using an automatic level during and following the installation to ensure the culvert does not break the designed uninterrupted flow.

Any pipe culvert installed using improper or “negative” grade shall be removed and re-installed at the expense of the Developer.

All pipe culverts shall be installed in accordance with the requirements established in the *Division E Subsection 2.4.3.3 - Open Drainage System - Pipe Laying and Jointing* of this document. Each end shall be stabilized in a manner acceptable to the Town.

In conjunction with the pipe installation, the culvert inlet and outlet headwalls or form of embankment stabilization and erosion control shall be installed in accordance with the approved design.

### **2.4.3.5 Subdivision Entrance and Cross-road Culverts**

The recommended minimum inside diameter for all subdivision entrance and crossroad culverts shall be six hundred (600) millimetres, and the road embankment at each end shall have headwalls and endwalls or be stabilized in a manner acceptable to the Town.

Culverts under roadways are to be reinforced concrete pipe

A recommended minimum of one thousand (1000) millimetres of gravel cover shall be required above the spring line of the pipe.



## SUBDIVISION SPECIFICATIONS & GUIDELINES

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## **DIVISION F: Green Space and Open Space Development**

### **CONTENTS**

Item 1: General Development Information



## SUBDIVISION SPECIFICATIONS & GUIDELINES

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## 1.0 GREEN SPACE AND OPEN SPACE DEVELOPMENT – General Information

This section applies to the Town's approach to open space development specifically the intent of green space design, and public space planning incorporating connections to public facilities, schools, parks and the development of a Municipal Trail Network system.

### 1.1 General Approach

The intent of the subdivision review at this stage is to ensure there are proper linkages between key nodes and elements of the community. There also has to be consideration that the development enables provision for an appropriate distribution of public facilities and compliments or enhances the variety of facilities and atmospheres suitable for all leisure and recreational activities in the community.

The Town will look to ensure development takes into account options for development of a linear trail network within the municipality looking to link where possible with existing municipal parks, playgrounds and trails as well as public facilities such as schools churches and commercial development. The trail network will consist of the connection of various travel corridors enabling the use of various modes of travel and forms of passive or active recreational activities.

Development will be subject to a review of the general plan for the area, topography, and general characteristics and features for the proposed development. The town will look to ensure the subdivision protects and enhances natural features keeping in mind the residential nature of the community. Emphasis will be given to waterfront development especially those affecting riverfront development or adjacent to streams, brooks, lakes, and wetlands.

Development will be examined to ensure the incorporation of open space that considers:

- i. Protection of groundwater resources
- ii. Recreational Activities
- iii. Habitat Conservation
- iv. Sustainable Development
- v. Environmental Benefits
- vi. Regional Benefits

### 1.2 Specifications for Development

The developer will be required to construct the subdivision in accordance with the Land for Public Purposes standards described in Section 6 of the Town Subdivision By-law and in accordance with recommendations identified by the Development Officer, Planning Advisory Committee, and Council.

### 1.3 Land for Public Purpose – Decision Guidelines

For all subdivisions, the tentative subdivision plan will be viewed on its own merits as to the immediate or future needs of the Town vis-à-vis whether the Town will take land or accept money, as permitted under the Community Planning Act. Normally land for public purposes will be taken.



## SUBDIVISION SPECIFICATIONS & GUIDELINES

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The items to be considered in determining whether to accept land or money in lieu of land thereof, although not exhaustive, should include:

- i. Does the Community Services Department have a specific use in mind for a parcel of land; i.e., as a part of a trail network or a link to it, playground, or other reason;
- ii. Is the subdivision one phase of an already largely developed subdivision which lacks any land for public purposes;
- iii. Is there any adjacent land for public purposes, or other Town owned land, surrounding the tentative subdivision? If so, can it be combined with LPP land from this subdivision, which may create a larger parcel;
- iv. What is the topography of the subdivision, the existing land cover and the slope, lay of the land, and subsoil;
- v. Are there any bona fide waterways, watercourses, marshes, ponds, lakes, rivers or streams on the property;
- vi. If this is only a phase of an eventual larger subdivision, does the Town want a larger parcel of land (not in the current subdivision plan) that could be credited back to the developer in future phases, through a future land trust bank? (The intent of this would be to evaluate each new subdivision phase as part of an overall review. If, for example, a landowner has fifty (50) acres but chooses to develop in smaller phases, say ten (10) acres at a time, the Town would evaluate the Land for Public Purposes requirement on the full fifty (50) acres and identify the preferred site for the Land for Public Purposes. Negotiations could then take place with the developer to see if setting aside the larger parcel for Land for Public Purposes is feasible from a legal and practical perspective. If so, the developer would then be appropriately credited with the larger Land for Public Purposes parcel initially set aside as each new phase is approved);
- vii. If the potential land were to be considered for sale sometime in the future, is it large enough for a building lot, or is it just a remnant parcel? (Remnant parcels may be considered only in consultation with staff and with a specific identified purpose in mind).
- viii. Would the residents benefit more from monies to be applied towards a centralized recreation project?



## PART IV: Typical Detail Drawings





## SUBDIVISION SPECIFICATIONS & GUIDELINES

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## List of Standard Typical Detailed Drawings

