# CITY OF PITT MEADOWS
# Subdivision and Development Servicing

## Bylaw No. 2589 and amendments thereto

### CONSOLIDATED FOR CONVENIENCE ONLY

**This is a consolidation of the bylaws listed below. The amending bylaws have been consolidated with the original bylaws for convenience only.**

**Certified copies of the original bylaws should be consulted for all interpretations and applications of the bylaws on this subject.**

| BYLAW NO. | ADOPTED |
|---|---|
| 2589 | March 5, 2013 |
| 2672 | February 3, 2015 |
| 2833 | October 1, 2019 |

The bylaw numbers in **bold** at the end of the clause refer to the bylaws that amended the principal bylaw.


# CITY OF PITT MEADOWS

## SUBDIVISION AND DEVELOPMENT SERVICING

## BYLAW No. 2589, 2013

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**CITY OF PITT MEADOWS**
**SUBDIVISION AND DEVELOPMENT SERVICING**
**BYLAW No. 2589, 2013**

**A Bylaw to Regulate the Servicing of Subdivisions and Developments.**

**WHEREAS** it is desired to guide City growth for the ultimate benefit of the community as a whole by ensuring that land is subdivided in an orderly and economical way to produce a safe, efficient, convenient and healthful environment and to preserve and enhance its natural amenities;

**AND WHEREAS** it is desired to ensure that the subdivision and development of land does not create a cost to the City of providing public utilities or other works or services which would be an excessive burden on the existing taxpayers;

**NOW THEREFORE** the Council of The Corporation of the City of Pitt Meadows, in open meeting assembled, ENACTS AS FOLLOWS:

## 1.0 TITLE

1.1 This Bylaw may be cited for all purposes as the "Subdivision and Development Servicing Bylaw No. 2589, 2013".

## 2.0 INTERPRETATION

2.1 Except as otherwise indicated, the words and phrases in this Bylaw are intended to be interpreted consistently with the ***Land Title Act***, the ***Local Government Act***, the ***Community Charter*** and other applicable enactments as the context and circumstances may require. A reference to a statute refers to a statute of the Province of British Columbia unless otherwise indicated, and a reference to any statute, regulation, code or bylaw refers to that enactment as it may be amended or replaced from time to time.

2.2 Words in the singular include the plural and gender specific terms include both genders and corporations.

2.3 Headings are for convenience only and must not be construed as defining or in any way limiting the scope or intent of this Bylaw.

2.4 The following words, terms and phrases, wherever they occur in this Bylaw, shall have the meaning assigned to them:

**"Approving Officer"** means the officer so appointed by Council Resolution according to the provisions of the ***Land Title Act***;

**"City"** means The Corporation of the City of Pitt Meadows or the municipal area comprised within the boundaries of The Corporation of the City of Pitt Meadows, as the context may require;

**"Consulting Engineer"** means a professional engineer experienced in municipal engineering and land *development* and certified to practice in the Province of British Columbia who is retained by the *Developer* in accordance with Section 5.1;

**"Developer"** means the registered owner of an estate in fee simple who applies to subdivide land or for a building permit, and includes a duly authorized representative of the registered owner;

**"Development"** means any construction for which a building permit is required.

**"Director"** means the Director of Operations and Development Services of the Corporation of the City of Pitt Meadows or a person authorized to act on the *Director's* behalf.

**"Drawings"** means the *Consulting Engineer's* or *Landscape Architect's* sealed design *drawings* which have been reviewed, accepted and stamped by the *Director* and which are to be used for construction of the *works* required under this Bylaw;

**"Excess or Extended Services"** has the meaning given in the ***Local Government Act***;

**"Highway"** includes a public street, road, lane, bridge, walkway, path, trail, thoroughfare and any other public way, whether or not improved for the passage of vehicles or pedestrians;

**"Landscape Architect"** means a member in good standing of the British Columbia Society of Landscape Architects who is retained by the *Developer* in accordance with Section 5.4;

**"Master Municipal Specifications and Standard Detail Drawings"** and **"MMCD"** mean the Specifications and Standard Detail Drawings of the latest edition of the Master Municipal Construction Documents published by The Master Municipal Construction Documents Association and incorporated by reference into and forming part of this Bylaw;

**"Servicing Agreement"** means an agreement in substantially the form attached as Schedule E entered into between the *City* and the *Developer* for the provision by the *Developer* of *works* for the *development* or *subdivision;*

**"Subdivision"** means a *subdivision* as defined in the ***Land Title Act***, and a *subdivision* under the ***Strata Property Act***;

**"Works"** means any work, service or utility which is required by this Bylaw and includes, without limitation, *works* and facilities for the supply and distribution of water, collection and disposal of sewage, collection and disposal of storm water, dykes and associated drainage facilities, street lighting, *highways*, curbs, gutters, sidewalks, medians, boulevards, boulevard crossings, boulevard landscaping including street trees, and on-site landscaping, and the underground supply and distribution of electricity, gas, and other forms of energy, telephone, telecommunications, and cablevision, together with *works* required to control drainage, erosion and sediment related to construction of the forgoing.

# 3.0 ADMINISTRATION

## 3.1 Authority

This Bylaw shall be administered by the *Director*.

## 3.2 Inspection

The *Director,* Operations Superintendent, Engineering Services Coordinator and employees supervised by them may enter at all reasonable times upon the lands for which application to subdivide has been made in order to ascertain whether the provisions of this Bylaw are being observed.

## 3.3 Offences and Penalties

a) No person shall obstruct or seek to obstruct the entrance into any place of any person acting pursuant to Section 3.2 of this Bylaw.

b) Every person who violates or who causes or allows to be violated by any of the provisions of this Bylaw shall be guilty of an offense against this Bylaw; and each day on which such violation occurs or is caused or allowed to continue shall constitute a separate offense.

c) A person who contravenes this Bylaw by doing an act that it forbids or by omitting to do an act it requires to be done commits an offence and is liable, upon summary conviction to a penalty not exceeding $10,000 and costs of prosecution. The penalties imposed under this subsection supplement and are not a substitute for any other remedy to an infraction of this Bylaw.

### 3.4 Severability

If any portion of this Bylaw is held to be invalid by a court of competent jurisdiction, that invalid portion shall be severed and the remainder is deemed to have been enacted without the invalid portion.

## 4.0 RESPONSIBILITY FOR WORKS

4.1 The Developer will be responsible for undertaking and bearing the cost of all design, inspection, testing, construction and installation of works required under this Bylaw and as outlined in a servicing agreement entered into between the City and the Developer and must pay on demand all estimated costs and charges for any work undertaken by the City connected with the construction of works for the subdivision or development. The Developer will:

a) enter into a Cost Estimate for Private Work Agreement when submitting payment for all the estimated costs in the form as attached in Schedule 'G'

b) in the event that the cost of the works exceeds the estimate, the Developer must submit the outstanding balance within 30 days of the work being done or prior to the issuance of an Occupancy Permit. **(Bylaw No. 2672, 2015)**

4.2 The *Developer* will continue to be fully responsible for the condition of the *works* and for remedying any defects or deficiencies until a Letter of Substantial Completion is issued by the *Director* for all *works,* except boulevard landscaping, and until a Street Tree Installation Certificate is issued by the *Director* for all boulevard landscaping.

4.3 The *Director* will determine whether the *Developer*, or others, will undertake the design, construction and installation of the *works* required in Sections 7.5 and 7.6.

4.4 The *City* will install all new *works* to existing *City* systems. The *Director* will determine whether connection of new *works* to *City* systems and manipulation of valves or control of pumps on existing *City* systems will be undertaken by the *Developer* or by others, and the *Developer* or the *Developer's* contractor must not do such work without first obtaining the express written permission of the *Director*.

## 5.0 DUTIES OF DEVELOPER

5.1 The *Developer* shall employ and retain a *Consulting Engineer* to undertake the design, inspection, testing and record keeping for the *works* until a Letter of Final Acceptance is issued by the *Director*, to resolve design and/or construction

related problems, and to prepare, certify and seal as-constructed *drawings* and other records. The *Consulting Engineer* shall certify that all materials supplied and all work performed conforms in all respects to this Bylaw or as otherwise approved by the *Director*.

5.2 Prior to commencing design of the *works*, the *Developer* must sign and submit a Commitment by *Developer* and *Consulting Engineer* substantially in the form in Schedule F setting out the minimum duties that the *Consulting Engineer* is to be hired to perform and lists projects similar in scope, nature and value that have been undertaken by the *Consulting Engineer*, sub-consultants and individuals assigned responsibility for specific components of the *works* under his or her over-all direction.

5.3 If the *Consulting Engineer* ceases to be retained for, or is unable to carry out, the described duties, the *Developer* must immediately make the lands being subdivided, developed or affected by the work safe, and all construction must cease until a new Commitment by *Developer* and *Consulting Engineer* has been delivered to the *Director* and he or she has authorized work to recommence. Maintenance of the site and drainage, erosion and sediment control must continue throughout that period.

5.4 The *Developer* must retain a *Landscape Architect* to undertake the design, inspection, testing and record keeping of boulevard landscaping required under this Bylaw until a Street Tree Final Certificate is issued by the *Director*. Plans for boulevard landscaping must be signed and sealed by the *Landscape Architect* and submitted to the *Director* for approval. The *Landscape Architect* shall certify that all materials supplied and all work performed in connection with boulevard landscaping conforms in all respects to this Bylaw or as otherwise approved by the *Director*. Alternatively, if no street trees or landscaping other than grass are required, the *Consulting Engineer* may undertake all of the responsibilities of the *Landscape Architect* set out in this Bylaw,

5.5 The *Developer* must engage qualified contractor(s) to undertake the construction of the *works* and must provide a summary of the projects that the contractor(s) has/have completed that are similar in scope, nature and value to the *works*.

5.6 The *Developer* must ensure the *Consulting Engineer*, *Landscape Architect* and all sub-consultants and specialist firms and all individuals' assigned responsibility for components of the *works* perform all work in accordance with this Bylaw.

5.7 The *Developer* must ensure its contractor(s) perform all *works* in accordance with this Bylaw and the *drawings* approved by the *Director*.

## 6.0 DUTIES OF CONSULTING ENGINEER

6.1 The *Consulting Engineer* must be thoroughly familiar with this Bylaw and *MMCD* Specifications and Standard Detail Drawings and sign the Commitment by *Developer* and *Consulting Engineer* and carry out the duties described therein in accordance with this Bylaw.

6.2 The *Consulting Engineer* must immediately notify the *Director* if he or she ceases to be retained, or is unable to carry out, the described duties before a Letter of Final Acceptance has been issued.

6.3 The *Consulting Engineer* and any sub-consultants must carry professional liability insurance of not less than $5,000,000 per claim during the term of his or her engagement and shall provide proof of such insurance to the *Director* before designs are submitted for approval.

## 7.0 WORKS REQUIRED

7.1 No land within the *City* shall be subdivided or developed except in conformity with this Bylaw.

7.2 All *works* shall be designed, located, constructed and installed in accordance with Schedules C and D of this Bylaw and the *drawings*.

7.3 A *Developer* must provide *works* to serve every parcel within a *subdivision* in accordance with Schedule C except as provided in Sections 7.9, 7.10 and 7.11 and except within a *subdivision* under the ***Strata Property Act***. Where underground wiring is required by the *Director*, separate ducts shall be provided for such services including electrical, gas and other forms of energy, telecommunications, telephone and cablevision services.

7.4 Except where, in the opinion of the *Director*, *works* may never need to be extended to serve land beyond the *subdivision*, they shall be extended to the boundaries of the *subdivision*. The *Director* may waive this requirement where it would require *works* to be extended across land designated on the *subdivision* plan as a remainder of a parcel being subdivided.

7.5 The *Director* may require a *Developer* to provide *works* directly attributable to a *development* on a *development* site.

7.6 The *Director* may require a *Developer* to provide *works* directly attributable to the *subdivision* or a *development* on that portion of a *highway* immediately adjacent to a site being subdivided or developed up to the centre line of the *highway*. Such *works* may include the upgrading or replacing of existing *works* that are of lower standard than required by this Bylaw. If the *highway* is classified as Arterial or Collector Street on Schedule A, road works and street lighting shall be provided in accordance with the appropriate classification.

7.7. The *City* will install all new *works* to existing *City* systems. The *Director* will determine whether connection of new *works* to *City* systems will be approved. The *Developer* may connect the *works* in a *subdivision* to the water distribution, sanitary sewer and storm sewer systems operated by the *City*. The *Developer* must not perform tie-ins to *City* systems without first obtaining the express written permission of the *Director*. A *City* inspector will be on site to witness the work if approved.

7.8 Streets, lanes and walkways shall be provided and laid out as follows:

(a) notwithstanding a requirement to provide or upgrade a road to the standard required for an Arterial street within or adjacent to a *subdivision* or *development*, direct vehicular access to individual parcels of land shall not be permitted from an Arterial street and provision shall be made for vehicular access by the additional construction of lower classification roads or by lanes unless, in the opinion of the *Approving Officer*, construction of such additional access is not feasible;

(b) streets shall be located and aligned so that each parcel abuts a street on one side only except where there is an intersecting street abutting a corner lot, or where, in the opinion of the *Director*, it is necessary:

i) to provide access to other parcels;
ii) to provide a consistent or continuous pattern of streets; or
iii) to complement a future pattern or *subdivision*;

(c) walkways shall be provided where streets or lanes do not provide a continuous pedestrian circulation system through the *subdivision* and adjacent lands;

(d) lanes shall be provided where, in the opinion of the *Director*, they are necessary to provide continuity of existing lanes, for secondary access or to provide access to parcels abutting arterial or collector streets.

7.9 All *highways* within or immediately adjacent to a *subdivision* shall be cleared to the minimum Right-of-Way width as set out in Schedule C of this Bylaw for the classification of *highway* and the zoning of the land to be subdivided.

7.10 Despite Section 7.2, a residential *subdivision* of not more than 3 lots all abutting an existing *highway* with overhead wiring adjacent to the *subdivision* shall be exempt from the requirement for underground wiring.

7.11 Despite Section 7.2, in zones where the ***Zoning Bylaw*** does not require sanitary sewerage facilities for the permitted uses, the requirement for provision of sanitary sewer systems may be waived at the discretion of the *Director* if

approval is obtained from the authority having jurisdiction over on-site sewage disposal or discharge to bodies of water.

7.12 Despite Section 7.2, a *subdivision* of not more than 3 lots all abutting an existing *highway* with adequate ditches, may be exempted from the requirement for piped storm drainage at the discretion of the *Director* who may approve drainage connections directly to the existing ditch where the construction of a piped storm drainage system is not technically feasible at the time of application.

## 8.0 EXCESS OR EXTENDED SERVICES

8.1 The *Director* may require a *Developer* to provide *excess or extended services* to land other than the land being subdivided or developed. The cost to the *City* of providing any such *excess or extended services* is considered to be excessive and must be paid by the *Developer*. If the *Developer* provides a *highway* or waterworks, sewage or drainage facilities that serve land other than the land being subdivided or developed, the *Developer* will be paid charges collected from owners of other benefiting land as a condition of connecting to, or using, the *excess or extended services*. The *Developer* shall provide studies; *drawings* and cost estimates prepared by the *Consulting Engineer* necessary to assist the *City* in determining the charges. The charges will include interest calculated annually at a rate established by bylaw, payable for the period beginning when the *excess or extended services* are certified as completed by the *Director* to the date when the connection is made or use begins. Charges will be collected up to a date agreed by the *Developer* and the *City* but not for more than fifteen (15) years.

## 9.0 WORKS COVERED BY DEVELOPMENT COST CHARGES

9.1 Any part of the cost of *works* required under Sections 7.5 or 7.6 that has been included in the calculations for a development cost charge bylaw shall be paid from the appropriate development cost charge reserve fund. If there are insufficient funds available for the *City*'s share of the cost and if the *Approving Officer* considers the cost to the *City* would otherwise be excessive and would therefore refuse to approve the *subdivision*, the *Developer* may agree to provide the *works* and services. If the *Developer* so agrees, the actual certified costs shall be deducted from the class of Development Cost Charges applicable to that service.

## 10.0 PARK LAND

10.1 The *Approving Officer* shall determine whether park land is to be provided or a payment is to be made in accordance with section 941 of the ***Local Government Act*** taking into account whether there is sufficient land in the vicinity of the proposed *subdivision* for public park and open space. The *Approving Officer* shall determine the location of any park land to be provided.

## 11.0 EXEMPTIONS

Servicing requirements may be waived where:

11.1 a proposed *subdivision* does not create any additional parcels and only results in *highway* or park dedication or an adjustment of boundaries between existing parcels; or

11.2 where a parcel is to be created solely for the use of unattended equipment necessary for the operation of:

a) a community water or sewer system;
b) a gas or oil transmission or distribution system;
c) a radio or television receiving antenna;
d) a telecommunication relay station;
e) an automatic telephone exchange;
f) an air or marine navigational aid;
g) an electrical substation or generating station; or
h) a similar facility,

and the *Developer* enters into a covenant with the *City* in a form satisfactory to the *City*'s solicitor and upon registration in the Land Title Office the covenant has the effect of preventing the land being used for any other purpose without the approval of the *City*.

## 12.0 RIGHTS OF WAY AND EASEMENTS

12.1 The *Developer* must grant, or acquire, statutory rights of way in favour of the *City* in such locations and with such dimensions as necessary to accommodate *works* required to serve a *subdivision* or *development* and for protection against drainage problems as a result of *subdivision* or *development* and the right of way must be in a form acceptable to the *City*'s solicitor.

12.2 Where it is not practical to service an individual parcel from a *highway*, the *Developer* must grant, or acquire, easements for servicing of individual parcels, if acceptable to the *Director*, in favour of the benefiting parcel and covenant with the *City*, in a form acceptable to the *City*'s solicitor, that the easement will not be altered or discharged without the approval of the *City*. No more than one parcel shall be served by this means across any other single parcel.

12.3 Rights of way and easement documents must be deposited and registered in the Land Title Office before the *subdivision* plan is signed or the building permit issued. Alternatively, the *Developer* may provide a solicitor's undertaking, satisfactory to the *City*'s solicitor, that the *subdivision* plan and rights of way documents will all be deposited in the sequence required by the *City*'s solicitor

and that, if that is not possible, the *subdivision* plan will immediately be returned directly to the *Approving Officer*.

12.4 If *works* required in accordance with this Bylaw will cross an established easement or other right of way, the *Developer* must, at his own expense before permission to proceed with construction is granted, obtain any amendments necessary to permit the construction, reconstruction, inspection, operation, repair, maintenance and use of the *works* under conditions acceptable to the *Director*.

## 13.0 COMMENCEMENT OF CONSTRUCTION

No land clearing, stripping of topsoil, excavation, placement of fill, construction or installation of any kind, other than required for site investigation, may be undertaken on a *subdivision* or *development* site until the signed Commitment by *Developer* and *Consulting Engineer*, a signed *Servicing Agreement* and all applicable fees, and necessary approvals of all other agencies have been received by the *Director*, and the *Director* has stamped the *drawings* as accepted and issued Permission to Commence Construction all in accordance with Schedules C and D.

## 14.0 COMPLETION OF WORKS AND SECURITY

14.1 All required *works* must be constructed and installed in accordance with this Bylaw at the expense of the *Developer*, all obligations of the *Developer* and *Consulting Engineer* set out in Schedule D must be fulfilled as evidenced by the issue of a Letter of Final Acceptance and all fees and debts owing to the *City* must be paid prior to approval of the *subdivision*, or the issue of the building permit, unless the *Developer*:

a) deposits with the *City* a clean, unconditional, irrevocable letter of credit acceptable to the *City*'s Director of Finance and Facilities as security; and

b) enters into a *Servicing Agreement* with the *City*, substantially in the form of the Sample *Servicing Agreement* contained in Schedule E, to complete the *works* by a specified date and fulfill all obligations of the *Developer* under this Bylaw or forfeit the security which may be used by the *City* at its sole discretion to complete the *works* required.

14.2 The *City*'s Engineering Department will prepare two copies of the *Servicing Agreement* and provide them to the *Developer*. The *Developer* must return both copies of the *Servicing Agreement* to the Engineering Department, signed and sealed by the authorized signatories for the *Developer*, along with;

a) the security deposit in the amount and form required by this Bylaw and specified in the *Servicing Agreement*;

b) a Certificate of Insurance in accordance with the requirements of the *Servicing Agreement*; and

c) two complete sets of *drawings* which must be identical to the *drawings* accepted for construction of the *works*.

14.3 The amount of security required in Section 14.1 shall be the greater of 120% of the cost of the *works* remaining to be completed or 25% of the total cost of the *works* required for the *subdivision* or *development*. The cost shall be estimated in detail by the *Consulting Engineer* and accepted by the *Director* and include engineering, *landscape architect* services, inspection, testing, construction and installation of all *works* and all associated taxes.

14.4 Partial refunds of the security will be made based on the proportion of the *works* completed, inspected, and, if required, tested all in accordance with certified, detailed progress reports submitted by the *Consulting Engineer* or *Landscape Architect* and approved by the *Director*. Partial refunds will not be made more frequently than once per month and will only be permitted to a maximum of 90% of the value of the *works* completed. Any costs incurred by the *City* which are recoverable from the *Developer* will be deducted from any partial refund regardless of whether the recoverable amount relates to the same *works* as the partial refund. Despite the forgoing, the *City* will retain not less than 15% of the total cost of the *works* required until a Letter of Substantial Completion has been issued and all project record documents have been submitted to the satisfaction of the *Director* in accordance with Schedule D Section 1.24 and then not less than 10% of the total cost of the *works* until the *Director* has issued a Letter of Final Acceptance. Thereafter refunds will be made for completed boulevard landscaping until a Street Tree Installation Certificate has been issued and then 10% of the cost of those *works* will be held until the *Director* issues a Street Tree Final Certificate.

## 15.0 TAXES

15.1 Every Applicant for approval of a *subdivision* shall pay all school taxes and all municipal taxes, rates and charges, assessed and levied against the lands to be subdivided, and where such taxes, rates and charges for the then current year have not been assessed, levied and imposed on the said lands at the date on which the *subdivision* is submitted for Final Plan Approval, pay the amount estimated by the Tax Collector to be the total of the school taxes, municipal taxes, rates and charges to be assessed, levied and imposed on the said lands for the then current year in accordance with Section 242 (1) of the ***Community Charter***.

15.2 Where application for Final Approval of a *subdivision* is made at any time between the 15th day of June and the 31st day of December in any year, the Applicant shall pay all school taxes and all municipal taxes, rates and charges

assessed and levied against the lands to be subdivided and which are outstanding and owing at the date of such application, together with a deposit in cash, certified cheque or by irrevocable letter of credit issued by a bank, trust company or credit union and valid for not less than one year, in the amount estimated by the Tax Collector to be the total of the school taxes, municipal taxes, rates and charges to be assessed, levied and imposed on the said lands for the next succeeding year; which deposit shall be held by the *City* and applied towards payment of the taxes, rates and charges to be assessed, imposed and levied on the said land in the next succeeding year, in the event that the *subdivision* approval is not registered prior to the preparation, completion and authentication of the Assessment Roll for that year, all in accordance with in Section 242 of the ***Community Charter***.

# 16.0 FEES

## 16.1 Application Fee

Prior to the review of a plan of a proposed *subdivision* by the *Approving Officer*, the *Developer* shall pay a non-refundable application fee as established in the latest ***Development Application Fee Bylaw*** for each additional lot proposed. If a plan of a proposed *subdivision* is revised in response to, and within 90 days of the *Approving Officer's* review, an additional fee is not required.

## 16.2 Administration and Inspection Fee

Prior to the signing of the *Servicing Agreement* or *subdivision* plan by the *City*, the *Developer* shall pay an administration and inspection fee before permission to proceed with construction is granted. The inspection and administration fee shall be calculated in accordance with Table 1: Administration and Inspection Fees, on the basis of either the cost of providing all *works*, as estimated by the *Director*, or the value of a contract for the construction of the *works* plus 10 percent.

***Table 1: Administration and Inspection Fees***

| Estimated Cost of Providing All Works Required By This Bylaw | Fee |
|---|---|
| Up to $300,000 | 5% |
| Over $300,000 | 5% on first $300,000 and<br>2% on remainder |

The minimum fee shall be $300.

The *Director* may reduce the fees by 50 percent if the *Consulting Engineer* will be undertaking the majority of inspection for unique infrastructure and an inspection program with professional certification is provided to the satisfaction of the *Director*.

## 17.0 REPEAL

17.1 Bylaw No. 2206, cited as the **"Subdivision and Development Servicing Bylaw"** and all amendments thereto, are hereby repealed.

## 18.0 SCHEDULES

18.1 This Bylaw includes six schedules dealing with the following subjects:

| | | |
|---|---|---|
| Schedule A | - | Arterial and Collector Streets |
| Schedule B | - | Bicycle Route Network |
| Schedule C | - | Design Criteria and Approval Process **(Bylaw No. 2833, 2019)** |
| Schedule D | - | Construction Requirements & Specifications |
| Schedule E | - | Sample Servicing Agreement |
| Schedule F | | Commitment by Developer and Engineer |
| Schedule G | - | Cost Estimate for Private Work Agreement **(Bylaw No. 2672, 2015)** |

READ a FIRST and SECOND time the 19th day of February, 2013.

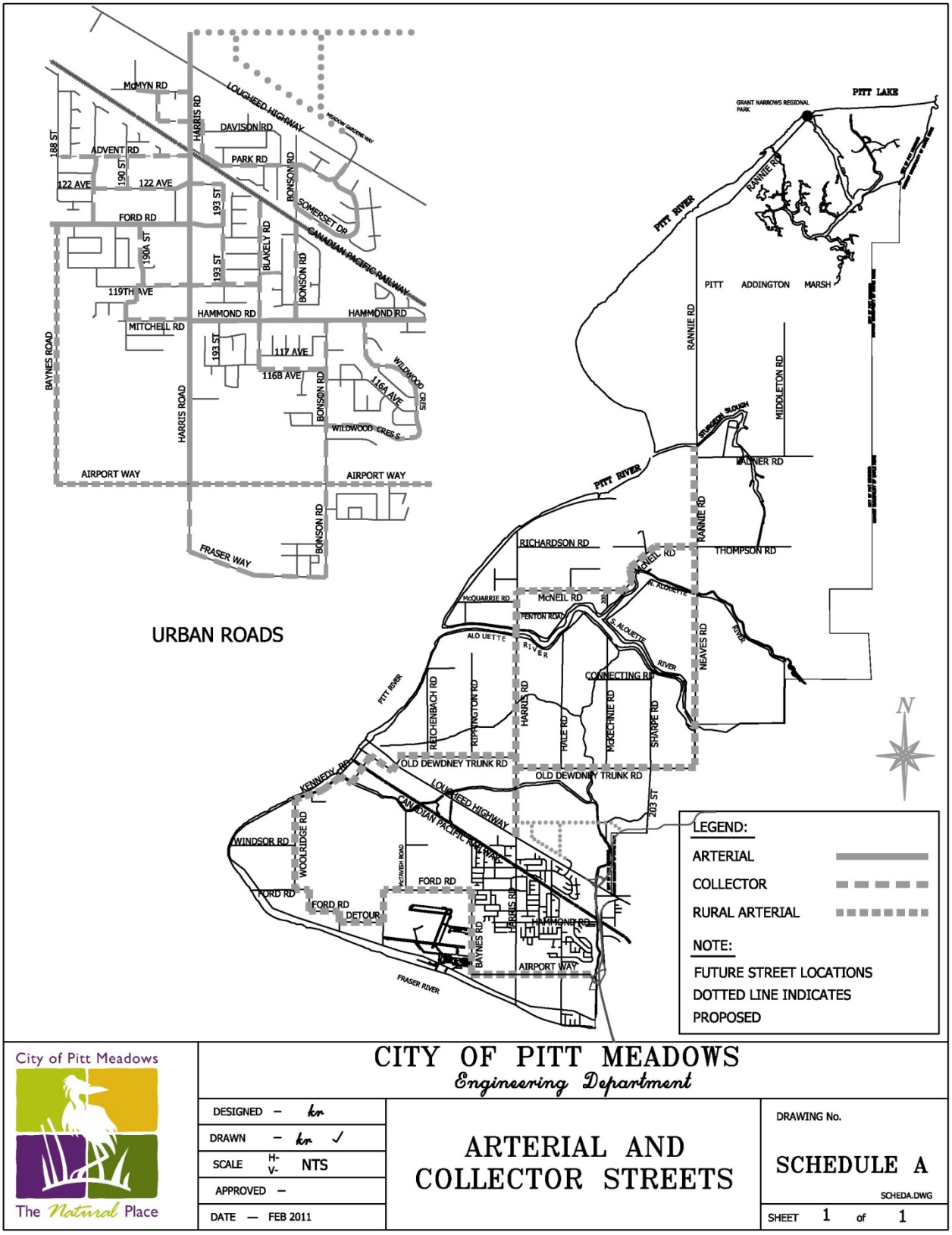
READ a THIRD time the 19th day of February, 2013.

ADOPTED the 5th day of March, 2013.

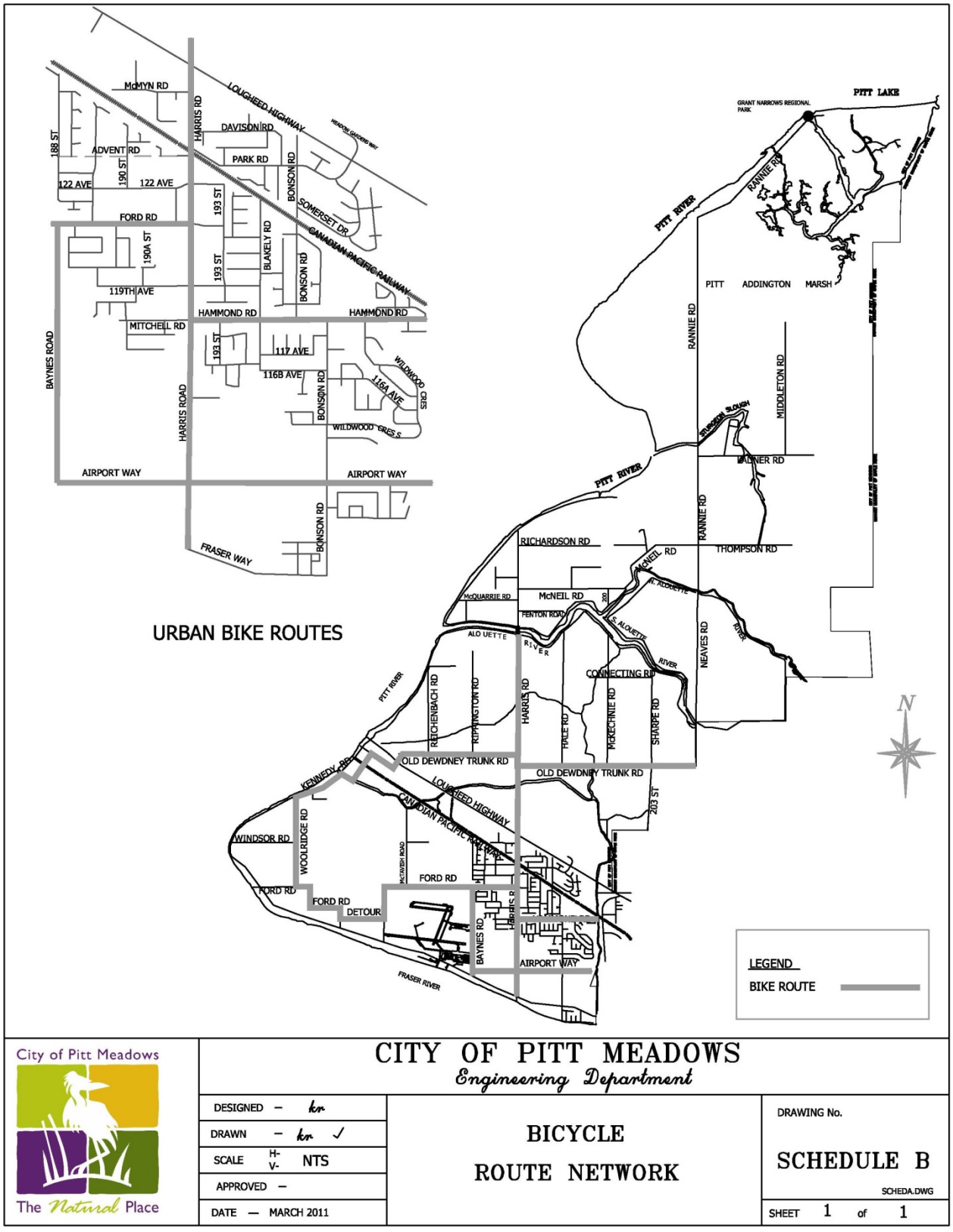
Mayor

Corporate Officer

# SCHEDULE A: ARTERIAL AND COLLECTOR STREETS



# SCHEDULE B: BICYCLE ROUTE NETWORK



# SCHEDULE C: DESIGN CRITERIA

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***Note:*** *Schedules C and D are distributed to technical personnel and reference sources only and are available from the Development Services Department on request. The Master Municipal Construction Document is available through MMCD Suite 102 211 Columbia Street Vancouver, B.C. V6A 2R5 Tel. (604) 681-0295 email admin@mmcd.net.*

# PART A: GENERAL

## A.1 COMMON DESIGN NOTES

### A1.1 Introduction

Schedule C sets out the criteria to be used for the design of Works required under the Bylaw.

For the purposes of Part A, the term Design Professional is used to refer to the Consulting Engineer and the Landscape Architect where either or both are appropriate in the context. The Consulting Engineer shall be responsible for overall coordination of design and ensuring no conflict exists between landscape design and engineering design or any existing municipal or other Works.

### A1.2 Design Criteria

Where conditions arise which are not covered by Schedules C or D, the Design Professionals shall consult with the Director prior to completing the design.

The first submission of the Design Drawings shall be accompanied with a declaration from the Design Professionals that the design of the proposed works is in general conformance with this Bylaw. Exceptions to general conformance shall be noted and documentation provided to explain the noted exceptions.

### A.1.3 Sealing of Drawings

The Design Professional's seal on the design drawings submitted to the Director for review and acceptance will certify that the design has been carried out in compliance with the Bylaw and in accordance with the best current acceptable engineering and landscaping standards and practices.

### A.1.4 Design Drawings

All Design Drawings prepared by the Design Professionals for submission to the Director shall conform to the minimum drawing standards specified in Section A.4 of this Schedule.

## A.2 APPROVAL PROCEDURE

### A.2.1 Works Required

Following favorable review of an application for subdivision by the Approving Officer, or for a building permit by the Building Inspector, submitted with all required fees and a conceptual servicing plan prepared by the Consulting Engineer and receipt of all required fees and of the signed Commitment by Developer and Consulting Engineer, the Developer will be provided with a preliminary list and general description of Works required to be constructed under this Bylaw. The preliminary information provided by the City is

intended only as a guideline to the Developer and does not necessarily represent a final and complete list of all necessary requirements. The Developer will provide this information to the Design Professionals who may request further information or clarification of the requirements prior to commencing design. Additional requirements may be identified by the City during or following completion of the initial design.

### A.2.2 Initial Design

Upon receipt of preliminary requirements, the Consulting Engineer shall arrange for all legal and/or topographic surveys, geotechnical investigations, traffic studies, and any other investigations, including test pits if necessary to confirm the location of underground utilities, required to prepare the design drawings. The Consulting Engineer shall be responsible for confirming the accuracy of any information about existing Works or other municipal infrastructure provided by employees of the City.

The Consulting Engineer shall perform all necessary calculations and field verifications to confirm that the proposed design of the Works conform to the Bylaw. Deviations from the preliminary requirements may be accepted, providing they accomplish the same purpose and are agreed to by the Director.

### A.2.3 Submission of Design Drawings

Prior to submission of Design Drawings, the Developer and the Consulting Engineer must jointly submit the Commitment by Developer and Consulting Engineer. The Consulting Engineer shall submit a minimum of two complete sets of sealed paper prints of the design drawings, including those prepared by the Landscape Architect, to the Director for review.

### A.2.4 Unacceptable Design Drawings

If design drawings are not acceptable to the Director, one marked-up set of drawings will be returned to the Consulting Engineer for correction and/or revision.

### A.2.5 Resubmission of Design Drawings

The Consulting Engineer shall submit a minimum of two complete sets of sealed paper prints of the revised design drawings to the Director for review plus additional prints of individual design drawings as may be required by the District for ancillary purposes.