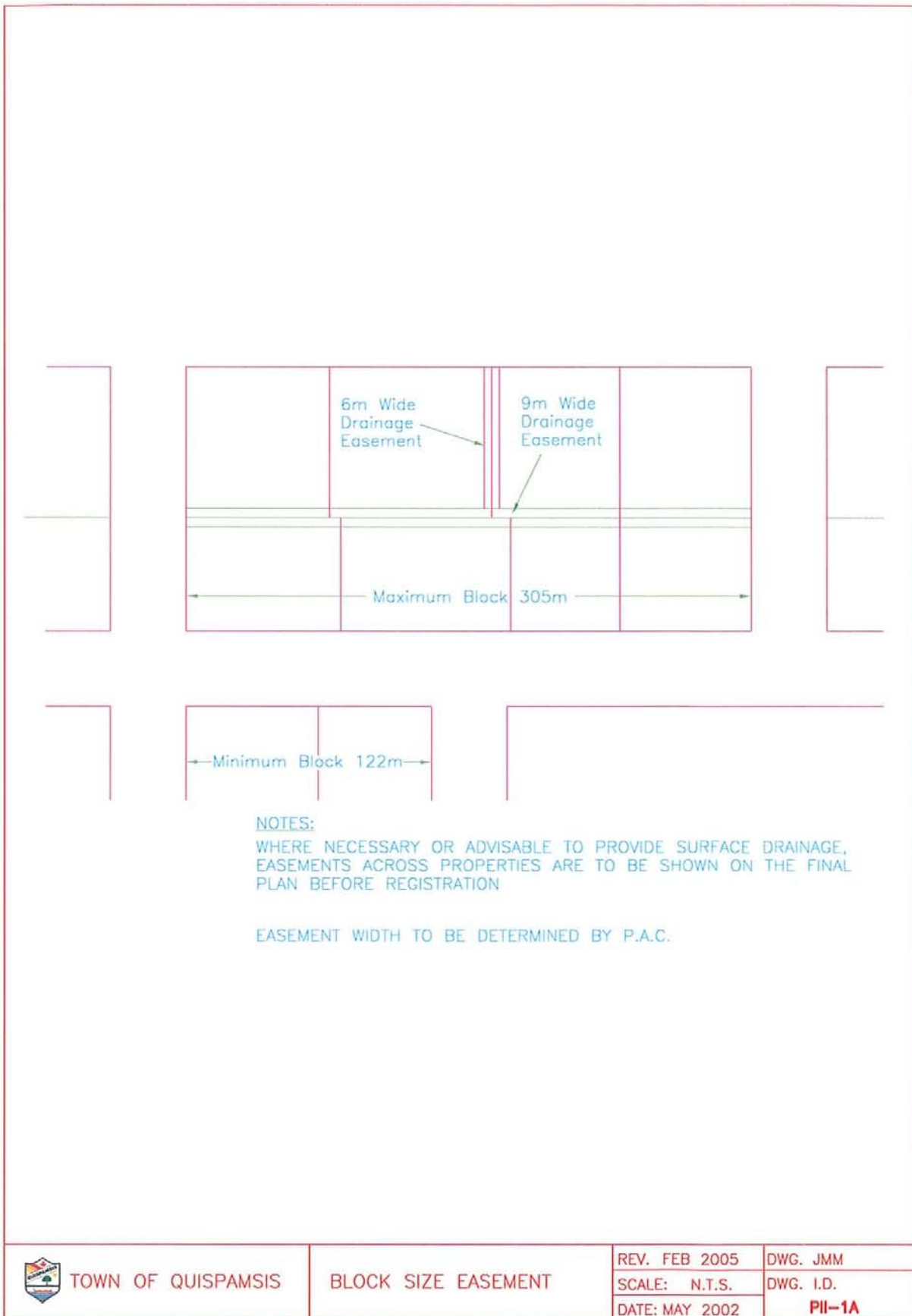
No.	Drawing Identification (DWG. I.D.)	Drawing Title
1	PII – 1A	Block Size Easements
2	PII – 2A	Sediment Control Fence
3	DIV. A – 1A	Angle Of Street Intersections
4	DIV. A – 1B	Cul-de-Sac Layout
5	DIV. A – 2A	Street Detail
6	DIV. B – 1A	Typical Trench Detail
7	DIV. B – 1B	Double Pipe Trench Detail
8	DIV. B – 1C	Triple Pipe Trench Detail
9	DIV. C – 1A	Sanitary Sewer Service Connection
10	DIV. C – 2A	Grates & Covers Round
11	DIV. C – 2B	Grates & Covers Square
12	DIV. D – 1A	Potable Water Service Connection
13	DIV. D – 2A	Hydrant Installation

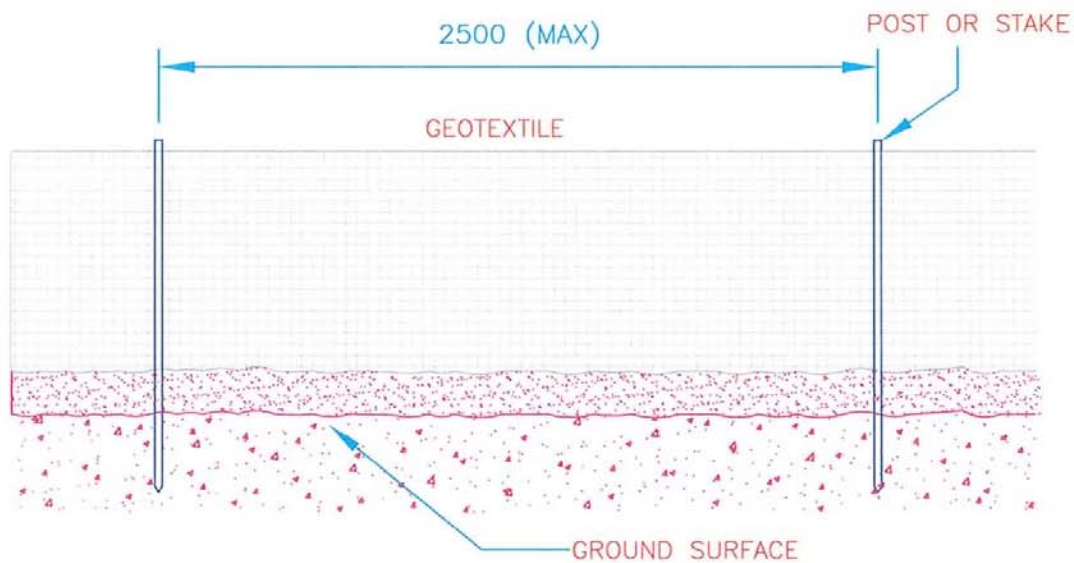


## SUBDIVISION SPECIFICATIONS & GUIDELINES

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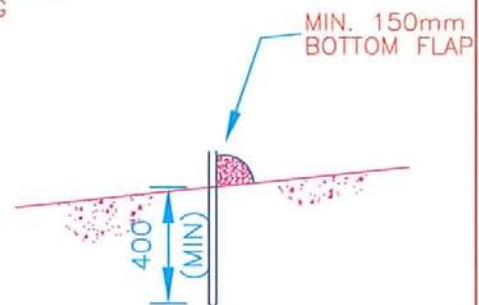
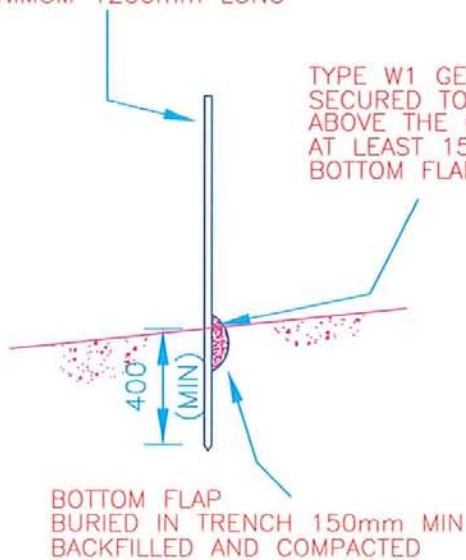
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WOODEN, METAL OR  
SYNTHETIC POST OR STAKE  
MINIMUM 1200mm LONG

TYPE W1 GEOTEXTILE  
SECURED TO POSTS 750 +/- 50mm  
ABOVE THE GROUND SUCH AS THAT  
AT LEAST 150mm IS LEFT AS A  
BOTTOM FLAP FOR BURYING



IN UNGRUBBED AREAS WHERE A TRENCH,  
IS UNPRACTICAL, FLATTEN BOTTOM FLAP  
ON THE GROUND, BACKFILL AND  
COMPACT THE SOIL



TOWN OF QUISPAMISIS

SEDIMENT CONTROL FENCE

REV.