### A.2.6 Approvals of Other Agencies

The Consulting Engineer shall obtain all necessary approvals from all other agencies that may be involved and submit them to the Director before the design drawings can be stamped as reviewed and accepted by the City. These agencies may include, but are not necessarily restricted to, Federal and Provincial Fisheries, Ministry of Environment, Metro Vancouver, Fortis Gas, Telus, B.C. Hydro, and the National Energy Board. Where an application to an agency must be made by the City, the Consulting Engineer shall supply

the City with the necessary copies of drawings and any other supporting information for the application.

### A.2.7 Acceptance of Design Drawings

Upon notification that the design drawings are acceptable to the Director, the Consulting Engineer shall submit five complete sets of sealed paper prints. One set will be stamped as having been reviewed and accepted by the City and returned to the Developer. The stamped drawings are the Contract Drawings as defined in this Bylaw.

The Director's review of the design drawings is to check for general compliance with the Bylaw and the subdivision requirements. The Director's stamp does not certify the accuracy or appropriateness of the design nor transfer any responsibility for proper design to the Director or the City. The Design Professional shall be fully responsible for the accuracy and suitability of the design and for its conformity to the Bylaw. Any design errors and/or omissions, when so ever discovered, shall be rectified at the cost of the Developer.

The stamping of the design drawings does not constitute subdivision approval, nor does it permit construction, or any other work on site, to be commenced.

### A.2.8 Other Utilities

The Consulting Engineer shall arrange for the coordination of the design, location and/or relocation of non-municipal utilities with B.C. Hydro, Telus, Fortis Gas, Shaw cable, and any other appropriate utility companies.

## A.3 UTILITY ALIGNMENTS

### A.3.1 General

Wherever practical, utility alignment shall conform to the offsets illustrated in the City's Typical Cross Section Drawings No. 101A to 101G in Schedule D for the class of road being constructed.

Where the standard offsets are not practical due to existing utilities in the ground or other considerations the following principles shall apply to the choice of alignment:

a) where feasible, no utilities to be located directly under or within 0.5 metres of the curb or sidewalk alignment;

b) manholes to be out of wheel paths on the roadway; and

c) minimum clearance from face of curb to any fixed object to be 0.3 metres.

## A.4 DRAWING & MANUAL STANDARDS

### A.4.1 General

All drawings shall be in metric units on A1 size sheets, 594 mm x 841 mm outside dimensions, using a high grade tracing paper or polyester film with 1/2 plan and 1/2 profile. Plan section to be on top of sheets, profile to have 2mm vertical x 20mm horizontal grid.

Design drawings shall be prepared by computer assisted drafting procedures, Leroy mechanical lettering or freehand, provided that they are in ink and clearly legible. Minimum lettering height shall be 2.5 mm. Line weights and letter sizes shall be in accordance with Table A1 of this Section.

***Table A1: Line Weights and Letter Sizes for Manually Drafted Drawings***

| **Item** | **Pen Size** | **Letter Size** *(Leroy Template)* |
|---|---|---|
| property lines | 1 (0.50 metric) | |
| rights-of-ways | 1 (0.50 metric) | |
| existing utilities | 3 x 0 (0.25 metric) | |
| existing dimensions and offsets | 4 x 0 (0.13 metric) | |
| proposed works | 3 (0.70 metric) | |
| existing lot and legal plan numbers | 0 (0.35 metric) | 120 (3.1 mm) |
| proposed lot and legal plan numbers | 1 (0.50 metric) | 140 (3.5 mm) |
| lot dimension | 0 (0.35 metric) | 100 (2.5 mm) |
| offsets of utilities | 0 (0.35 metric) | 100 (2.5 mm) |
| sizes of utilities | 0 (0.35 metric) | 100 (2.5 mm) |
| elevation figures | 0 (0.35 metric) | 100 (2.5 mm) |
| notes | 0 (0.35 metric) | 100 (2.5 mm) |
| street names | 3 (0.70 metric) | 240 (6.1 mm) |
| drawing numbers | 4 (1.00 metric) | 290 (7.5 mm) |
| | | |

*Note: Computer assisted drafting standards shall be comparable to these standards and to the satisfaction of the Director.*

### A.4.2 Title Block

All drawings shall have the following information:

a) drawing title;
b) drawing number;
c) date of drawing;
d) scale;
e) City of Pitt Meadows project number;
f) Name of Developer;

g) name of Consulting Engineer, or Registered Landscape Architect with address, telephone, facsimile number and email address;
h) official seal of the professional engineer or landscape architect; and
i) drawing revision information including date of revision.

### A.4.3 Preparation of Design Drawings

All dimensions on plan and profile shall be in metres. The plan view shall show the legal layout of existing and proposed roads and properties, with all existing and proposed lot numbers and dimensions (to the nearest 0.01 m) taken from registered legal plans. It shall also show existing house numbers and all registered and proposed rights-of-way. The names of existing streets shall be indicated outside of the road Right-of-Way boundaries.

On profiles, all elevations used shall be geodetic and rounded off to the nearest 0.005 metre.

On profiles the starting chainage station 1 + 00 shall coincide with an accented vertical line on the grid and line up vertically with the 1 + 00 station on the plan view. Chainage stations shall be a maximum of 20 metre intervals and rounded off to the nearest 0.1 m.

Location and elevation of all survey monuments, permanent and temporary bench marks shall be shown on the plan view.

Reference numbers to the appropriate Supplementary or MMCD specification or detail drawing shall be noted, and, if none apply, specifications or details are to be shown on the drawings of the appropriate Works or utility.

Clearance between all water, sewer, drainage and other utility mains where they cross each other shall be show on the drawings.

The following scales shall be used:

| | |
|---|---|
| plan views..... | 1:500 or 1:250 |
| profile, horizontal..... | 1:500 or 1:250 |
| profile, vertical..... | 1:50 or 1:25 |

All symbols on the drawings shall be as shown on Standard Detail Drawings G1 to G3. All offsets of existing and proposed services shall be shown to the nearest 0.1 m. The North arrow shall be clearly shown on all plan views.

### A.4.4 Roadworks

The plan view shall show the baseline survey and all proposed/existing:

- Watermain, sanitary sewers, and storm sewers;
- Gas and underground electrical and telephone ducts;

- Driveway culverts with sizes;
- Ditches;
- Edges of roads and driveways;
- Water valves and other surface features such as trees, retaining walls and hedges which may be affected by proposed construction;
- Manholes;
- Catchbasins;
- Poles; and
- Fire hydrants.

The proposed roadwork's shall be drafted in bold lines as shown on Standard Detail Drawing G1 and lightly shaded (on reverse side of drawing for manually prepared drawings). The profile view shall show chainages and profile along the survey baseline complete with elevations of existing ground along the baseline and proposed road centerline and gutter line. Drawings shall show all vertical and horizontal geometry necessary for layout and construction of the roadwork's.

### A.4.5 Storm Sewer Works

The plan view shall show the baseline survey and all proposed/existing:

- Watermain, sanitary sewers, storm sewers and ditches;
- Driveway culverts with sizes;
- Major drainage routes;
- Edges of roads and driveways;
- Water valves and other surface features such as trees, retaining walls and hedges which may be affected by proposed construction;
- Gas and underground electrical and telephone ducts;
- Manholes;
- Catchbasins;
- Poles; and
- Fire hydrants.
- Storm connections; and
- Lot grading (see requirement below).

Each proposed service connection shall be referred to adjacent lot property lines and sized if different than standard service connection sizes. All sizes shall be in millimetres. The proposed storm sewer shall be shown in bold lines as shown on Standard Detail Drawing G1 and the offset circled. Basement and crawl space elevations of existing houses and average ground elevation of vacant lots shall be shown. The invert and approximate depth (at property line) for each proposed service connection shall be "boxed in" for each property.

The profile view shall show chainages, profile of proposed road or ground surface, and location and elevations of all existing ditch inverts, culvert and storm sewer inverts and services crossed by the proposed works. The proposed works shall be shown including grade, invert elevations, distances between manholes and pipe specifications (i.e. type and class of pipe). Full flow hydraulic capacities of pipes and design flow in litres per second (l/s) shall also be shown.

Where a Stormwater Management Plan is required, show all data pertaining to the design of the proposed storm sewer system including the hydraulic grade lines of minor system if minor system sewers are surcharged. The Consulting Engineer shall submit design calculations complete with plan showing catchment area.

a) Tributary areas in the catchment with existing and ultimate land uses.
b) Details indicating how the local catchment area relates to the boundaries in the Master Drainage Plan or Watershed Drainage Plan, if such plan has been developed by the City.
c) Contours at 1.0 m elevation intervals.
d) Existing watercourses including environmental classifications and/or fish presence information, if available.
e) Layouts of existing and proposed drainage systems.
f) Major flow paths showing the 100 year hydraulic grade line.
g) Conceptual lot grading patterns with existing and proposed elevations at intersections of property lines and the general direction of surface run-off within the site of the proposed subdivision or development and the adjoining properties.
h) Locations, sizes and hydraulic grade line elevations of proposed detention facilities.
i) Other proposed mitigation measures, if appropriate.
j) Proposed minimum building elevations (MBE) and 100 year hydraulic grade line of major flow path.
k) Pre and post-development flows, with and without the impact mitigation measures.
l) Current and future upstream and downstream flows and system capacities.
m) Water quality control plan if required.

The extent of the tributary drainage area of the storm drainage system under design shall normally conform to the natural contours of the lands. The Consultant shall confirm the extent of the tributary drainage area with the Director prior to design, and incorporate designs for the minor and major flows into the City's ultimate overall coordinated drainage system.

### A.4.6 Sanitary Sewer Works

The plan view shall show the baseline survey and all proposed/existing:

- Watermain, sanitary sewers, storm sewers and ditches;
- Driveway culverts with sizes;
- Edges of roads and driveways;
- Sanitary connections;
- Water valves and other surface features such as trees, retaining walls and hedges which may be affected by proposed construction;
- Gas and underground electrical and telephone ducts;
- Manholes;
- Catchbasins;
- Poles; and
- Fire hydrants.

Each proposed service connection shall be referenced to adjacent lot property lines and sized if different than standard service connection sizes. All sizes shall be in millimetres. The proposed sanitary sewer shall be shown in bold lines as shown on Standard Detail Drawing G1 and the offset circled. Basement and crawl space elevations of existing houses and average ground elevation of vacant lots shall be shown. The invert and approximate depth (at property line) for each proposed service connection shall be "boxed in" for each property.

The profile view shall show chainages, profile of proposed road or ground surface, and location and elevations of all existing ditch inverts, culvert and storm sewer inverts and services crossed by the proposed works. The proposed works shall be shown including grade, invert elevations, distances between manholes and pipe specifications (i.e., type and class of pipe). Full flow hydraulic capacities of pipes and design flow in litres per second (l/s) shall also be shown.

### A.4.7 Waterworks

The plan view shall show the baseline survey and all proposed/existing:

- Watermain, sanitary sewers, storm sewers and ditches;
- Driveway culverts with sizes;
- Edges of roads and driveways;
- Water connections;
- Water valves and other surface features such as trees, retaining walls and hedges which may be affected by proposed construction;
- Gas and underground electrical and telephone ducts;
- Manholes;
- Catchbasins;
- Poles; and
- Fire hydrants.

Each proposed service connection shall be referenced to adjacent lot property lines and sized if different than standard service connection sizes. All sizes shall be in millimetres. The proposed waterworks shall be shown in bold lines as shown on Standard Detail Drawing G1 and the offset circled. All fittings and thrust restraints shall be "boxed in" for each location. Additional details of valves, fittings and thrust blocks may be required for clarification.

The profile view shall show chainages and profile of proposed road or ground surface and location and elevations of existing services crossed by the proposed works. All design data of the proposed watermain, including the size, grades and profile of proposed works, grade changes, test points and pipe specifications (i.e., type and class of pipe) shall also be shown.

The maximum working pressure shall be shown as a separate note on the drawing.

When thrust blocks are specified on the drawings which are different than the sizes specified on the Standard Detail Drawings, a note shall be included on the drawing stating the design criteria assumed in sizing the thrust block areas (i.e., test pressure, type of soil and bearing pressure assumed in design calculations). Details and location of approved restraint devices, if used instead of thrust blocks, shall be clearly shown.

### A.4.8 Street Lighting Works

The drawings shall include only plan views, no profile is required. The plan view shall show all existing underground services, poles, edges of roads and lanes, sidewalks, ditches and other surface features such as trees, retaining walls and hedges which may be affected by proposed construction. All sizes shall be in millimetres. The proposed street lighting works shall be shown in bold lines as shown on Standard Detail Drawings G1 and G3 and the offset of the proposed ducts circled. Each proposed street light location shall be referenced to adjacent lot property lines. The size and type of poles, wattage and type of luminaries, number and size of wires and ducts, proposed hydro connections and junction boxes shall be shown. The numbers of street light poles shall be shown on the drawing if provided by the City before final review for acceptance.

### A.4.9 Sidewalks

When sidewalks are constructed in conjunction with roadworks, the following requirements for sidewalks may be replaced by typical road cross-sections.

The drawings shall include both plan and profile views. The profile view shall show elevations of top of existing curb and proposed curbside edge of sidewalk. If curbs are non-existent, elevations of road crown and proposed curbside edge of sidewalk shall be shown instead.

The plan view shall show the same existing information as for street lighting works. In addition, the proposed sidewalk shall be shown in bold lines as shown on Standard Detail Drawing G1 and lightly shaded (on reverse side of drawing for manually prepared drawings). The offset of the sidewalk shall be circled.

### A.4.10 Cross Sections

Cross-sections shall be provided for all roadwork's and sidewalks. For roadwork's, show existing and proposed details across the full width of the road right-of-way regardless of whether a full or partial width of road construction is proposed. Cross-sections shall show property lines, final fill and cut slopes, ditches, edges of existing road, centerline of road and curb and gutter. Distances and elevations of each break in the cross-section shall be clearly shown.

The proposed roadworks shall be shown in bold lines with emphasis on the finished surface of the road. Elevations of the proposed road cross-sections shall be shown. If the

proposed road centerline is different than the road right-of-way centerline, it shall be clearly shown.

For sidewalks, cross-sections showing only the side of the road where the work is proposed shall be required. The proposed sidewalk shall be shown in bold lines. Cross-sections shall use scales as follows:

| | |
|---|---|
| Horizontal | 1:100 |
| Vertical | 1:20 |

Elevations shall be rounded off to the nearest 10 mm.

### A.4.11 Drainage, Erosion and Sediment Control Plan *(Bylaw 2833, 2019)*

Every applicant who proposes to carry out a subdivision or development under a building permit shall first, submit an Erosion and Sediment Control (ESC) Plan before carrying out any development on the land. The ESC plan must be designed, signed and sealed by a Qualified Professional. A Qualified Professional may be a registered engineer, biologist, geoscientist, or other professional certified in Erosion and Sediment Control. The ESC plan shall include, but not necessarily be limited to, the following:

a. baseline survey;
b. pre-development contours and drainage boundaries;
c. post-development contours and drainage boundaries;
d. type of existing vegetation;
e. boundaries between different soil types;
f. critical erosion areas;
g. limits of clearing and grading;
h. top and bottom of cut and fill slopes;
i. swales, interceptor trenches and ditches, cut-off trenches, storm sewers and ditches, water courses, inlets, outlets all with grades and dimensions, direction of flow and details of diverting off-site run-off around cleared and disturbed areas;
j. location of storm water management Best Management Practices;
k. location, details and specifications of temporary and permanent erosion control measures including seeding and planting of grass and other plants;
l. temporary and permanent sediment control measures including sections, details and specifications of traps, ponds, filters, inlet and outlet stabilization, silt fabric fences;
m. construction equipment and vehicle entrance locations, dimensions of rock surfaced vehicle entrances to minimize tracking of soil off site with thickness and size of rock, wash down areas; and
n. proposed phasing of the plan in relation to the sequence of clearing and construction.

The requirement for an Erosion and Sediment Control Plan may be waived, in part or in full, at the discretion of the Director if all the following criteria are met:

i. The development is:
   - An addition to an existing building where the lot coverage of the addition is not more than the lesser of 10% of the lot area and 25% of the gross floor area of the building in which the addition is contained; or
   - An Accessory Building or Accessory Structure as defined in the General Definitions of the Zoning Bylaw No. 2505, 2011; outlined in Section 4.13.

ii. The site where the development will occur;
   - does not have an excavation greater than 1m;
   - is not within 30m of a watercourse;
   - does not contain slopes greater than 20 percent;
   - does not have a history of erosion or soil and slope instability;
   - will not disturb the natural vegetation by an area greater than 500 sq. m.

iii. Adherence to best management practices including but not limited to:
   - retain existing vegetation and ground cover where possible;
   - restrict vehicle access and utilize wheel wash pads at access points;
   - install silt fencing around stockpiles, at the toe of disturbed slopes, on the lowest point of the lot abutting a road;
   - completely cover temporary stockpiles or spoiled material with polyethylene or tarps and surround with silt fence;
   - install and maintain filter fabric bags inside any catch basins, lawn basins, exposed manholes or any other open storm sewer access points collecting runoff from the building site;
   - divert runoff away from disturbed areas and roadways by use of perimeter ditches, low berms, and diversion swales to onsite sediment controls or vegetated areas.
   - convey surface runoff through swales designed to minimize flow velocity and erosion while maximizing settling;
   - where possible, collect runoff into suitable sediment settling facility or facilities prior to discharge off-site;
   - unless deemed unnecessary, a sediment pond should be designed, installed and maintained according to the Land Development Guidelines for the Protection of Aquatic Habitat by DFO;
   - keep all sand, gravel, spoiled material and concrete mix off of the paved surfaces;

- during excavation, holes requiring dewatering should be pumped to a vegetated area, suitable settling facility or other safe location which will prevent sediment-laden water from accessing the City's Drainage System;
- regularly sweep roads; and
- re-vegetate disturbed areas as soon as practically possible and within 30 days of completion of construction works.

### A.4.12 Boulevard Landscaping

The plan view shall show the baseline survey and:

a) the location of the plant material with respect to curb, sidewalk, underground utilities, driveway locations, corner sight lines, mailbox locations, street lights, and, where abutting the street, building doorways, overhangs, awnings, canopies and signs;
b) planting detail in accordance with the City's design criteria and supplementary specifications and detail drawings pertaining to street tree and boulevard plantings;
c) plant list showing quantity, botanical name, common name and size of proposed trees;
d) surface treatment of boulevard;
e) any other information required during the drawing review process;
f) notation that 'final location and species selection shall be to the satisfaction of the Director.

### A.4.13 As-Constructed Drawings

As-Constructed Drawings shall consist of all the Contract Drawings accurately revised to reflect actual construction recorded in accordance with MMCD 01 33 01.1.7 as amended by the supplementary specifications. One complete set of As-Constructed Drawings on Mylar shall be provided to the City sealed by the professional engineer who has provided construction services during the construction contract. In addition, one mounted micro-fiche copy of each sheet of drawings, one service record card for each service connection provided, an AutoCAD drawing file (latest version) and PDF file for all works and services provided on a computer disk shall be submitted to the City as official records.

The micro-fiche copies shall be mounted on 3M Company's FILMSOR. Brand Aperture and Camera Cards (Stock No. 3M-20241).

### A.4.14 Operation and Maintenance Manuals

Operation and Maintenance Manuals must be provided by the Developer's consultant for all pump stations, pressure reducing stations, reservoirs, water intakes, disinfection and water treatment plants, sewage treatment plants and outfalls, stormwater management BMPs, major drainage systems and any other Works and Services for which the Director requires them.

Three copies of each Operation and Maintenance Manual must be provided in accordance with MMCD 01 33 01 as amended by the supplementary specifications and, in addition, contain, as appropriate:

a) design criteria;
b) as constructed shop drawings;
c) test reports;
d) equipment layout drawings;
e) electrical, control, and alarm wiring diagrams;
f) operating instructions for all equipment including manufacturers data and service manuals;
g) maintenance instructions for all equipment, including frequency of maintenance tasks;
h) maintenance diary;
i) equipment data sheets;
j) spare circuit cards for critical components;
k) certified head/capacity curves for pumps;
l) equipment part lists and list of suppliers; and
m) emergency operating procedures.

The maintenance manuals must be in sturdy D type three ring binders with the name of the facility on the cover. Manuals must contain a table of contents with each section identified by a plasticized, labeled divider.

# PART B: ROADWORKS

## B.1 GENERAL

### B.1.1 Widths

Roads and lanes shall be designed to the minimum right of way and pavement widths for the appropriate classification and type of land use. Minimum widths are specified in Table B13: Minimum Standards for Roadworks in this Section and shown on Supplementary Detail Drawings 101A, 101B, 101C, 101D, 101E, 101F and 101G.

All road and lane intersections shall have triangular corner truncations measuring not less than 3 metres each way from the corner.

## B.2 GEOMETRICS

### B.2.1 General

Roadway geometrics shall be governed by the design speed required for each type of road as designed in Table B13: Minimum Standards for Roadworks in this section. Values of all the parameters with the exception of grades shall be in accordance with latest Transportation Association of Canada (TAC) edition of ***Geometric Design Guide for Canadian Roads***. Some of these parameters are summarized in Table B1 below, along with lesser standards. Where the required design parameters cannot reasonably be achieved, the Director may allow lesser design parameters to be used.

***Table B1: Road Design Parameters***

| Street Classification | Design Speed (km/h) | Maximum Grade | | Minimum Stopping Distance | Maximum Super-elevation | Minimum Radius (m) * |
|---|---|---|---|---|---|---|
| | | Desirable % | Absolute % | | | |
| Arterial | 60 | 6 | 9 | 85 | 4 | 130 |
| Collector | 60 | 8 | 10 | 85 | 4 | 130 |
| Local | 50 | 10 | 15 | 45 | ** | 50 |
| Rural | 50 | 10 | 15 | 65 | ** | 90 |
| * | Where grades exceed maximum desirable the minimum radius for horizontal curves shall be increased as appropriate. | | | | | |
| ** | Not applicable for local streets. | | | | | |

#### a) Grade

Desirable minimum gutter grade shall be 0.50% with absolute minimum grade being 0.30%.

Maximum grade for downhill cul-de-sacs shall not exceed 8%.

Absolute maximum grades shown in Table B1 above may only be used where:

(1) desirable maximum grade cannot be obtained due to topographical constraints;

(2) the geometric design of intersections can be improved by increasing maximum grade on minor street to avoid compromising design of major street. The use of absolute design criteria is subject to approval of the Director.

**(b) Vertical Curvature**

Use of K values below desirable may only be used where justified by topographical constraints and in the case of sag curves where street lighting is provided. The use of absolute design criteria is subject to approval of the Director.

***Table B2: Vertical Curvatures***

| Street Classification | Design Speed (km\h) | K Values | | | |
|---|---|---|---|---|---|
| | | Crest Curves | | Sag Curves | |
| | | Absolute | Desirable | Absolute | Desirable |
| Arterial | 60 | 15 | 20 | 10 | 20 |
| Collector | 60 | 15 | 20 | 10 | 20 |
| Local | 40 | 4 | 5 | 4 | 7 |
| Rural | 50 | 7 | 10 | 6 | 11 |

Vertical curve length is calculated by the equation:

**L = KA**

where: L = length in metres
A = algebraic difference in grades in percent
K = given in Table B2

Vertical curves may be omitted where the algebraic difference in grades does not exceed 2% for local streets and 1% for other streets.

**c) Cross Slopes**

Roadways shall generally be constructed using a centerline crown.

Under adverse topographic conditions, offset crown or cross-fall may be used, subject to the approval of the Director.

Minimum cross-slopes shall be 2.5%, with a maximum 4%.

Centerline valley shall be used for lanes and local roads in mobile home subdivisions or in other similar developments.

### B.2.2 Intersections

#### a) General

Intersections shall be as near as possible to right angles. The minimum angle of intersection shall be 70° and the maximum angle 110°. Intersections on horizontal curves will normally not be acceptable.

The minimum spacing between tee or cross intersections along a street shall be 60 metres.

If minimum requirements for site distances at un-signalized intersections cannot be met, alternative designs shall be submitted by the Consulting Engineer to the Director for consideration.

#### b) Curb Return Radii

Curb return radii at intersections shall be as follows:

***Table B3: Curb Return Radii***

| Street Classification | Intersecting Street Classification | Minimum Radius |
|---|---|---|
| Collector | Arterial<br>Collector | 10.0 m<br>10.0 m |
| Local | Arterial<br>Collector<br>Local | 11.0 m<br>9.0 m<br>7.5 m |

#### c) Local Streets Intersecting with Arterial Streets

Intersecting local streets shall have a minimum width of 11 metres for a distance of 20 metres from the major street curb return.

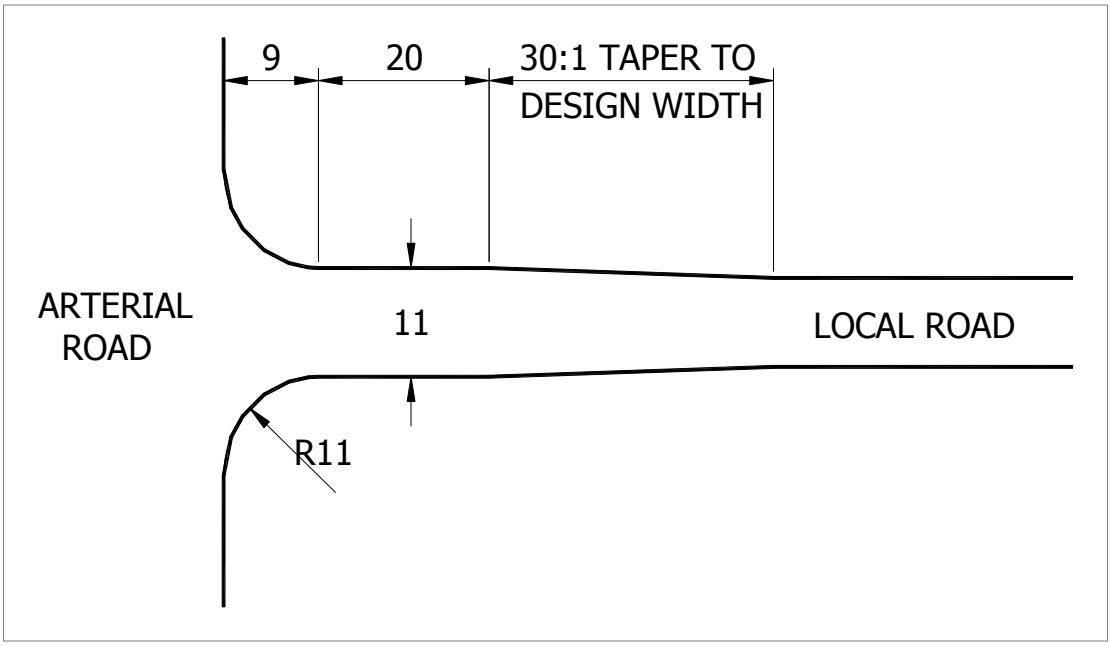



***Figure B1: Local Streets Intersecting with Arterial Streets***

**d) Vertical Curvature at Intersections**

Providing the minor intersecting street is marked as a STOP, the following K values may be used for the minor street:

***Table B4: Minor Street Curvature***

| Intersecting Street Classification | K Values | | | |
|---|---|---|---|---|
| | Crest Curves | | Sag Curves | |
| | Min. | Desir. | Min. | Desir. |
| Collector | 4 | 6 | 4 | 6 |
| Local | 2 | 4 | 2 | 4 |

Use of K values below desirable may only be used where justified by topographical constraints and, in the case of sag curves, where street lighting is provided. Such designs shall be subject to approval of the Director.

**e) Cross-slope at Intersections**

At intersections the cross-slope of the minor street shall be varied to suit the cross-slope of the major street.

The maximum rate for changing cross-slope of the minor street at intersections shall be as follows:

| | |
|---|---|
| Collector | 4% in 30 m |
| Local | 6% in 30 m |

### B.2.3 Cul-de-sacs

The maximum length of cul-de-sacs measured from the centerline of the intersecting street to the center of the cul-de-sac turnaround shall not exceed 150 metres. Cul-de-sac turnarounds shall conform to the following minimum dimensions:

***Table B5: Cul-de-Sac Dimensions***

| Circular or Circular Offset Cul-de-Sac Dimensions | | |
|---|---|---|
| Street Classification | R/W Radius (meters) | Outer Edge of Pavement Radius (meters) |
| Local with center island * | 16.0 | 14.0 |
| Local without center island | 14.0 | 12.0 |
| Industrial** without island | 17.0 | 14.5 |

* A cul-de-sac with a center island shall have a minimum road width of 9 metres.

** Tee or Hammerhead type designs may be used for industrial cul-de-sacs and shall have the minimum dimensions shown below.

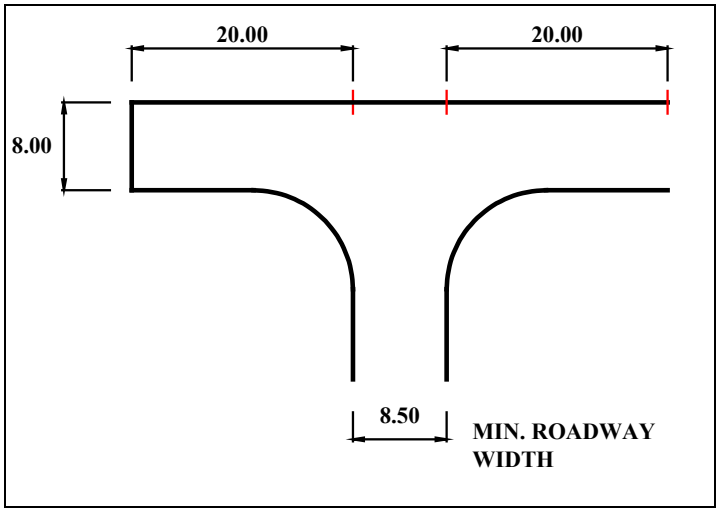



***Figure B2: Hammerhead Design***

### B.2.4 Turnarounds in Lanes

Turnarounds in lanes shall have the minimum dimensions shown below:

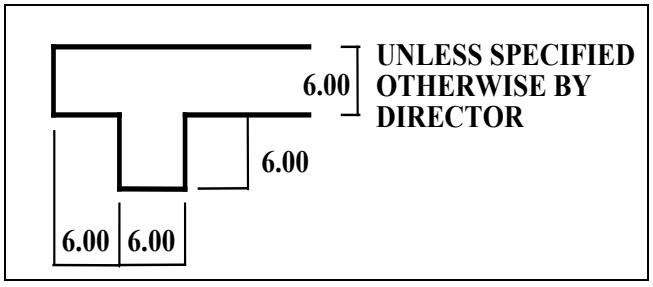



***Figure B3: Turnaround Lanes***

## B.2.5 Clearance

### a) Structures

Minimum horizontal clearance in metres from structure of edge of travel or parking lane:

***Table B6: Horizontal Clearance***

| Street Classification | Overpass Lane Edge to Rail or Parapet | | Underpass Lane Edge to Abutment or Wall | |
|---|---|---|---|---|
| | With Sidewalk* | No Walk | With Sidewalk* | No Walk |
| Arterial | 2.50 | 1.75 | 2.50 | 2.50 |
| Collector | 2.50 | 1.00 | 2.50 | 1.75 |
| Local | 2.25 | 1.00 | 2.50 | 1.25 |
| * Sidewalk - minimum 1.5 m wide and minimum 150 mm above roadway grade. | | | | |

Minimum vertical clearance from finished road grade to bottom of underpass or bridges shall be 5.0 metres.

### b) Aerial Utilities

Minimum vertical clearance in metres from finished road or sidewalk grade to aerial utility:

***Table B7: Vertical Clearance***

| Type of Utility | Vertical Clearance |
|---|---|
| Communications and guy wires | 5.0 |
| Hydro Conductors less than 90,000 volts | 5.5 |
| Consulting Engineer shall verify with Hydro and Telus. | |

### c) Signs and Poles

Sign placement to conform to the latest edition of the Manual of Uniform Traffic Control Devices for Canada.

Minimum horizontal clearance between street light pole and hydro pole shall be 2.5 metres.

Minimum vertical clearance between street light pole and aerial hydro lines of 750 - 22000 volts shall be 2.5 metres.

## B.3 SIDEWALKS, WALKWAYS AND TRAIL GUIDELINES

### B.3.1 Independent Walkways

#### a) Grades

Walkways shall be designed in accordance with Standard Detail Drawing C10. Where walkways are not an integral part of a roadway the following shall apply:

***Table B8: Walkway Grades***

| R/W Width* | Pavement Width** | Maximum Longitude Grade | | Min. Cross-Slope | Maximum Cross-Slope | |
|---|---|---|---|---|---|---|
| | | Desir. | Absol. | | Desir. | Absol. |
| 2.4m | 2.25m | 7% | 9% | 2% | 4% | 6% |

* Where a walkway serves as an emergency vehicle access right of way width shall be 4.0 m.

** The portion of the paved walkway in the intersecting boulevard area shall be flared outwards at 45 degrees to meet the back of the curb or sidewalk as appropriate.

Absolute grade and cross-slope may be used only where desirable values cannot be obtained due to topographical constraints. Such designs shall be subject to approval of the Director.

In cases when the absolute grades will be exceeded, concrete steps complete with handrails conforming to the latest edition of ***Work Safe BC*** shall be installed as part of the walkway.

For pedestrian bridges or underpasses the minimum unobstructed width shall be 2.5 metres.

#### b) Summary for Road and Off Road Trail Guidelines

The following table is a summary of the minimum requirements for trail design. The guidelines are for reference only and should not be applied without proper judgment. Each site will have different constraints, which will require slightly different treatments. Features such as benches, signs, viewpoints or alignment details shall be part of any comprehensive trail design:

***Table B9: Trail Guidelines***

**SUMMARY – TRAIL GUIDELINES**

| | Condition | Trail Width | Buffer | Width | Height | Max. Grade | Surface |
|---|---|---|---|---|---|---|---|
| ***Single Use*** | | | | | | | |
| **Pedestrian** | | | | | | | |
| Urban | - | 2.0m | 0.5m | 2.5m | 2.0m | 10% | Asphalt |
| | - | 1.5m | 0.5m | 2.5m | 2.0m | 25% | Gravel |
| **Equestrian** | | | | | | | |
| One Way | Shoulder | 1.0m | 1.0m | 2.0m | 3.0m | 20% | Gravel |
| Two Way | Separated | 2.6m | 0.5m | 3.6m | 3.0m | 20% | Gravel |
| **Bicycle** | | | | | | | |
| One Way | Shoulder | 1.5m | 0.5m | 2.0m | 2.5m | 10% | Asphalt/ Gravel |
| Two Way | Separated | 2.5m | 0.5m | 3.5m | 2.5m | 10% | Asphalt/ Gravel |
| ***Shared Use*** | | | | | | | |
| **Pedestrian/ Equestrian** | | | | | | | |
| One Way | Shoulder | 2.0m | 0.5m | 2.5m | 3.0m | 10% | Gravel |
| Two Way | Separate | 2.6m | 0.5m | 4.1m | 3.0m | 20% | Gravel |
| **Pedestrian/ Bicycle** | | | | | | | |
| One Way | Shoulder | 2.0m | 0.5m | 2.5m | 2.5m | 10% | Asphalt |
| Two Way | Separate | 4.0m | 0.5m | 5.0m | 2.5m | 10% | Asphalt |
| **Pedestrian/ Equestrian/ Bicycle** | | | | | | | |
| One Way | Shoulder | 3.5m | 0.5m | 4.0m | 3.0m | 10% | Gravel |
| Two Way | Separate | 4.0m | 0.5m | 5.0m | 3.0m | 10% | Gravel |

### c) Fencing

Unless otherwise specified, walkways shall be provided with a 1.8 metre high chain link fence on each side located 150mm from the side property line. The fence shall terminate 300 mm from the road property line at each end. Fencing shall be constructed in accordance with Standard Detail Drawing C13.

### d) Bicycle Baffles

Bicycle baffles shall be placed at each end of the walkway in accordance with Standard Detail Drawings C10 and C11. If the walkway also serves as emergency vehicle access, the bicycle baffles shall be hinged at the property line.

## B.3.2 Sidewalks on Road Right-of-Way

### a) Sidewalk Standards

Table B13 shows the requirements for number of sidewalks based on the predominant land use and the classification of roads.