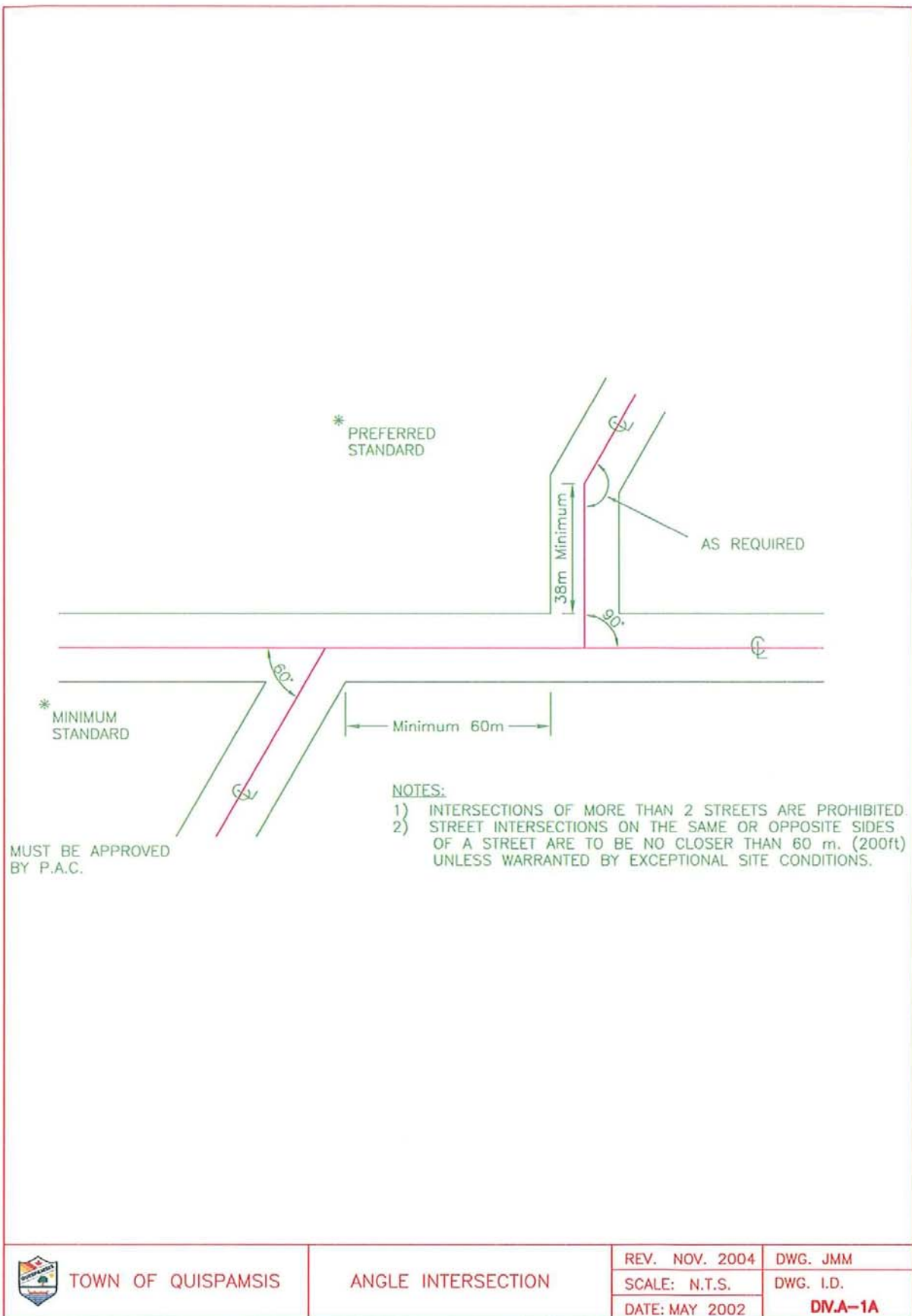
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DATE: MARCH 2005

DWG. BJB

DWG. I.D.

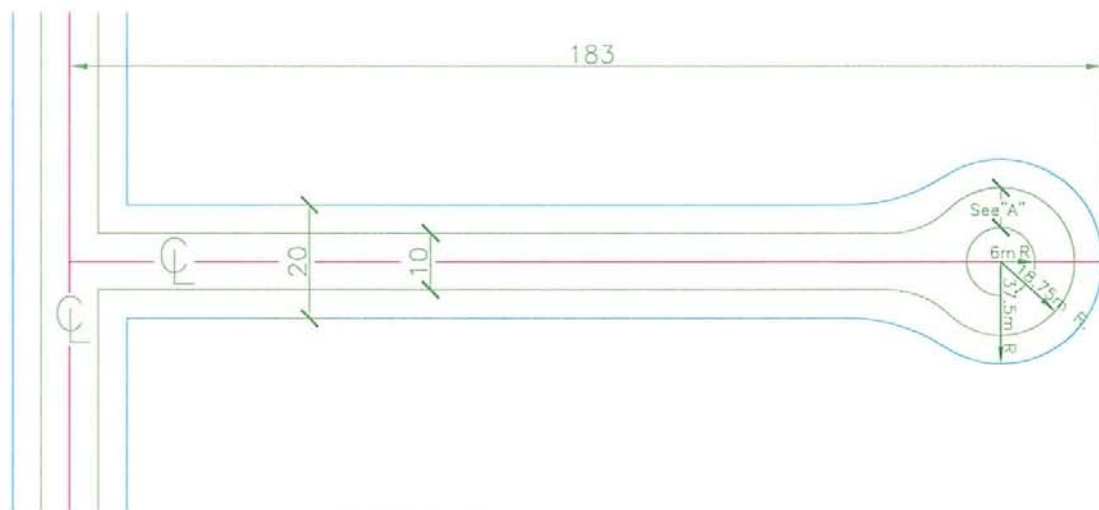
PII-2A



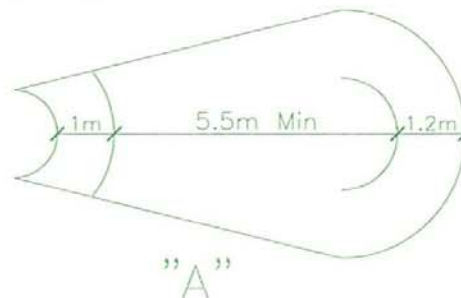
 <b>TOWN OF QUISPAMISIS</b>	<b>ANGLE INTERSECTION</b>	REV. NOV. 2004	DWG. JMM
		SCALE: N.T.S.	DWG. I.D.
		DATE: MAY 2002	<b>DIV.A-1A</b>

NOTES:

- 1) DISTANCES ARE GIVEN IN METERS
- 2) MAXIMUM CUL-DE-SAC LENGTH IS 183m MEASURED ALONG CENTRELINE
- 3) 12m RADIUS TO OUTSIDE EDGE OF ASPHALT
- 4) 1m SHOULDER BETWEEN INSIDE EDGE OF ASPHALT AND ISLAND  
(STANDARD 1.2m SHOULDER ALONG OUTSIDE EDGE)
- 5) INSET "A" TO BE USED WHERE CUL-DE-SAC DESIGNED WITH ISLAND



SCALE N.T.S.