Widths of sidewalks shall conform to the following table:

***Table B10: Sidewalk Widths***

| Street Classification | Predominant Land Use | Minimum Width | |
|---|---|---|---|
| | | Adjacent to Curb | Separate from Curb |
| Arterial | Low Density Residential | Not Desirable | 1.5 m |
| | High Density Residential | Not Desirable | 1.8 m |
| | Commercial | 2.5 m | 1.8 m |
| | Industrial | Not Desirable | 1.5 m |
| Collector | Low Density Residential | Not Desirable | 1.5 m |
| | High Density Residential | Not Desirable | 1.5 m |
| | Commercial | 1.8 m | 1.8 m |
| | Industrial | Not Desirable | 1.5 m |
| Local | Low Density Residential | Not Desirable | 1.5 m |
| | High Density Residential | Not Desirable | 1.5 m |
| | Commercial | 1.8 m | 1.8 m |
| | Industrial | Not Desirable | Not Desirable |

Sidewalks separate from the curb shall be in accordance with MMCD Standard Detail Drawing C1 except for the infill strip. Sidewalks adjacent to the curb shall be in accordance with Drawing C2 or C3 as applicable or as otherwise required by the Director.

**b) Concrete Curb and Gutter**

Concrete curb and gutter shall be in accordance with MMCD Standard Detail Drawing C4 or C5. Barrier type curb and gutter will be used in all cases except adjacent to single and two family residential zoned property where rollover curb and gutter will be used.

Extruded curb on pavement shall be used only for islands or medians where fill materials are placed directly behind the curb as shown on Standard Detail Drawing C6.

Reverse gutter sections shall be used where the road cross-slope falls away from the curb.

**c) Wheelchair Ramps**

Wheelchair ramps shall be formed at all intersections where curbs separate sidewalks or walkways from roadways. Wheelchair ramps shall normally be located at the mid-point of the curb return and in accordance with the Standard Detail Drawings shown in the ***Universal Design Guidelines for Outdoor Spaces***, Standard Detail Drawings C8 and C9, and Supplementary Detail Drawing SR-2 in Schedule D. All newly constructed letdowns to come complete with Tactile Warning strips.

Where barrier curb exists at the ramp location, it shall be removed for the required length and a new section of curb placed to provide the required letdown and taper.

## B.4 DRIVEWAY CROSSINGS

### B.4.1 General

Locations of driveway crossings shall be based on the ***Pitt Meadows Highway Access Bylaw No. 1025***, as amended. Items pertaining to the location of driveway crossings not specified in Bylaw No. 1025 shall, unless conditions dictate otherwise, be based on the latest edition of ***Guidelines for Driveway Design and Location***, an Institute of Transportation Engineers Recommended Practice Manual.

### B.4.2 Widths at Property Line

Driveway widths shall be in conformance with the following table:

***Table B11: Driveway Widths***

| Land Use | Minimum Width | Maximum Width |
|---|---|---|
| 1 & 2 family residential | 3.5 m | 7.0 m |
| Apartment residential * | 6.0 m | 9.0 m |
| Commercial, public parking, | 4.5 m | 9.0 m |
| service stations * | 6.0 m | 9.0 m |
| Industrial * | 6.0 m | 15.0 m |
| * Subject to approval by the Director of Operations & Development Services, driveways may be treated as intersections and curb returns used with minimum radius specified in 4.2.2 (b). | | |

Lane and industrial driveway crossings shall be constructed as intersections with the road including curb returns and wheelchair ramps as appropriate.

Wherever possible every effort shall be made to locate residential driveways no closer than 4.0 metres to curb return as shown on Supplementary Detail Drawing SR-1 in Schedule D of this Bylaw.

The locations of driveways accessing directly onto arterial and collector streets shall be subject to approval of the Director.

### B.4.3 Driveway Profile

Where driveways involve an elevation difference in excess of 0.3 m metres, the following profile may be used to define the maximum grade and vertical curvature. (Grades shall not exceed 20% in any case.)

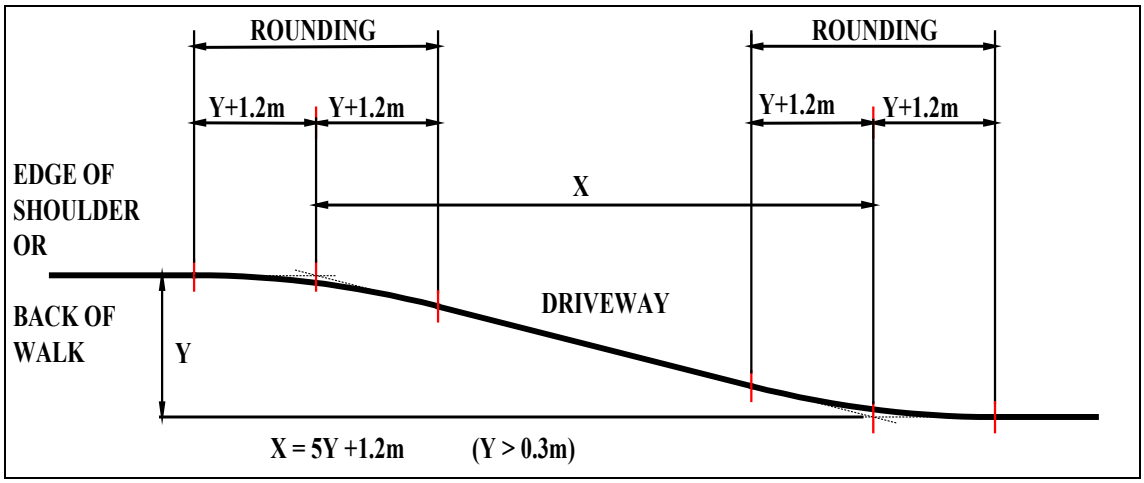



***Figure B4: Driveway Profile***

Above profile may be used for both positive and negative grades by reversing driveway road location.

## B.5 PAVEMENT STRUCTURE

### B.5.1 General

Pavement design shall be based on one of the following methods:

a) Pavement design shall be guided by other successful pavement designs in adjacent similar areas.

b) For new roads or total reconstruction of existing roads, any design method covered in Part 5 "Structural Design of Flexible and Rigid Pavement" of the latest edition of the ***Pavement Design and Management Guide*** of the Transportation Association of Canada. Pavement design shall include consideration of the road classification, traffic volume, geotechnical considerations, frost susceptibility, moisture conditions and sub-grade drainage provisions.

c) For existing roads where only overlay is needed, the design methods covered in The Asphalt Institute's 2000 edition of ***Manual MS-17 Asphalt Overlays for Highway and Street Rehabilitation***.

### B.5.2 Design Criteria

Design life of all classifications of roads shall be a minimum 20 years.

Where the Benkelman Beam design method is used, the design deflections (mean plus tow standard deviations) shall be as follows:

Local and Lanes..... 1.5 mm
Collector..... 1.3 mm
Arterial and Industrial..... 1.0 mm

Where existing pavements are to be overlaid, the minimum thickness of asphaltic concrete pavement overlay shall be at least twice the maximum aggregate size, but in no case less than 25 mm.

### B.5.3 Pavement Structure

Regardless of the method used for pavement structure design, pavement structures shall be at least equal to or greater than the minimum pavement structures shown in Table B12.

Minimum pavement structures shown below are based on the in-situ soil classification as defined in the ***Unified Soil Classification System***. Soils at the sub grade level having classifications of MH, CH, OH, and Pt require treatment or total removal and replacement with soil having a higher classification.

The Consulting Engineer shall provide a geotechnical report confirming that the City's minimum pavement requirement are adequate and appropriate for the proposed application.

### B.5.4 Minimum Pavement Structure Using Asphaltic Concrete Pavement

Minimum pavement structures shall be:

***Table B12: Minimum Pavement Structures***

| Road Classification | Minimum Thickness with Subgrade Soil Classification SC & Better | Minimum Thickness with Subgrade Soil Classification ML/CL/OL |
|---|---|---|
| Local, Rural Local, Cul-de-Sacs & Lanes | 75 mm * asphaltic concrete<br>75 mm base course<br>150 mm subbase | 75 mm * asphaltic concrete<br>75 mm base course<br>300 mm subbase |
| Collector | 75 mm * asphaltic concrete<br>100 mm base course<br>200 mm subbase | 75 mm * asphaltic concrete<br>100 mm base course<br>300 mm subbase |
| Arterial, Industrial & Rural Arterial | 100 mm ** asphaltic concrete<br>100 mm base course<br>200 mm subbase | 100 mm ** asphaltic concrete<br>150 mm base course<br>300 mm subbase |
| * To be placed in two lifts; 40 mm and 35 mm (Rural roads in one 75mm lift)<br>** To be placed in two lifts; 50 mm and 50 mm | | |

In all cases the second lift shall be placed after the installation of all underground services and construction of 90% of the buildings within the development are complete. This

requirement may be waived if the Director considers it to be impractical (e.g. minor road widening).

Rural roads shall have min 0.5m wide by 100 mm gravel shoulders of 19mm granular base material on same sub-base as adjacent AC pavement.

### B.5.5 Minimum Pavement Structures for Sidewalks, Walkways and Driveways

All sidewalks, walkways and driveways shall be constructed of Portland cement concrete in accordance with the applicable Standard Detail Drawings C1, C2, C3, C7 and C10.

## B.6 BRIDGES

### B.6.1 General

All bridge design shall be in accordance with CAN/CSA-S6 ***Design of Highway Bridges*** published by the Canadian Standards Association.

Roadway bridges shall be designed to a minimum loading of CL625 or to criteria provided by the Director.

***Table B13: Minimum Standards for Roadworks***

| Classification | Predominant Permitted Land Use for New Development | Road Right of Way Width (m) | Roadway Width Curb to Curb Urban Pavement Rural (m) | Number of Sidewalks | Design Speed (km/h) |
|---|---|---|---|---|---|
| **URBAN ROADS** | | | | | |
| Local | 1,2 & 3 family residential | 15 | 8.5 | 1 | 50 |
| Local | Multifamily, Commercial, Institutional | 20 | 11.0 | 2 | 50 |
| Local | Industrial | 18 | 11.0 | 1 | 50 |
| Collector | all urban land uses | 20 | 11.0 | 2 | 50 |
| Arterial | all urban land uses<br>- 2 travel lanes<br>- 4 travel lanes | <br>22<br>30 | <br>14.0<br>19.5 | <br>2<br>2 | <br>60<br>60 |
| **RURAL ROADS** | | | | | |
| Local | Agricultural, Rural Residential and Suburban Residential | 20 | 7.0 | 0 | 50 |
| Collector | ditto | 20 | 7.0 | 0 | 60 |
| Arterial | ditto | 20 | 9.6 | 0 | 60 |

**NOTES to Table B13: Minimum Standards for Roadwork's**

1. *Selection of the road design criteria set out in Table B13 shall be based on the predominant permitted land use for new development adjacent to the road and the road classification. Where the predominant permitted land uses for new development are different on opposite sides of a road, the greater of the applicable road widths shall be required.*

2. *If one side of a road of any classification is predominantly urban and the other rural, the urban side must have curb, gutter, sidewalk, boulevard landscaping and trees in accordance with the relevant Supplementary Detail Drawings 101A to 101E, but the rural side may be constructed with shoulders and ditches in accordance with drawing 101F. Where urban uses are predominant on both sides of a local road but a multifamily or institutional use is the predominant use on only one side, a sidewalk will be required on that side only. In these cases, right of way widths may be adjusted accordingly.*

3. *The design speed governs vertical and horizontal geometrics. Values of all parameters shall be taken from the latest edition of the Transportation Association of Canada manual* Geometric Design Guide for Canadian Roads*.*

4. *Local Urban Roads of 8.5 m width may be constructed within a 12 m right of way for compact residential developments of 25 units/hectare or greater as shown on Drawing 101B:*

   a) *on short connecting blocks where, because all parcels also abut other roads, underground wiring and gas mains are unnecessary; or*
   b) *if the Developer acquires or grants statutory rights of way in favour of the utility companies for the installation of underground wiring and gas mains.*

5. *Where there is insufficient standard boulevard width to accommodate transformers between curb and sidewalk in accordance with BC Hydro requirements, the sidewalk shall be located further from the curb at that location and the road right of way shall be widened as necessary.*

# PART C: WATER DISTRIBUTION SYSTEM

## C.1 SIZING OF WATERMAINS

Watermains shall be sized in accordance with the City's Water Distribution System Computer Model which has incorporated the following design parameters:

### C.1.1 Design Flow

The design flow for watermains shall be based on the greater of the following:

either (a) Peak Hour Demand

2,100 litres per capita per day for residential areas, and 175,000 litres per hectare per day for commercial, institutional and industrial areas

or (b) Peak Day Demand plus Fire Demand:

1,400 litres per capita per day for residential areas, and 90,000 litres per hectare per day for commercial, institutional and industrial areas plus the applicable fire demand at a location where the pressure drop would be most critical.

Despite a) and b), where zoning or a development permit determines a specific type of commercial, institutional or industrial land use, water demand may be based on generally accepted data for the type of use taking into account the greatest water demand that may be required for the permitted use on any part of the land.

### C.1.2 Fire Demand

Fire demands shall be determined based on the latest edition of the Insurance Bureau of Canada's publication ***Water Supply for Public Fire Protection - A Guide to Recommended Practice***. However, the fire demands so determined shall not be less than the minimum fire demands shown below corresponding to the various developments:

Buildings not protected by an automatic fire sprinkler system:

| **Type of Development** | **Minimum Fire Demand** |
|---|---|
| Rural Agricultural | 30 litres/sec |
| Single & Two Family Dwellings | 60 litres/sec |
| 2 Story Multifamily | 90 litres/sec |
| 3 Story Multifamily | 120 litres/sec |
| Commercial Buildings | 150 litres/sec |
| Institutional Buildings | 150 litres/sec |
| Industrial Buildings | 225 litres/sec |

If buildings are protected with automatic sprinkler systems protecting the entire building, the minimum fire flow may be reduced to the greater of:

(a) the minimum fire flow calculated in accordance with the NFPA 1142 Standard on ***Water Supplies for Suburban and Rural Fire 1999 Edition*** allowing for automatic fire sprinklers; or

(b) the minimum flow required to support the automatic fire sprinkler systems plus all other water requirements for firefighting purposes in the subdivision or the development.

If a main is extended, it must be sized to meet the higher minimum fire flow required for either the existing buildings or for the land use permitted by the ***Zoning Bylaw*** on each property adjacent to the extension.

### C.1.3 Design Computations

Use the Hazen-Williams Formula:

$Q = CD^{2.63} S^{0.54}/278{,}780$

where: Q = Rate of flow in litres per second
D = Nominal pipe diameter in mm
S = Slope of hydraulic grade line in m/m
C = Roughness coefficient 110 for all pipes sizes

### C.1.4 Water Pressure

The water distribution system shall be designed to supply water at pressures within the following ranges:

| | | |
|---|---|---|
| Minimum pressure at peak hour demand | = | 300 KPa (40 PSI) |
| Maximum pressure at low demand | = | 1,035 KPa (150 PSI) |
| Minimum pressure at the fire test location under peak day demand excluding hydrant losses | = | 140 Kpa (20 PSI) |

### C.1.5 Minimum Pipe Sizes

Minimum sized distribution mains shall be 150 mm in Single & Two Family Residential areas and 200mm in Multi-family, Institutional, Commercial & Industrial areas.

Fire hydrant connections shall be 150 mm.

## C.2 PIPELINES AND APPURTENANCES

### C.2.1 Looping of Watermains

All watermains shall be looped, except in cul-de-sacs of less than 80 metres in length, and statutory rights-of-way at least 3.0 m wide in favour of the City will be used for looping where necessary.

When a water main is located within a statutory right-of-way, access must be provided for maintenance vehicles and equipment. Maintenance access shall be constructed to support 9.0 t loading. Where a pipeline is located close to the boundary of a property, the right-of-way and access shall be entirely on one side of the boundary.

### C.2.2 Blow-off Assemblies

All dead-end watermains, whether permanent or temporary, shall be provided with a blow-off assembly as shown on Supplementary Detail Drawing SW-4. Blow-offs for 200 mm or larger watermains shall require special design.

### C.2.3 Location

Alignment of watermains shall generally be as shown on Supplementary Detail Drawings 101A to 101F. Minimum separation of watermains from sanitary and storm sewers or services shall be as outlined In Part D: Sanitary Sewer System;

Service connections shall normally be located at the centre of the lot frontage.

With the exception of service connections in the turnaround area of cul-de-sacs, service connections shall be aligned, as near as is practical, perpendicular to the watermain.

A pipeline crossing under a watercourse or under a structure must be encased in concrete. A pipeline crossing under an arterial highway or railway may be required to be inside an encasing pipe.

### C.2.4 Minimum Depth of Cover

Mains and services shall be of sufficient depth to:

(a) prevent freezing;

(b) clear other underground utilities; and

(c) prevent damage from live surface loading.

Irrespective of above, minimum cover shall be 1.20 metres.

### C.2.5 Line Valves

In general, line valves shall be located as follows:

(a) at pipe junctions:

min. 3 valves at "X" junctions

min. 2 valves at "T" junctions;

(b) not more than 200 metres apart;

(c) not more than one hydrant isolated; and

(d) the location of the line valves shall be such that interruptions to water supplies to adjoining properties are minimized in the event that isolation of a section of main becomes necessary.

Additional line valves may be required as determined by the Director.

Gate valves of the same diameter as the nominal pipe size shall be used for watermains up to and including 300 mm diameter. On watermains 450 mm and larger, gate valve sizes may be one size smaller than the nominal pipe size.

Butterfly valves with mechanically assisted operating gear boxes may be substituted for gate valves 450 mm diameter and larger.

### C.2.6 Fire Hydrant Spacing

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

a) i) not more than 150 m apart, 75 m from the furthest building site nor 90 m by an unobstructed path of travel from the exterior perimeter of a building other than a single or two family dwelling in the Urban Area;

ii) not more than 250 m apart in the Rural Area;

b) in accordance with the latest edition of the ***Uniform Fire Code*** for hydrant placement; and

c) at least 0.6 meters from the property line, and 1.0 m from the back of curb or edge of uncurbed pavement.

The final location of hydrants is subject to approval of the City's Fire Chief.

### C.2.7 Service Connections

The maximum size water service connection shall be 25 mm. Service connection criteria to meet specifications as outlined in the City's ***Water Works Bylaw 2343, 2007*** Section 5 and its amendments. All service connections to be installed by City forces.