TOWN OF QUISPAMISIS

CUL-DE-SAC-LAYOUT

REV.

SCALE: N.T.S.

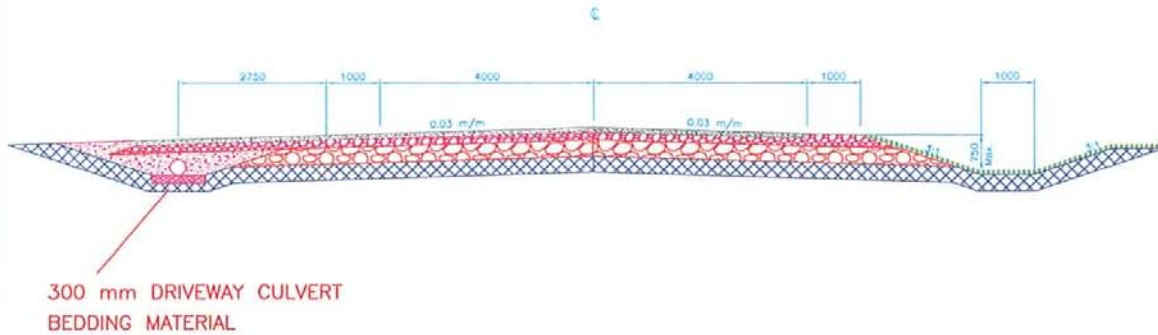
DATE: MARCH 2005

DWG. BJB

DWG. I.D.

**DIV.A-1B**

## STREET DETAIL



### NOTES

MAX DITCH SLOPE 3:1

DITCHES TO BE CRUSHED GRAVEL TO APPROVED PROFILES (Landscaping as per deed covenants)

ASPHALT CROWN TO BE CARRIED TO CENTRELINE OF CULVERT

\*THESE MEASUREMENTS MAY VARY TO SUIT ROAD ALIGNMENT AND STORM SYSTEM

## STREET DETAIL



TOWN OF QUISPAMISIS

STREET DETAIL

REV.

SCALE: N.T.S.

DATE: FEB. 2005

DWG. BJB

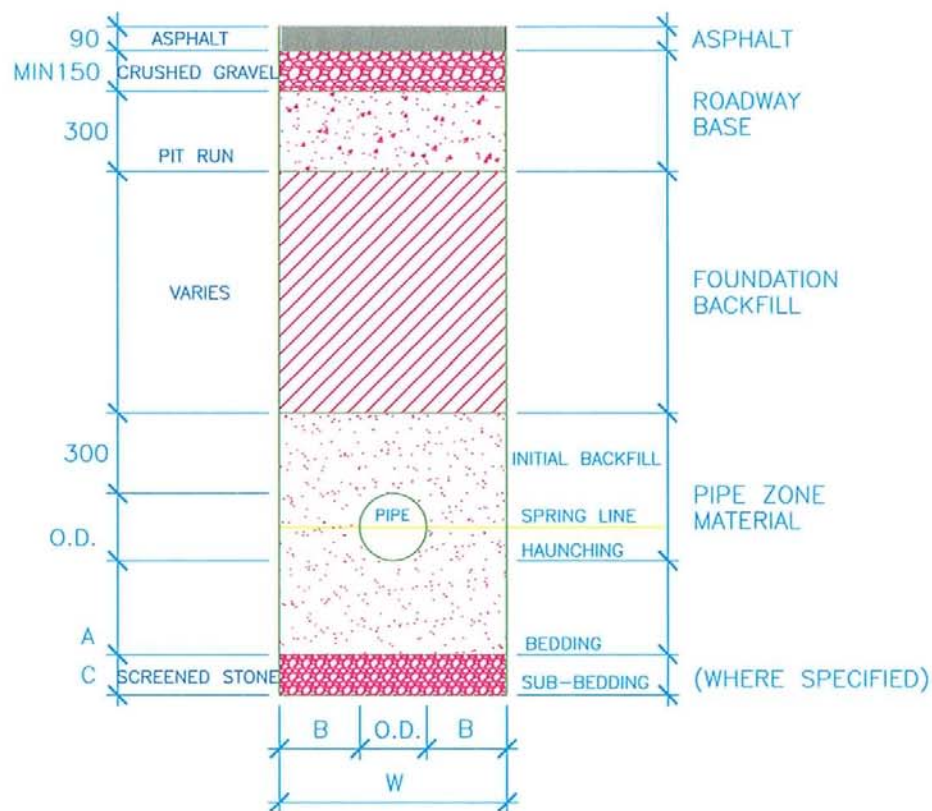
DWG. I.D.

**DIV.A-2A**



**NOTES:**

- 1) ACTUAL CONSTRUCTION WIDTHS SHALL BE IN ACCORDANCE WITH N.B. INDUSTRIAL SAFETY ACT.
- 2) WHEN THE TRENCH IS NOT DUG ALONG OR ACROSS ROADWAY, THE ROADWAY BASE LEVEL IS NOT NECESSARY AND EXISTING GROUND IS TO BE RESTORED AS DIRECTED.
- 3) DIMENSIONS SHOWN ARE IN MILLIMETERS.
- 4) BEDDING MATERIAL SHOULD BE APPROVED WELL GRADED SAND OR GRANULAR MATERIAL.



PIPE SIZE O.D.	DIMENSIONS		
	A	B	C
UP TO 810 mm	150	305	150
840mm TO 1220mm	200	405	150
OVER 1220 mm	305	610	150



TOWN OF QUISPAMSIS

TYPICAL TRENCH DETAIL

REV. FEB. 2005

DWG. JMM

SCALE: N.T.S.