### C.2.8 Thrust Blocks

Concrete thrust blocks or other restraining devices approved by the Director shall be provided at bends, tees, wyes, reducers, plugs and caps as shown on Standard Detail Drawing W1 and Supplementary Detail Drawing SW-3. The size of thrust blocks shall not be less than the minimum values corresponding to the test pressure and soil types specified or as may otherwise be required. The Consulting Engineer shall verify that the minimum sizes shown are adequate for the design. If larger thrust blocks are required, the

size of thrust blocks for the various types of soil conditions and the test pressure shall be clearly specified on the Design Drawings.

### C.2.9 Minimum Pipe Grade

Watermains shall be designed with a minimum grade of + 0.1%.

### C.2.10 Air Valves

Air valves shall be installed at all summits, and at abrupt changes in vertical grade from steep to flat sections, on all mains of 200 mm or larger except where the difference in elevation between the summit and low point is less than 600 mm or where active service connections are suitably located to dissipate entrapped air. The air valves shall be double acting air release and vacuum valves sizes according to normal and extreme operating conditions expected.

### C.2.11 Test Points and Disinfection

Locations of all test points for the purpose of hydrostatic pressure testing and disinfection shall be shown on the design drawings. Test points shall be installed at locations which ensure complete disinfection of the newly constructed main. There should be at least one test point installed beside a line valve on each section of watermain between adjacent valves. Test points shall consist of a minimum size of 19 mm corporation stop. A corporation stop installed for an air valve may be used as a test point or a bleed point but not for flushing purposes.

### C.2.12 Fire Line Connections

Fire line connections shall be sized for the fire protection system anticipated to be necessary for each parcel in accordance with National Fire Protection Association standards. Fire line connections shall be terminated at the property line with an appropriate Backflow Prevention Device.

### C.2.13 Structural Design

Live loads on watermains shall include Highway H-20 loading and an impact factor of 1.5. Ductile iron shall be considered as rigid and flexible conduits when selecting design methods. Where more stringent construction requirements are necessary, design drawings shall specify type of pipe and installation requirements.

### C.2.14 Corrosion Protection

Where, in the opinion of the Director there may be corrosive soils, the Director may require the Consulting Engineer to arrange for soils tests to determine whether or not corrosion protection measures are required for mainline pipe, valves and fittings. The Consulting Engineer shall specify all corrosion protection measures necessary to ensure that the water distribution system is adequately protected in accordance with the recommendations of the soils tests.

## C.3 RESERVOIRS

### C.3.1 Pre-Design Requirements

A pre-design report must be submitted and must be approved by the Director before detailed design is commenced. The pre-design report must address the following issues and provide schematics as appropriate:

- existing and future pressure zone boundaries;
- existing and future service areas;
- siting and access;
- overflow and drainage;
- existing and future capacity requirements;
- reservoir cleaning;
- water quality;
- control and rate of filling;
- security;
- aesthetics;
- neighbourhood impact; and
- geotechnical and seismic considerations.

### C.3.2 Reservoir Capacity

Reservoir capacity shall be not less than the greater of:

a) the one day average annual consumption for the service area, or

b) the total storage requirement A+B+C where:

A = Fire storage to meet the ***Fire Underwriters Survey Guidelines*** with not less than the fire flows for the highest fire demand in the service area as specified in these design criteria.

B = Equalization Storage of 25% of maximum day demand of service area.

C = Emergency Storage of 25% of A + B.

### C.3.3 Reservoir Design

The following design requirements may be modified at the discretion of the Director:

a) Reservoirs are to be reinforced concrete designed in accordance with the American Concrete Institute's ***Manual of Environmental Engineering Concrete Structure ACI 350R*** published 2001.

b) If the required reservoir volume is greater than 2,300,000 litres, 2 cells are required each containing one half of the total required volume and capable of being drained and filled independently. If the reservoir volume is less than

2,300,000 litres, 1 cell is sufficient provided an adequate temporary supply can be maintained during reservoir cleaning.

c) Each cell is to have an access opening in the roof for cleaning and maintenance with minimum dimension of 900 mm x 900 mm located so the overflow pipe is clearly visible inside the reservoir when viewed from the opening.

d) A permanent bronze survey mark is to be provided at all access hatches showing the geodetic elevation.

e) Access hatches shall be reinforced for 1,465 kg/$m^2$ and have:

- an aluminum 6 mm tread plate;
- a perimeter drain;
- a perimeter sealing gasket;
- a slam lock with aluminum removable sealing plug and opening tool;
- a flush lift handle;
- a gas spring assist cylinder;
- a 90 degree hard open arm;
- a flush fitting padlock tang;
- minimum 100 mm thick reinforced concrete box as a security cover for the hatch; and
- fasteners are to be made of 316 stainless steel.

f) Ventilation pipes or openings must be sized to handle appropriate intake and exhausting volumes of air for filling and drawing the reservoir. The minimum shall be two 150 mm diameter pipe vents with secure, vandal proof, baffled, “toad stool” top and stainless insect screen.

g) Floors are to slope to a sump at a minimum 2% grade and an FRP grating provided over the drain sump.

h) An outside perimeter drain and under floor sub-drain to collect and drain leakage shall be directed in separate drain pipes to an inspection manhole which may be connected to an overflow pipe provided suitable measures are incorporated to prevent surcharging.

i) An interior wall ladder is required from roof access to floor. Any exterior personnel onto the roof. All ladders must meet WCB regulations and have fall arrest equipment where required.

j) Separate inlet and outlet pipes are to be provided and designed to provide effective circulation.

k) The overflow drain is to be sized to carry the maximum pump discharge, and be connected to an acceptable point of discharge.

l) Telemetry is to be installed to be compatible with and to the same standards as the City’s system. Telemetry information is to be transmitted by a

programmable logic controller and radio modem to the water source (pump station or inlet valve). An intrusion alarm system must also be connected to the City system by SCADA.

m) Reservoir controls are to consist of 0-100%, indicating level transmitters (one for each cell), either pressure or ultra sonic.

n) Backup high and low level control balls are required for each cell (not to contain lead or mercury).

o) The Consulting Engineer is to review the need for re-chlorination based on demand forecasts.

p) The reservoir valve chamber design shall incorporate:

- all valving associated with reservoir;
- door from grade or an access hatch of the same type as for the reservoir roof and large enough to permit safe removal of largest single piece of equipment;
- lifting beams and hoists where necessary to enable removal of equipment or components;
- heat and light where necessary;
- ventilation to meet WCB regulations;
- all control wiring junction boxes;
- a sump and drain with FRP grating in valve chamber floor;
- a 50 mm valved outlet off the supply line within the valve chamber for water supply for cleaning the reservoir;
- piping and valves to be painted with epoxy enamel to American Waterworks Association standards;
- valves and piping to be clearly labeled;
- chamber walls to be painted white, floor grey, using paint for potable water service; and
- modulating control (altitude) valve if more than one reservoir is in the same zone, or if the reservoir is supplied by gravity. The altitude valve shall be by Clayton Valve or Singer Valve and the design shall be submitted for approval.

q) The reservoir must be cleaned and disinfected to AWWA standards.

r) Access roads less than 0.5 km long must be paved.

s) Grated black chain link perimeter fencing is required.

t) Landscaping acceptable to the Director shall be provided.

## C.4 PUMP STATIONS

### C.4.1 General

Pump stations shall be designed with no fewer than two duty pumps to meet peak maximum day demand with the largest pump out of service and balancing storage on line. Alternatively, if balancing storage is not on line, pump station capacity shall meet peak hour demand with the largest pump out of service, and stand-by power shall be provided to allow the greater of maximum day demand plus fire flow or peak hour demand during a power outage.

Utility services to the station will be underground. Auxiliary power for emergency use will be provided.

A list of all materials and equipment shall be submitted to the Director for approval.

### C.4.2 Pre-Design Requirements

A pre-design report must must be submitted and must be approved by the Director before detailed design is commenced. The pre-design report must address the siting of the pump station and all design considerations and provide schematics as appropriate.

### C.4.3 Pump Station Design

The following design requirements may be modified at the discretion of the Director.

a) Three-phase power is required for 10 HP, or larger, pumps.

b) Electrical phase loss protection is required.

c) Power factor correction is to be provided as required by Power Authority.

d) Motor controls are to be of “soft start” type.

e) Motors are to be energy efficient.

f) Hour meters are required on each pump.

g) Ammeters are required on each pump.

h) Pumps are to start and stop individually. Start and stop to be based on water levels in control reservoir; automatic alternation of pump sequence.

i) A Programmable Logic Controller (PLC) and telemetry system, compatible with the District’s Supervisory Control and Data Acquisition (SCADA) system are required. The controller shall be capable of communicating utilizing Modbus protocol.

j) A complete range of pressure flow, temperature and entry sensors with telemetry consistent with the City’s SCADA system shall be provided.

k) Control valves are required to minimize starting and stopping surges.

l) Globe type control valves are to have rising stem indication.

m) All hydraulic control valves are to have duplex pilot filter systems.

n) A recording flow meter is required at each pump station to record instantaneous and total flows; 4-20 mA connected to PLC

o) Recording suction and discharge pressure gauges are required at each pump station and 4-20 mA transmitters connected to the PLC.

p) The station will be provided with a high pressure (discharge) override stop plus alarm, and low pressure (discharge) override stop plus alarm. All alarms are to interface with the SCADA system.

q) The control panel is to have a lamp test button and include an alarm bypass button.

r) Station piping shall be cement or AWWA epoxy lined ductile iron or AWWA epoxy lined steel pipe and fittings.

s) Station piping is to include a sample point for water quality testing.

t) Internal and external lighting, and automatic heating and ventilating systems are required.

u) Noise control may be required by the Director.

v) Drainage is to be provided for all pump stations.

w) If a chamber is used, it must be sized to allow adequate room for operation and maintenance.

x) Adequate labelling is required.

y) Paved access is required for a hoist truck with a 1.8 m boom for removal of equipment.

z) Landscaping acceptable to the Director is to be provided and include irrigation where necessary. Two metre high perimeter fencing may be required, black chain link unless otherwise approved.

aa) A security system and alarm for protection against vandalism and theft will be provided.

bb) The station is to be provided with all manufacturers' recommended spares.

cc) A wall mounted spare fuse box shall contain all spares for station.

## C.5 PRESSURE REGULATING VALVE STATIONS

### C.5.1 General

A pressure reducing station is required wherever a pipeline connects different pressure zones.

The need for, and siting of, a pressure reducing station must be reviewed by the Director.

### C.5.2 Pre-Design Requirements

A pre-design report must be submitted and must be approved by the Director before detailed design is commenced. The pre-design report must address the following issues and provide schematics as appropriate, location to be outside of the traveled portion of a street if possible:

- pressure zones, water main looping and maximum pressures;
- proposed and ultimate flows;
- energy efficiency;
- back up supply to each zone;
- fire flows;
- location of existing utilities including proximity of sewer for drain connection and telephone connection point for telemetry communication, if required;
- schematic for monitoring and control instrumentation;
- schematic showing access for personnel, vehicles and service and retrieval equipment;
- schematic for landscaping, and security; and
- floor and top elevations.

### C.5.3 Approval

Specific equipment proposed for the facility shall be reviewed with the Director to confirm acceptance of the equipment, or specific model of equipment, required by the City.

### C.5.4 Design Requirements

The following design requirements may be modified by the Director.

#### a) Chamber

The PRV chamber shall be precast reinforced concrete of sufficient size to accommodate the required equipment.

The chamber shall be designed and fabricated for H20 loading and supplied in two sections. Internal height shall be a minimum of 2.0 metres. Adequate floor area must be allowed for valve and component maintenance and access to wall mounted instrumentation. A 600 mm wide aisle shall be provided. Minimum clearance of 200 mm is required between piping and chamber walls.

A 610 mm x 610 mm access riser shall be fabricated integrally with the top section and have 10M reinforcing steel dowels for on-site construction of a riser extension.

Openings shall be provided for riser pipes for isolation valve extension rods and fitted with 150 mm PVC bell ends.

Core hole openings are required for two 100 mm diameter vent pipes. After vent installation, joints shall be sealed and made water tight.

Vent pipes shall be 100 mm diameter schedule 40 steel pipes, hot dipped galvanized after fabrication. Vent openings shall be provided with rain protection and bird screens.

Anchor brackets are to be cast into the concrete roof above all valves as lifting devices and in adjacent walls to assist in removing equipment.

The outside of the chamber must be painted with asphalt emulsion and the inside painted white (2 coats).

The chamber is to be lit with a 1.2 m single bulb explosion proof fluorescent light connected by a standard 120V grounded electrical cord.

The chamber shall be equipped with a dehumidifier and with heating to prevent freezing.

The chamber is to be drained with a 150 mm diameter drain by gravity to an approved storm system.

**b) Access Hatch**

The access hatch is to be installed flush to the finished ground elevation and shall be MSU type or approved equal, complete with recessed padlock hoop locking arrangement or approved equivalent. The access hatch shall be cast into the concrete riser extension which is to be fabricated in the field.

**c) Access Ladder**

The access ladder shall be a heavy duty industrial grade aluminum ladder, complete with an extend pole. The ladder shall be attached to the chamber wall with aluminum brackets and Hilti type concrete anchors complete with plastic washers.

**d) Pressure Regulating Valves**

Pressure regulating valves will be complete with valve position indicator assembly or approved equal.

Two or more pressure regulating valves shall be required to serve low and high flow conditions and to provide redundancy for valve maintenance. The Director shall approve settings for both low flow and high flow conditions.

Each pressure regulating valve shall have approved resilient seat gate valves as mainline isolation valves. Isolation valves must have hand wheels and extensions for valve operation from the surface and should be regulated with CRD and CRL pilots (i.e.; dual pilot system).

Basket type strainers are to be provided at each pressure regulating valve.

**e) Controls**

Control lines shall be stainless steel. Control line tube fittings shall be stainless steel (single ferrule) fittings with Moli coated nuts or approved equals.

Control line isolating valves must be provided for pressure regulating valves which are 100 mm and larger. Isolating valves must be 304 stainless steel, full port, and two piece body ball valves.

Victaulic couplings are to be used for easy disassembly of pipe sections without damaging gaskets,

**f) Pipe Support**

Pipe supports are required for easy removal of pipe sections and equipment and be primed and painted.

**g) Air Valves**

Double acting combination air/vacuum valves shall be installed both upstream and downstream of pressure regulating valves.

**h) Pressure Gauges**

Pressure gauges are to be stainless steel case, brass internals, liquid filled, 5mm (¼ inch) MPT bottom mount or approved equal and are to be installed upstream and downstream of pressure regulating valves. Gauges should read up to 184 Kpa (300 PSI).

**i) Flow Meters and Miscellaneous Equipment**

Approved flow meters and pressure transducers, with adequate straight length sections of upstream and downstream pipe, are to be installed, if required, in accordance with the manufacturer's specifications.

**j) SCADA Requirements**

Equipment shall be installed compatible with the City's Supervisory Control and Data Acquisition (SCADA) system.

A 75 mm PVC conduit must be installed for SCADA provisions terminating with a junction box adjacent to the PRV station.

## C.6 CONSTRUCTION PERMIT

### C.6.1 General

Design drawings for extensions of the City's water distribution system must be submitted to the Regional Public Health Engineer following review by the Director. The drawings will not be accepted and stamped by the Director until a Construction Permit has been issued by the Regional Public Health Engineer.

# PART D SANITARY SEWER SYSTEM

## D.1 GRAVITY SEWERS

### D.1.1 Analysis and Sewage Flows

The sanitary sewer system shall be analysed using "XP SWMM" or approved alternative computer model.

Average Dry Weather Flows shall be:

| | |
|---|---|
| Residential | 360 l/cap/day |
| Commercial and Institutional | 35,000 l/ha/day |
| Industrial | 32,000 l/ha/day |

Notwithstanding the above criteria, where zoning or a development permit requires a specific type of commercial, institutional or industrial land use, average dry weather sewage flow may be based on generally accepted data for the permitted use taking into account the greatest sewage flow that may be generated by the permitted use on any part of the land.

### D.1.2 Peaking Factor

The peaking factor shall be determined from the Harmon Formula:

$$H = \frac{18+P}{4+P}$$

where H = Peaking Factor
P = Square Root of Population in thousands

### D.1.3 Infiltration and Inflow

Average infiltration and inflow rate shall be 0.06 l/s/ha for pipes above water table and 0.12 l/s/ha for pipes that may be below water table at any time.

For existing systems, flows shall be based on actual measured peak wet weather flows if they exceed these criteria and if immediate remedial measures to the existing systems are not proposed. If there are inadequate measured flows to determine actual peak wet weather flows, a rate of 0.12 l/s/ha shall be used for all pipes.

### D.1.4 Design Flows

The design flow shall be:

(Average Dry Weather Flow for all land uses X Peaking Factor) + Infiltration and Inflow

The Consulting Engineer should review the City's ***Sanitary Sewer and Storm Drain Bylaw No. 1702*** to ensure that proposed discharges are acceptable to the City and also to other regulatory authorities.

### D.1.5 Pipe Sizing Formula

Design flows shall be calculated using the Manning's Formula:

$Q = AR^{0.667} S^{0.5}/n$

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

0.013 for all pipes acceptable for use in sanitary sewers

Pipes shall be designed to carry design flows with pipes flowing at full depth.

Pipelines shall not have a smaller diameter than upstream pipes regardless of grade.

### D.1.6 Velocity

Gravity sewers shall have minimum velocity of 0.6 m/s at peak dry weather flow, and force mains 0.75 m/s.

Where velocities may exceed 6 m/s, consider measures to prevent pipe erosion and movement.

### D.1.7 Minimum Pipe Diameter

| | |
|---|---|
| Mainline sewer | 200 mm |
| Service connections | 100 mm |

### D.1.8 Minimum Grade

Minimum grades of gravity sewers are as required to obtain the minimum velocity of 0.60 m/s except for the upstream section of a residential sewer serving a design population of 25 or less in which case the minimum grade is 0.6%, unless otherwise approved by the Director.

Terminal sections of mainline sewers between the last two manholes of each lateral shall have a minimum grade of 1%.

See MMCD Section 33 30 01 sub section 3.19.5 for acceptable ponding limits.

### D.1.9 Sewer Depth

Mains and services shall be of sufficient depth to:

a) Permit gravity service connections to existing basements;

b) Properly service all of the tributary lands upstream of the proposed sanitary sewer extension point;

c) Prevent freezing;

d) Clear other underground utilities; and

e) Prevent damage from live surface loading.

The minimum cover shall be 1.0 metres.