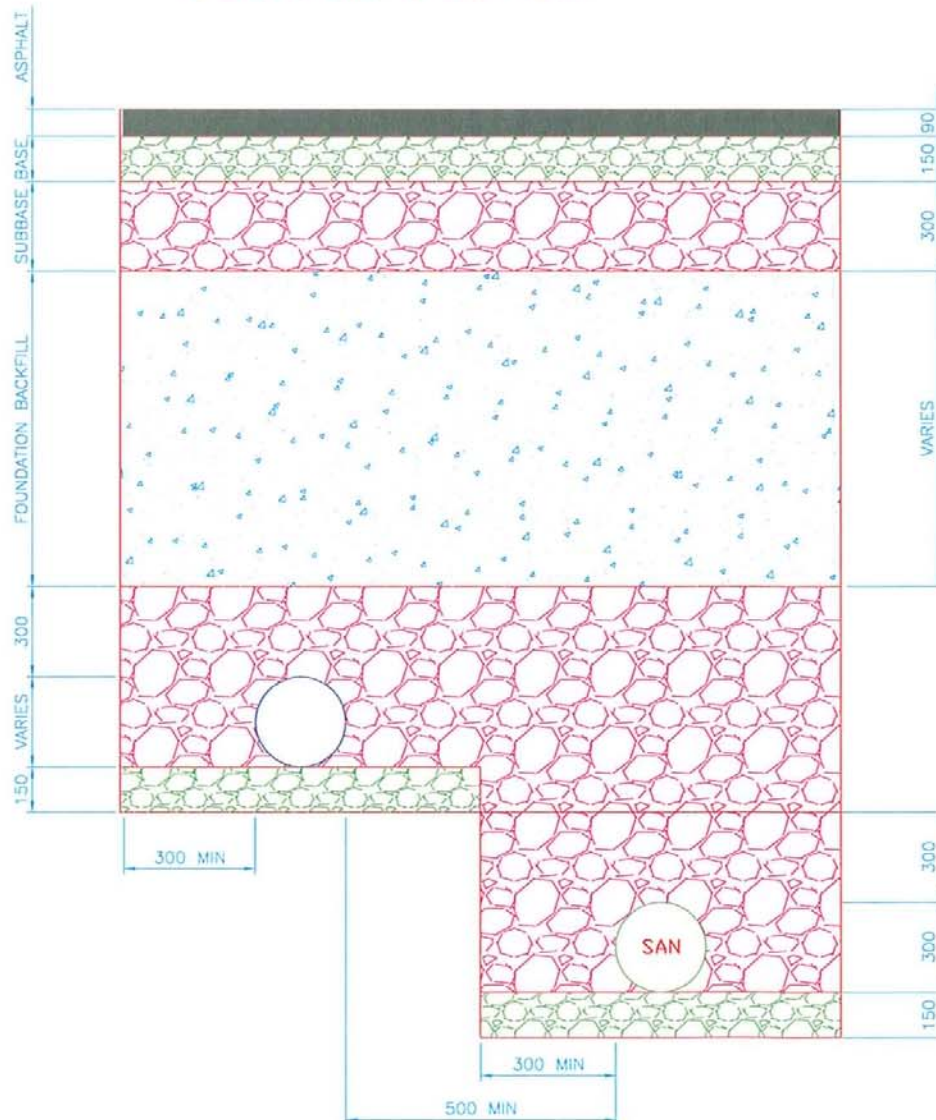
DWG. I.D.

DATE: MAY 2002

**DIV.B-1A**

NOTES:

1. FOUNDATION BACKFILL MAY BE WITH APPROVED EXCAVATED MATERIAL
2. SANITARY SEWER MINIMUM 1800mm COVER
3. WATER MAINS MINIMUM 1800mm COVER
4. ALL PIPE INSTALLED IN ACCORDANCE WITH NB OCCUPATIONAL HEALTH AND SAFETY ACT
5. ALL DIMENSION ARE MILLIMETERS
6. BEDDING MATERIAL TO BE 300mm IN ROCK
7. MATERIAL TO BE COMPACTED TO 95% DRY DENSITY IN ACCORDANCE TO ASTM D698



TOWN OF QUISPAMSIS

DOUBLE PIPE

REV.

SCALE: N.T.S.

DATE: MARCH 2005

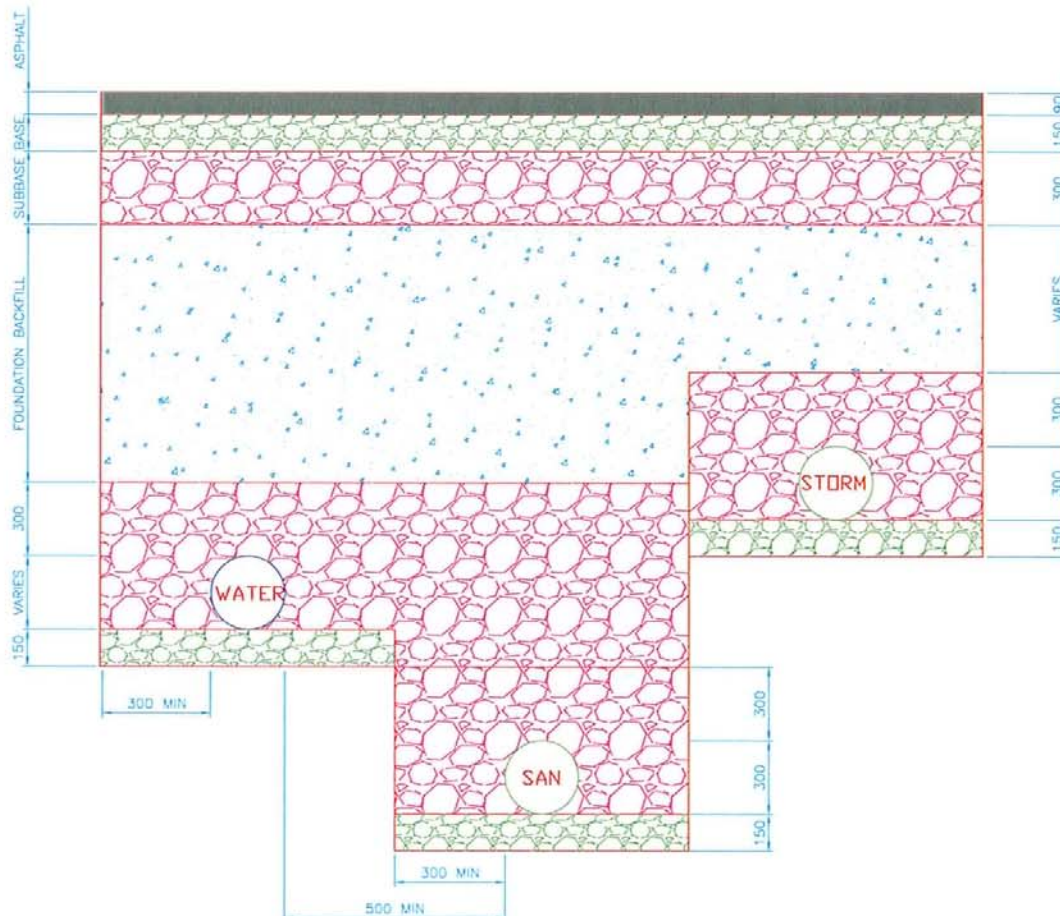
DWG. BJB

DWG. I.D.

**DW.B-1B**

NOTES:

1. FOUNDATION BACKFILL MAY BE WITH APPROVED EXCAVATED MATERIAL
2. SANITARY SEWER MINIMUM 1800mm COVER
3. WATER MAINS MINIMUM 1800mm COVER
4. ALL PIPE INSTALLED IN ACCORDANCE WITH NB OCCUPATIONAL HEALTH AND SAFETY ACT
5. ALL DIMENSION ARE MILLIMETERS
6. BEDDING MATERIAL TO BE 300mm IN ROCK
7. MATERIAL TO BE COMPACTED TO 95% DRY DENSITY IN ACCORDANCE TO ASTM D698



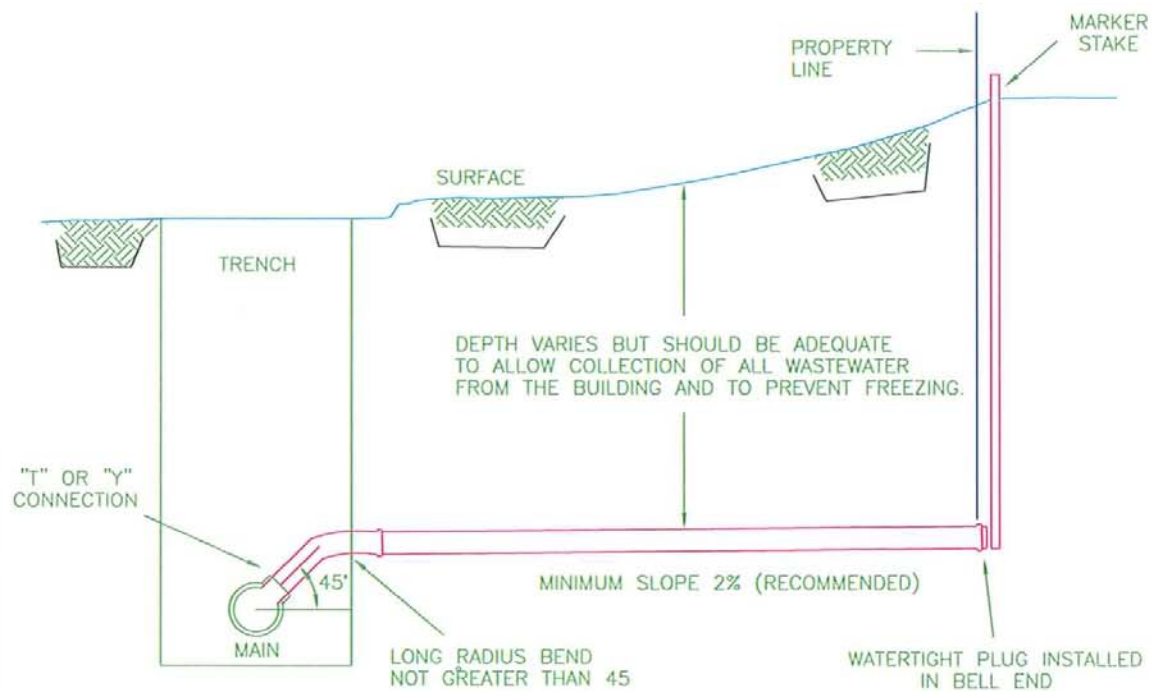
TOWN OF QUISPAMISIS

TRIPLE PIPE

REV.  
SCALE: N.T.S.  
DATE: MARCH 2005

DWG. BJB  
DWG. I.D.  
**DN.B-1C**





TOWN OF QUISPAMSIS

# SANITARY SEWER SERVICE CONNECTION

REV. FEB. 2005

SCALE: N.T.S.

DATE: MAY 2002

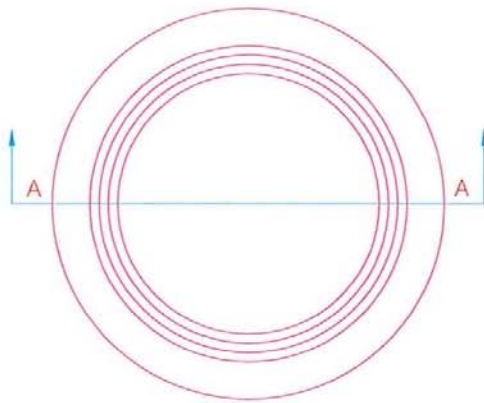
DWG. JMM

DWG. I.D.

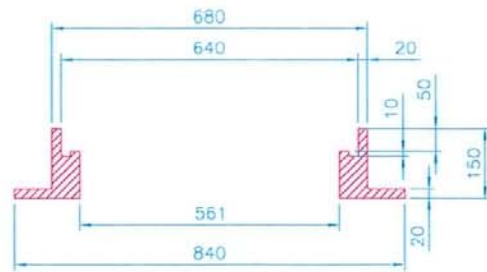
**DM.C-1A**

NOTES:

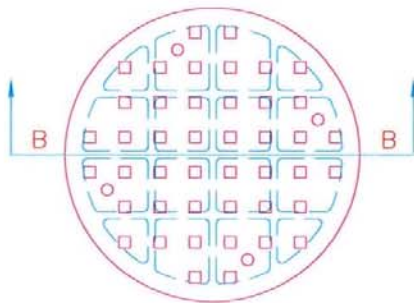
MATERIAL CAST IRON TO  
ASTM A48, CLASS 30  
MINIMUM MASS: FRAME 125 KG  
COVER 63 KG