The maximum depth of cover shall normally be 3.0 m from finished grade. On side-slope developments additional mainline sanitary sewers will be required to permit gravity connections to the lots located on the down-slope side of the fronting road to avoid depths in excess of 3.0 m.

**D.1.10 Sewer Location**

Alignment of sewers shall be in accordance with Section A.3.1 and Supplementary Detail Drawings 101A to 101F.

Separation from watermains:

- minimum 3.0 metres horizontally
- minimum 0.5 metres vertical clearance below watermains and in separate trench if 3.0 metres horizontal clearance is not possible.

Sanitary sewers may be laid in a common trench with storm sewers, however, in these cases, the Consulting Engineer shall ensure that a minimum clearance of 0.3 m is maintained between pipes and that conflicts do not exist at service connections, manholes and utility crossings.

Sewers on private property must be centred in a registered statutory right of way in favour of the City. The minimum right of way width is 3.0 m unless the sewer depth exceeds 3.0 m in which case a greater width may be required by the Director. A sanitary and storm sewer at 1.0 m depth and located 1.0 m apart may share a 3.0 m right of way. If a sewer is located within a statutory right-of-way, the developer may be required to provide access for maintenance vehicles and equipment. The maintenance access shall be constructed to support 9.0 tonne loading. Where a pipeline is located close to the boundary of a property, the right of way and access shall be entirely on one side of the boundary.

A pipeline crossing under a watercourse, or under a structure, must be encased in concrete. A pipeline under a road or railway may be required to be inside a carrier pipe.

**D.1.11 Curvilinear Sewers**

Where joint deflection is permitted, maximum joint deflection shall be 75% of that recommended by the pipe manufacturer.

A constant radius must be maintained throughout the curve.

Minimum radius = 60 metres for pipes up to 600 mm in diameter.

Only one vertical or one horizontal curve shall be permitted between manholes.

Horizontal curves must parallel the street centre line.

The minimum design velocity shall be 0.9 m/s.

The mid-point and quarter points of the curve must be located by survey and the offsets shown on the record drawings. Elevations must be shown at 5.0 m stations for vertical curves.

### D.1.12 Manholes

The distance between manholes shall conform to the following:

***Table D1: Distance between Manholes***

| Distance between Manholes | |
|---|---|
| **Pipe Size (mm)** | **Maximum Distance (m)** |
| 375 and smaller | 125 |
| 450 to 750 | 155 |
| 900 and larger | 185 |

Manholes shall be located at every pipe size change, every line or grade change which cannot be accommodated by the allowable radius of curvature, at each end of curvilinear sewers and at every intersecting sewer. The upper end of the proposed sanitary sewer where further extension of the sewer is not feasible shall be terminated with a standard benched manhole.

Manhole locations must not conflict with curbs, gutters or sidewalks, and, where possible, shall be located out of the of the wheel path of normal traffic flow.

At manholes where future sanitary sewer extensions are likely, one pipe length shall be extended beyond the manhole with the end capped and marked as stub for future extension.

Horizontal changes of direction greater than 90° are not permitted in a manhole.

### D.1.13 Hydraulic Losses through Manholes

The following criteria shall be used to minimize hydraulic losses through manholes:

a) The crown of the downstream pipe shall not be higher than that of the upstream pipe.

b) Minimum drop in invert levels through manholes:

- Straight run no drop required
- Deflections up to 45° 20 mm drop
- Deflections 45° to 90° 30 mm drop

c) Where intersecting sewers are not designed to meet crown-to-crown an inside ramp, outside ramp or outside drop type manhole shall be designed as shown on Standard Detail Drawing S3. The selection of manhole type will be a function of sewer profiles and pipe sizes. The type of manhole with all pipe sizes and invert elevations shall be shown on the design drawings. Inside drop manholes as shown on Standard Detail Drawing S4 will be permitted only when specified by the Director and will generally be considered only where a tie-in to an existing manhole using an outside drop type is considered undesirable or not feasible.

### D.1.14 Service Connections

Service connections shall normally be located at 2.0 metres from low side of lot boundary and shall be installed with inspection chambers as shown on Standard Detail Drawings S7 and S9.

Every existing property that is passed in the extension of the sanitary sewer system shall be provided with a minimum of one sanitary sewer connection. Additional service connections may be required by the Director. The Consulting Engineer shall send a registered letter to the owner of each such property to ensure that the new connection(s) is/are installed at a/the location(s) acceptable to the property owner. Copies of the correspondence shall be forwarded to the Director for record purposes. If the property owner does not give permission to extend the connection into the property it shall be terminated at the property line.

With the exception of service connections in the turnaround area of cul-de-sacs, service connections shall be aligned, as near as is practical, perpendicular to the mainline sewer. Within the turnaround area service connections shall be connected to the terminal manhole whenever possible.

Service connections for industrial properties, and from any property requiring a connection greater than two pipe sizes smaller than the main, must enter the main at a manhole. Service connections entering manholes shall not be in an adverse direction to the flow in

the mainline sewer nor shall the crown of the service connection be at a lower elevation than the crown of the highest mainline sewer.

The design elevation of the inspection chamber for each property shall be specified on the design drawings. The invert of the inspection chamber shall be such that:

a) gravity connection to all known existing and proposed outlets is possible. A minimum allowance of 0.5 metres below basement slab elevation to invert of service connection at the inspection chamber location is required;

b) the minimum and maximum depths of the inspection chamber crown at property line shall provide 1.0 metres and 2.0 metres cover, respectively;

c) where no dwelling exists, the invert of the inspection chamber shall be 1.2 metres lower than the average ground elevation at the 7.5 metre setback from the front property line unless topographic constraints make this depth impractical.

### D.1.15 Structural Design

The structural design of sanitary sewer and forcemain installations shall be in accordance with the latest edition of ***ASCE Manuals and Reports on Engineering Practice No. 37 - Design and Construction of Sanitary and Storm Sewers***. Live loads on the sewer conduit shall include Highway H-20 loading and an impact factor of 1.5. Pipe shall generally be installed in accordance with Standard Detail Drawing G4. In cases where more stringent construction requirements are necessary to achieve the required field supporting strength of the sewer conduit, the Consulting Engineer shall specify installation requirements on the design drawings.

## D.2 SEWAGE PUMP STATIONS

### D.2.1 General

The use of sanitary lift stations is to be minimized and alternative collection system arrangements considered to avoid lift stations where it is practical to do so. Any proposed use of lift stations must receive prior approval from the Director.

All pump stations shall be package systems using duplex submersible Flygt pumps in a fiberglass barrel unless otherwise approved by the Director. Sanitary lift stations should normally be located outside of the required road dedication

Prior to commencing detailed design of a lift station, the Consulting Engineer shall submit a pre-design report that addresses all design considerations. Approval of the pre-design concepts must be obtained prior to commencing detailed design.

These criteria cover both dry well and submersible sewage lift stations. Larger capacity sewage lift stations or lift stations with special design or siting requirements may require additional assessment and review of criteria.

The location and layout of a lift station must include an assessment of the following basic design considerations:

- ultimate flows of the designated catchment;
- type of station and impact on adjacent residents;
- proximity of receiving sewers, water mains, and adequate power supply;
- soil conditions;
- maximum flood and groundwater elevations and station uplift design;
- construction dewatering requirements;
- construction access;
- maintenance access;
- aesthetics, noise, odour control and landscaping requirements;
- security against vandalism and theft;
- minimizing energy requirements;
- standby power and its compatibility;
- convenience of operation and maintenance;
- safety for operators and the public; and
- capital costs and operation and maintenance costs

Pump stations shall conform to all requirements of the ***Workers' Compensation Act*** of British Columbia.

The Consulting Engineer shall submit all design calculations to the Director for review upon request. A list of all materials and equipment shall be submitted to the Director for approval.

### D.2.2 Pump Station Design

The station must be designed for uplift based on maximum groundwater or flood levels.

Barrels shall be fibreglass and minimum 2140 mm diameter.

Pumps shall be:

- capable of passing solids up to 75 mm in size;
- equipped with hour meters;
- easily removed for maintenance;
- operate with a motor running at 1750 RPM;
- 600 volt 3 phase electrical power;
- able to operate alternately and independently of each other;
- able to meet maximum flow condition with one pump in failure mode;

- designed so that each pump does not cycle more than the manufacturers recommended maximum starts per hour, with one pump in failure mode; and
- one pump shall include an automatic flush valve.

All pumps must be factory tested prior to installation.

Minimum storage between the high level alarm and the start of overflow prior to entering private property or the environment must be provided for the more critical of:
minimum 1 hour in wet well at average wet weather flow.
minimum 1 hour in wet well and influent pipes at peak wet weather flow.

Pump stations to include automatic generator sets for standby power in case of power failure. Provision for SCADA system to be included. Generator set enclosures to be weatherproof and to include noise control. Compatible switching gear and "pigtail" to be supplied in electrical kiosk if station to be used by portable generator.

A gate valve is required on the influent line and a plug valve on each pump discharge. The valves must be outside the station and be complete with square operating nut and nelson box.

Check valves will be ball lift check valves.

Stations are to have a magnetic flow meter complete with ultrasonic cleaner or the PLC programmed to calculate and record flows based on a change in wet well levels.

Motors cables, power cables, etc. must be continuous from within the pump station to within the kiosk unless an adequate exterior pull pit and junction box is installed.

All wiring must be explosion-proof, Class 1, Division 2, and electrical design and installation is subject to the acceptance of the Provincial Safety Inspector.

Levels are to be controlled by ultrasonic level transmitter with emergency high and low level balls (float switches).

All auxiliary equipment and control panels must be mounted in a suitable kiosk adjacent to the station. The kiosk must be located a minimum of 3.0 m from the station lid.

The control kiosk must be designed to contain all control and telemetry equipment on the front panel and all power equipment on the rear panel. The kiosk must have a built in heater complete with thermostat.

A Programmable Logic Controller (PLC) and telemetering system, compatible with the City's Supervisory Control and Data Acquisition (SCADA) system must be provided. The controller must be capable to communicate utilizing Modbus protocol.

The station must be complete with an Uninterruptible Power Supply (UPS) to serve all alarms and controls.

The pump control panel must incorporate an operator interface.

The panel must have a lamp test button.

An hour meter must be built into the panel for each pump.

An ammeter must be provided for each pump.

All stations require an explosion-proof supply fan, meeting Work Safe BC requirements for ventilation in a confined space. The fan must have an adjustable speed drive set to operate continuously at 10 air changes per hour and a high speed setting for intermittent operation to meet Work Safe BC requirements (minimum 20 air changes per hour). A screened exhaust vent must also be provided. All ventilation piping will be PVC or FRP.

Entrances to all stations must be waterproof and provided with a suitable lock. Access hatches must be reinforced for 1465 kg/m2 and a minimum 900 mm x 900 mm. The access hatch shall have:

- aluminum 6 mm tread plate;
- perimeter drain;
- perimeter sealing gasket;
- slam lock with an aluminum removable sealing plug and opening tool;
- flush lift handle;
- gas spring assist cylinder;
- 90 degree hold open arm;
- flush fitting padlock tang; and
- all fasteners to be made of 316 stainless steel.

The entrance must be above ground level but, in no case, more than 300 mm above the ground. An explosion-proof light with a protective cover must be located in a suitable location in the station and the light is to be activated by the entrance cover.

Access into the station will be by an aluminum ladder. The location of the ladder must not interfere with the removal and installation of the pumps, etc. The ladder must be designed to extend and lock at least 600 mm above the station entrance. A platform is to be provided above the high water level float to permit wet well access. The platform is to be a fibreglass (FRP) grating and meet WCB standards.

All equipment must be CSA approved and have at least a one year guarantee for parts and labour.

If a lift station is to be constructed in an area that may be subject to vehicle loads, the roof and cover of the pump station must be designed to withstand a loading of H-20 (Highways Standard).

A 50 mm diameter water connection including a Reduced Pressure Backflow Assembly for wash down purposes must be provided. Backflow prevention to be located in an above ground heated enclosure for testing and maintenance access.

The area around the station and all associated equipment or building, must be asphalted. The size of the area is to be determined by the requirements for maintenance.

The surface of all steel components and fibreglass stations must receive at least two coats of two component white epoxy enamel. All concrete stations must be designed and constructed to prevent sulphide attack.

The wet well bottom must be benched to direct all solids into the pump suction. The influent line must be located tangentially to the wet well to encourage scouring of the wet well.

Stations are to be designed to allow removal of pumps using a hoist truck with 1.8 m boom.

Fencing must be provided unless otherwise approved by the Director. The fence must be 9 guage black chain link and a minimum of 2.0 m high.

Landscaping, acceptable to the City, is to be provided and include irrigation.

Noise levels for the pump station facilities must not exceed the City standards or 65 dB at the property line.

Odour control must be required.

Station to have a 180 degree automatic sub floor sprinkler head(s) Sellers #C19924 or equivalent for wash down system. Sprinkler to be a Rotating Cleaning Head type mounted in the wet well under the centre of the FRP platform, minimum size to be 50mm (2”). Larger sizes dependent on station diameter.

A minimum 25mm diameter water service is required in the wet well above the sub floor, hose bib to be complete with 6m of hose and nozzle for wash down purposes.

A minimum of two sets of Operating and Maintenance Manuals are to be supplied to the City

Install a concrete base adjacent to the station access hatch complete with an approved mounting sleeve that can accommodate a confined space entry davit arm.

### D.2.3 Testing of Pump Stations

Wet well chambers must be tested for exfiltration by filling the chamber to the underside of the roof slab with water. The test duration will be a minimum of three hours. No leakage will be permitted.

In areas of high groundwater tables, the Director may require an infiltration test. No leakage is permitted.

Lift stations will be tested using water. Stations must be tested through the operating range to verify emergency float operation, pumps, controls, alarms, backup power and manual operation.

A noise level test is required to confirm pumping station and standby power are within specified acceptable limits.

## D.3 FORCEMAINS

### D.3.1 Pipe Sizing

Size forcemains using Hazen-Williams formula:

$$Q = CD^{2.63} S^{0.54}/0.00374$$

Where Q = Rate of flow in l/s
D = Internal pipe diameter in m
S = Slope of hydraulic grade line in m/m
C = Friction coefficient =

120 for all pipes acceptable as sewage forcemains

Minimum diameter of forcemains shall be 100 mm.

### D.3.2 Velocities

Under normal operating conditions the following velocities are required:

Minimum = 1.0 m/s
Maximum = 3.50 m/s

### D.3.3 Pipeline

High density polyethylene pipe shall be used for force mains unless the Director approves an alternative.

An encasing pipe shall be used for force mains under creeks.

A tracer wire shall be installed for the purpose of locating a force main.

All force mains shall be designed to prevent damage from superimposed loads or from water hammer or column separation phenomena.

### D.3.4 Air Relief Valve Assembly

An air relief valve assembly in accordance with Standard Detail Drawings W6 and W7 shall be placed in high points in the forcemain to prevent air locking.

### D.3.5 Connections to Manholes

The direction of the forcemain entering the receiving manhole shall not be in an adverse direction to the flow in the mainline sewer. The crown of the forcemain shall not be at an elevation higher than the crown of the highest mainline sewer.

# PART E: STORM DRAINAGE SYSTEM

## E.1 DESIGN METHODS

### E.1.1 Stormwater Management Plan

A Storm Water Management Plan shall be submitted for a subdivision or development in accordance with this Section, and as set out in Section A.4, except for:

a) a subdivision or development within an area subject to, and which meets the requirements of, a watershed or integrated stormwater management plan adopted by Council;

b) a subdivision in accordance with single or two family residential zoning which does not require the construction of a road and which can be served by extensions of existing minor and major drainage systems that have adequate capacity;

c) a building permit for a single or two family dwelling; or

d) a building permit, other than for a single or two family dwelling, on a parcel no greater than 1100 $m^2$.

A Storm Water Management Plan shall include a statement describing how the criteria in E.2.2 are to be achieved.

Storm drainage systems shall be designed using either the conventional method or the stormwater management method.

### E.1.2 Conventional Method

Design shall be based on the Rational Formula. This method shall only be used for the design of minor systems with storms of 1 in 10 year return serving a watershed of 8 ha or less and only if the Director is of the opinion that the downstream minor and major drainage systems have adequate capacity.

### E.1.3 Stormwater Management Method

This method utilizes one of the Hydrograph Methods listed in Section E.3.1 b). It is applicable to design of complex minor drainage systems and all storage calculations and major drainage systems and involves the integrated design of both the minor and major systems.

## E.2 STORMWATER MANAGEMENT

### E.2.1 Major and Minor Systems

The stormwater management system shall consist of the following components:

a) The minor system shall consist of pipes, gutters, catch basins, driveway culverts, open channels, watercourses and stormwater management facilities designed to convey flows of a 10 year return frequency;

b) The major system shall consist of the route followed by storm runoff when the capacity of the minor system is exceeded. The system shall consist of surface flood paths, roadways, roadway culverts, watercourses, and stormwater management facilities designed to carry flows of a 100 year return frequency; and

c) Where approved by the Director, a piped minor system may be enlarged or supplemented to accommodate major flows.

### E.2.2 Flow Control

The following criteria shall be used to limit flows from subdivision and development sites:

a) Limit the post-development peak rate of runoff to the pre-development peak rate of runoff for the 10-year design storm or to a higher rate of runoff approved by the Director if the downstream drainage system and watercourses have the capacity to carry a greater rate of runoff meeting the requirements of Subsections E.2.2 b), c) and d).

b) Downstream detrimental impacts should not be increased. Where peak flow rates or volumes are increased and will cause detrimental impacts, provisions for downstream improvements must be provided.

c) Increases in peak storm flows and volumes to the major watercourses and receiving waters shall be minimized. Any potential increase in storm flows and volumes shall be analyzed for fish bearing watercourses and watercourses presently close to full capacity.

d) The number of stormwater control facilities shall be minimized, and the Director may require the Developer to provide facilities to serve land other than the land being subdivided or developed in accordance with Section 7.12 of the Bylaw. Where detention is used, off-stream storage is to be provided where possible rather than on-stream storage within a watercourse. Detention facilities designed for flow control shall account for the effects of multiple storms that do not allow the detention facility to empty completely between storms. Where single-event models are used to determine the volume of detention facilities designed for flow control, a factor of safety shall be used to account for the effects of sequential storms. The factor of safety shall be 1.1 for development sites with a post-development impervious cover of 20%, and shall increase linearly to a factor of safety of 1.5 for development sites with a post-development impervious cover of 100%. Alternatively, continuous models may be used to check for the effects of multiple storms.

e) Groundwater infiltration shall be used where site-specific studies determine that this practice is appropriate. Allowance shall be made for infiltration in the hydraulic design if approved by the Director.