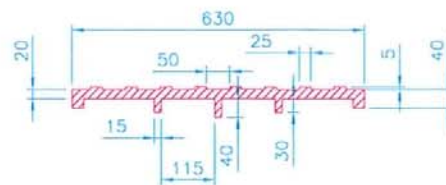
FRAME



SECTION A-A



COVER



SECTION B-B



TOWN OF QUISPAMISIS

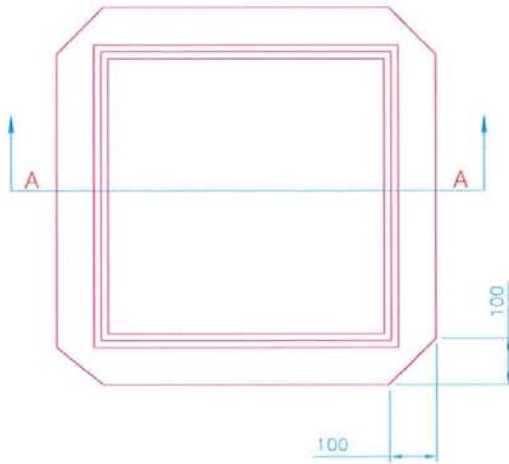
GRATES & COVERS ROUND

REV.  
SCALE: N.T.S.  
DATE: MARCH 2005

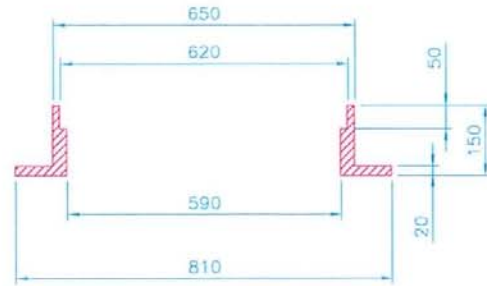
DWG. BJB  
DWG. I.D.  
**DIV.C-2A**

NOTES:

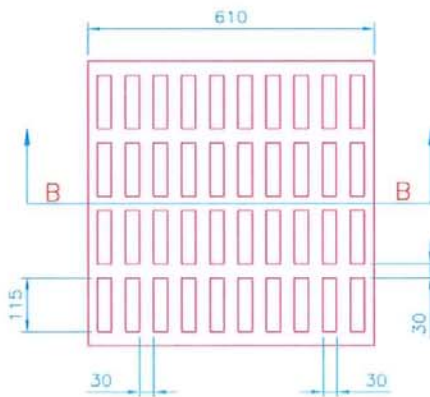
MATERIAL CAST IRON TO  
ASTM A48, CLASS 30  
MINIMUM MASS: FRAME 110 KG  
COVER 85 KG



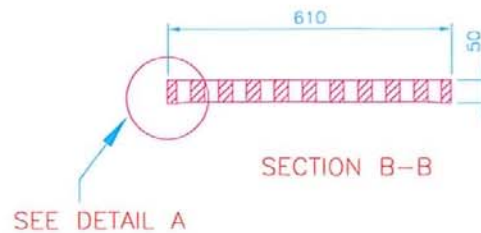
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SECTION A-A

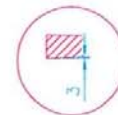


GRATE



SECTION B-B

SEE DETAIL A



DETAIL A



TOWN OF QUISPAMSIS

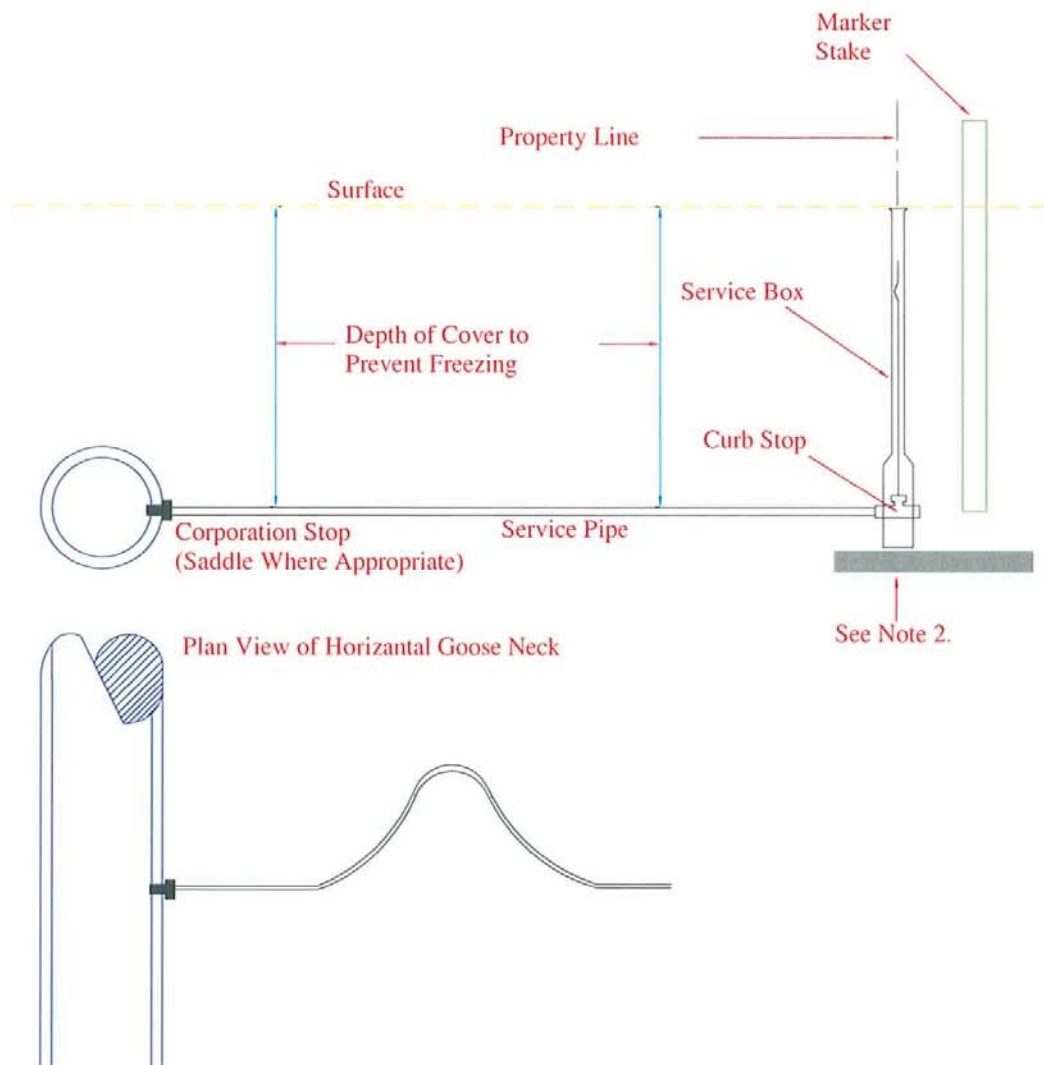
GRATES & COVERS SQUARE

REV.  
SCALE: N.T.S.  
DATE: MARCH 2005

DWG. BJB  
DWG. I.D.  
**DIV.C-2B**

NOTE:

1. ALL DIMENSIONS SHOWN IN MILLIMETERS
2. 50mm x 250 mm x 450 mm (LONG) PRESSURE TREATED LUMBER REQUIRED UNDER CURB STOP IF COPPER IS NOT USED
3. INSURE THAT SERVICE BOX IS PLUMB AND CENTERED OVER CURB STOP OPERATING NUT. TOP OF SERVICE BOX TO BE LEVEL WITH SURFACE.



TOWN OF QUISPAMIS

POTABLE WATER  
SERVICE CONNECTION

REV. FEB. 2005

SCALE: N.T.S.

DATE: JUNE 2004

DWG. MTI

DWG. I.D.

**DW.D-1A**

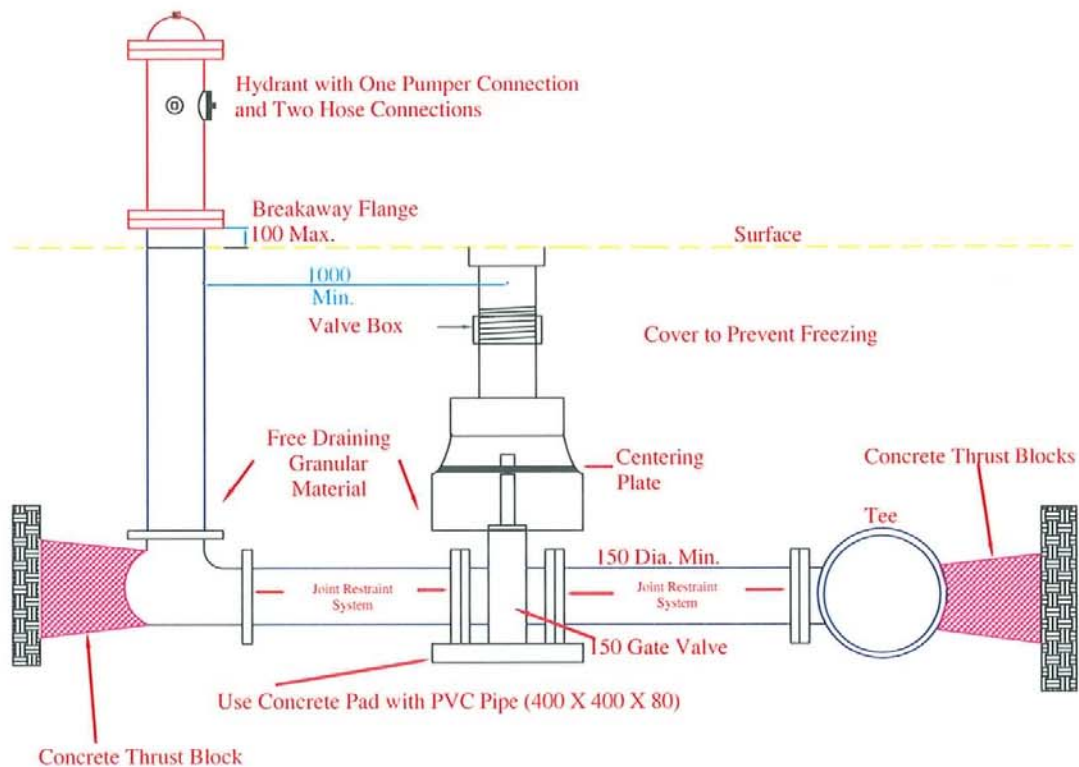
# NOTES

1. ALL DIMENSIONS IN MILLIMETERS

2. INSURE THAT VALVE BOX IS PLUMB AND CENTERED OVER VALVE OPERATING NUT, TOP OF VALVE BOX TO BE LEVEL WITH SURFACE

3. HYDRANT LEAD SHALL BE LEVEL FROM TEE

4. BACKFILL AROUND HYDRANT AND VALVE BOX SHALL BE GRANULAR MATERIAL



TOWN OF QUISPAMSIS

HYDRANT INSTALLATION

REV.

SCALE: N.T.S.

DATE: JULY 2004

DWG. MTI

DWG. I.D.

DM.D-2A



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**APPENDIX A**

**Tentative Plan Checklist**



# TOWN OF QUISPAMISIS

## CHECKLIST - TENTATIVE PLAN

File # \_\_\_\_\_

Date Received \_\_\_\_\_

1. GENERAL INFORMATION				
PROPOSED NAME OF SUBDIVISION				
OWNER				
ADDRESS				
PHONE NUMBERS	HOME #	WORK #	CELL #	
Item	OK	NO	N/A	Comments
Is there a written application for approval?				
Does the scale of the plan satisfy requirements?				
Is the plan marked "TENTATIVE PLAN"?				

2. A PLAN CONTENT - (are the following requirements satisfied?)				
Item	OK	NO	N/A	Comments
<b>A</b> boundaries of part to be approved adequately marked				
<b>B</b> Location, width and names of existing & proposed streets abutting and within the proposed subdivision				
<b>C</b> Approximate dimensions and layouts of proposed lots, blocks, and other parcels, and the propose for which they are intended				
<b>D</b> Natural & artificial features; railways, highways, water				
<b>E</b> Nature, location, and dimensions of existing and new easements				
<b>F</b> Water and sewerage facilities available to proposed lots				
<b>G</b> Where necessary, a key plan				

2.B PLAN CONTENT - (are the following to be required?)				
Item	OK	NO	N/A	Comments
<b>H</b> Natural and artificial features within or adjacent: buildings, drainage ditches, swamp, wooded areas				
<b>I</b> Natural and porosity of the soil				
<b>J</b> Contours and elevations as necessary to determine the grade of streets and drainage of the land				
<b>K</b> Plans for landscaping and tree planting				
<b>L</b> Proposed location of the buildings				
<b>M</b> Further information				

### 3. BY-LAW REQUIREMENTS - (are they satisfied?)

Item	OK	NO	N/A	Comments
<b>A</b> Lot, block, other parcel (inc. remnant) dimensions				
<b>B</b> Lot, block, other parcels abutting a street				
<b>C</b> Adequate street giving access to the subdivision				
<b>D</b> Land for Public Purposes (is it adequate)				
<b>E</b> Prejudice to future subdividing				
<b>F</b> Sufficient Hydrogeological study by registered Professional Engineer				
<b>G</b> Professionally engineered Storm Drainage System				

### 4. REFERRALS – (is referral necessary?)

Item	OK	NO	N/A	Comments
Is referral necessary				

### 5. SIGNATURES

\_\_\_\_\_  
Date Processed

\_\_\_\_\_  
Development Officer

**APPENDIX B**

**Service Connection Report Template**

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## Service Connection Report



Subdivision Development Particulars	Construction Particulars
<b>Subdivision:</b>	<b>Contractor:</b>
<b>Phase:</b>	<b>Date of Construction:</b>
<b>Street Name:</b>	<b>Drawn By:</b>
<b>Lot No.:</b>	
<b>Developer:</b>	

Dist. (m)	Description
1.	
2.	
3.	
4.	
5.	

Service Connection Particulars			
Type	Water	Sanitary	Storm
Markers	Yes		No
Pipe Type			
Pipe Size	(mm)		
Depth to Pipe Crown	(m)		
Distance to Main	(m)		

**Remarks:**

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