### E.2.3 Water Quality Control

A water quality control plan may be required as part of the Stormwater Management Plan at the discretion of the Director where there are reasonable grounds to anticipate discharge of contaminants to the drainage system.

A Water Quality Inlet or Coalescing Plate Separator shall be required to treat the runoff from all impervious surfaces at fuel transfer stations and other operations where there is a risk of spills of petroleum hydrocarbons.

Where structural facilities for contaminant removal are required and single event runoff models are used, facilities shall be designed to treat the runoff volume resulting from the 24-hour storm with a 6-month return frequency, unless specified otherwise by the Director. The 6-month, 24-hour storm can be estimated as 70% of the 2-year, 24 hour storm. Where continuous runoff modelling is used, contaminant removal facilities shall be designed to treat 90% of the runoff volume in an average year.

## E.3 DESIGN CRITERIA

### E.3.1 Design Flows

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

**a) Rational Formula**

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

where Q = Peak Flow in m3/s
A = Drainage area in ha.
I = Rainfall intensity in mm/hr
R = Runoff coefficient (see Subsection E.3.5)

The rainfall intensity for the Rational Method should be determined using the appropriate rainfall IDF curve with the duration equal to the Time of Concentration (TC) calculated as indicated by Item E.3.4.

**b) Hydrograph Methods**

Drainage designs using Hydrograph Methods require computer models capable of modeling the hydrologic characteristics of the watershed and of generating flow hydrographs from each sub-catchment for a critical storm or a series of storms and routing the hydrographs through the drainage network pipes, channels and storage facilities.

The following programs are considered suitable for the applications indicated, but it should be noted that the list of programs is not intended to be comprehensive or to exclude other suitable programs:

- OTTHYMO: Suitable for preliminary design of rural and urban areas, especially where backwater and surcharge effects are not significant. Also suitable for generating design flows in cases where pipes are being designed using manual methods.
- HYDSYS: Suitable for design of systems with no surcharge or backwater effects.
- EPA SWMM RUNOFF and EXTRAN: Suitable for detailed evaluation of the operation of drainage networks and storage facilities.
- QUALHYMO and SWMM TRANSPORT: Suitable for evaluating the performance of storage facilities over long winter wet weather periods.

Other stormwater management models which have been calibrated with actual rainfall-runoff measurements in adjacent municipalities and approved by the Director.

Whenever possible, modeling results shall be calibrated using observed rainfall and flow data from the design watershed or a similar watershed. Sensitivity of the model predictions to variations of key parameters shall be tested and the findings used to develop realistic and conservative models.

Post-development hydrographs shall be generated at key points of the major drainage systems for a 10-year and 100-year design storm with durations of 2, 6, 12 and 24 hours for each development condition. A different range of storm durations may be appropriate, subject to approval by the Director. This will identify the critical storm event to be used in designing the system component. The storm durations that generate the critical peak flow may be different from the durations that generate the critical storage volume. Systems may require analysis for sequential storm events or modeling with a continuous rainfall record (see Subsection E.2.2 d).

Detailed designs shall include maximum hydraulic grade lines (HGLs) of the minor and major systems plotted on profiles of the minor system components and compared with minimum building elevations (MBE) to demonstrate flood protection.

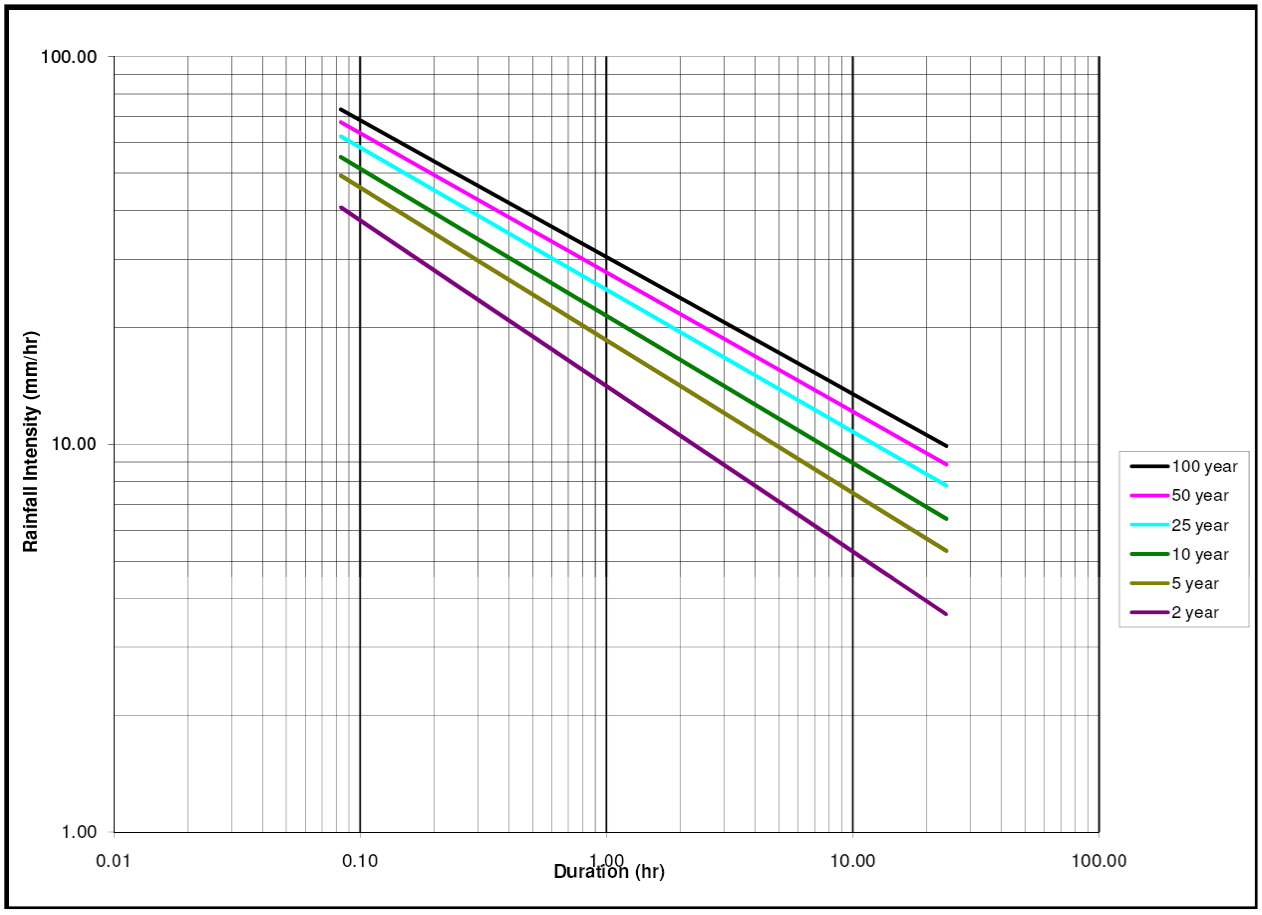
Modelling results are to be submitted to the Director in a report containing at least the following information:

- Plans showing catchment and sub-catchment boundaries, slopes, soil conditions, land uses and flow control facilities;
- Name and version of modeling program(s);
- Parameters and simulation assumptions;
- Design storm details; and
- Pre-development and post-development hydrographs.

### E.3.2 Rainfall Intensity/Duration/Frequency (IDF) Curves

IDF curves shown in Figure E1 shall be used for all calculations requiring such information. Additional rainfall data for The City of Pitt Meadows may be obtained from the Regional Office of Atmospheric Environment Service of Environment Canada.

***Figure E1: Rainfall IDF Curve – Short Duration***




| | |
|---|---|
| Rain Gauge: | PW71 - Meadowlands Elementary School |
| Latitude: | 49° 15' N |
| Longitude: | 122° 43' W |
| Elevation (Geodetic) (m): | 5 |
| Report Date Range: | From Jan. 01, 2001 - To Dec. 31, 2008 |

### E.3.3 Rainfall Return Frequency

The following return frequencies shall be used for design:

Minor Systems - 10 year return
Major Systems - 100 year return

### E.3.4 Time of Concentration

The following formula shall be used for time of concentration:

TC = Ti + Tf

where TC = Time of concentration (minutes)
Ti = Inlet time (minutes)
Tf = Travel time in channels and pipes based on Manning's Formula (minutes)

**a) Inlet or Overland Flow Time (Ti)**

Typical inlet times for urban areas are as follows:

| | |
|---|---|
| Single Family Lot | 10 minutes |
| Multi-Family Lot | 8 minutes |
| Commercial/Industrial/Institutional | 5 minutes |

The inlet time for larger areas can be calculated using the "Airport Method" as follows:

$$Ti = \frac{3.26(1.1 - C)L^{0.5}}{S^{0.33}}$$

where Ti = inlet time (minutes)
C = runoff coefficient (see above)
L = travel distance (m). Maximum length = 300 m
S = slope of travel path (%)

**b) Travel Time (Tt)**

The travel time in sewers, ditches, channels or watercourses can be estimated using the Modified Manning formula:

$$Tt = \frac{L\ n}{60R^{0.667}\ S^{0.5}}$$

where Tt = travel time (minutes)
L = length of flow path (m)
n = Manning roughness coefficient =
0.050 Natural channels
0.030 Excavated ditches
0.013 Pipe and concrete lined channels
R = Hydraulic radius (area/wetted perimeter) in m
S = slope in m/m

Other formulae are available for calculation of Ti and Tt. Obtain approval from the Director.

### E.3.5 Runoff Coefficient (for Rational Formula)

The following runoff coefficients are for use with the Rational Formula. These coefficients are for general application only. Design values are subject to verification by the designer and approval by the Director.

Higher values may be applicable in those areas which experience rainfall during the winter when the ground is frozen. These values may reach 0.80 to 0.95.

***Table E1: Runoff Coefficient for Rational Formula***

| Land Use | Percent Impervious | Runoff Coefficient | |
|---|---|---|---|
| | | 5/10 Year Storm | 100 Year Storm |
| Suburban Residential (Lots >04. ha) | 20% | 0.35 | 0.40 |
| Low Density Residential | 40% | 0.50 | 0.55 |
| Medium Density Residential | 65% | 0.60 | 0.65 |
| High Density Residential | 78% | 0.70 | 0.75 |
| Commercial | 90% | 0.80 | 0.85 |
| Industrial | 90% | 0.80 | 0.85 |
| Institutional (e.g. Schools) | 80% | 0.75 | 0.80 |
| Parks/Grasslands | 20% | 0.20 | 0.30 |
| Cultivated Fields | 30% | 0.30 | 0.40 |
| Woodlands | 5% | 0.10 | 0.30 |

An adjustment factor (AF) is to be applied to the runoff coefficient to reflect variations in soil permeability and slope.

***Table E2: Runoff Coefficient Adjustment Factor (AF)***

| Soil Type and Slope | AF |
|---|---|
| Sandy soil with flat slope (up to 5%) | 0.9 |
| Sandy soil with steep slope (over 5%) | 1.0 |
| Clayey soil with flat slope (up to 5%) | 1.0 |
| Clayey soil with steep slope (over 5%) | 1.1 |
| Rock | 1.1 |

The above runoff coefficient adjustment factors are for general application. Design values are subject to verification by the designer and approval by the Director.

### E.3.6 Hydraulic Calculations

#### a) Storm Sewers and Open Channels

Use Manning's Formula:

$$Q = AR^{0.667}S^{0.5}/n$$

where: Q = Design flow in $m^3/s$
A = Cross-sectional area in $m^2$

R = Hydraulic radius (area/wetted perimeter) in m
S = Slope of hydraulic grade line in m/m
n = Roughness coefficient =

0.013 for all smooth pipes
0.024 for corrugated steel pipe (unpaved)
0.020 for gravel lined channels
0.013 for concrete or asphalt lined channels
0.050 for natural streams and grassed channels

**b) Culverts**

Use the applicable inlet control or outlet control methods referred to in the latest editions of:

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

See Schedule D Supplementary Detail Drawing SS-2 for typical Rural Driveway Culvert installation.

### E.3.7 Velocity and Pipe Grade

Minimum velocity for storm sewers shall be 0.6 m/s at half or full flow.

Where velocities may exceed 6 m/s, provision must be made for protection against scouring of pipes.

Terminal sections of mainline sewers between the last two manholes of each lateral shall have a minimum grade of 1%.

### E.3.8 Sewer Depth

The minimum depth of cover shall be as follows:

a) Culverts across roads and driveways: minimum 0.3 metres provided that pipe has been designed to withstand dead load and H-20 highway loads complete with impact factor of 1.5.

b) Mains and services shall be of sufficient depth to:

- permit gravity service connections to adjoining properties;
- properly service all of the tributary lands upstream of the proposed storm sewer extension point;
- prevent freezing;
- clear other underground utilities; and
- prevent damage from live surface loading.

The minimum cover of mains and services shall be 1.0 metre.

The maximum depth of cover shall normally be 3.0 m from finished grade. On side-slope developments additional mainline storm sewers will be required to permit gravity connections to the lots located on the down-slope side of the fronting road to avoid depths in excess of 3.0 m.

### E.3.9 Minimum Pipe Diameter

| | |
|---|---|
| Mainline Sewers..... | 250 mm |
| Culverts - crossing roads..... | 600 mm |
| - crossing driveways..... | 600 mm |
| Catchbasin leads..... | 200 mm |
| Service connections..... | 100 mm |

### E.3.10 Curvilinear Sewers

Where joint deflection is permitted, maximum joint deflection shall be 75% of the maximum recommended by pipe manufacturer.

Minimum radius = 60 metres for pipes up to 600 mm diameter.

Constant radius throughout curve.

Only one vertical or one horizontal curve shall be permitted between manholes.

Horizontal curves must parallel the street centre line.

Minimum design velocity = 0.9 m/s.

For concrete pipes, mitered bends or skewed bell ends will be permitted, subject to the approval of the Director.

Subject to approval by the Director, sewers larger than 600 mm dia. may include deflections formed by mitred bends, with minimum 1.25 m straight sections and maximum 45° mitres.

The mid-point and quarter points of the curve must be located by survey and the offsets shown on the record drawings. Elevations must be shown at 5.0 m stations for vertical curves.

### E.3.11 Manholes

Manholes shall be located at every pipe size change, every line or grade change which cannot be accommodated by the allowable radius of curvature, at each end of curvilinear

sewers and at every intersecting sewer (not including service connections). The upper end of the proposed storm sewer where further extension of the sewer is not feasible shall be terminated with a standard 1050 mm benched manhole.

***Table E3: Distance between Manholes***

| Distance between Manholes | |
|---|---|
| **Pipe Size (mm)** | **Maximum Distance (m)** |
| 900 and smaller | 150 |
| greater than 900 | 250 |

Manhole locations must not conflict with curbs, gutters or sidewalks, and, where possible, shall be located out of the of the wheel path of normal traffic flow.

At manholes where future storm sewer extensions are likely, one pipe length shall be extended beyond the manhole with the end capped and marked as stub for future extension.

### E.3.12 Hydraulic Losses through Manholes

The following criteria shall be used to minimize hydraulic losses through manholes:

a) The crown of the downstream pipe shall not be higher than that of the upstream pipe.

b) Minimum drop in invert levels through manholes:

straight run ..... no drop required
deflections up to 45°..... 20 mm drop
deflections 45° to 90°..... 30 mm drop

c) Where intersecting sewers are not designed to meet crown-to-crown, an inside ramp, outside ramp or outside drop type manhole shall be designed as shown on Standard Detail Drawing S3. The selection of manhole type will be a function of sewer profiles and pipe sizes. The type of manhole with all pipe sizes and invert elevations shall be shown on the design drawings. Inside drop manholes as shown on Standard Detail Drawing S4 will be permitted only when specified by the Director and will generally be considered only where a tie-in to an existing manhole using an outside drop type is considered undesirable or not feasible.

### E.3.13 Sewer Location

Alignment of mainline sewers shall be in accordance with the criteria described in Section A.3.1, illustrated on Supplementary Detail Drawings 101A to 101F.

Separation from watermains if reasonably and practically possible:

- minimum 3.0 metres horizontally; and
- minimum 0.5 metres vertical clearance below watermains and in separate trench if 3.0 metres horizontal clearance is not possible.

Storm sewers may be laid in a common trench with sanitary sewers however, in these cases, the Consulting Engineer shall ensure that a minimum clearance of 0.3 metres is maintained between pipes and that conflicts do not exist at service connections, catchbasin leads, manholes and utility crossings.

Storm sewers on private property must be centred in a registered statutory right of way in favour of the City. The minimum right of way width is 3.0 m unless the sewer depth exceeds 3.0 m in which case a greater width may be required by the Director. A sanitary and storm sewer at 1.0 m depth and located 1.0 m apart may share a 3.0 m right of way. If a sewer is located within a statutory right-of-way, the developer may be required to provide access for maintenance vehicles and equipment. The maintenance access shall be constructed to support 9.0 tonne loading. Where a pipeline is located close to the boundary of a property, the right of way and access shall be entirely on one side of the boundary.

A pipeline crossing under a watercourse, or under a structure, must be encased in concrete. A pipeline under a road or railway may be required to be inside a carrier pipe.

### E.3.14 Service Connections

Service connections shall normally be located at 2.5 metres from low side of lot boundary and shall be installed with Inspection Chambers as shown on Standard Detail Drawing S7 & S9.

Every existing property that is passed in the extension of the storm sewer system shall be provided with a minimum of one storm sewer connection. In cases where several drains outlet into an existing ditch from one property, the drains shall be connected to the new storm sewer. Where no existing storm drains from an adjoining property are evident, the Consulting Engineer shall send a registered letter to the owner of each such property to ensure that the new connection(s) is/are installed at a/the location(s) acceptable to the property owner where possible. Copies of the correspondence shall be forwarded to the Director for record purposes. If the property owner does not gives permission to extend the connection into the property it shall be terminated at the property line.

Additional service connections shall be installed as required to provide for existing or future drainage of low lying areas, existing minor drainage courses or as may be required by the Director.

With the exception of service connections in the turnaround area of cul-de-sacs, service connections shall be aligned, as near as is practical, perpendicular to the mainline sewer.

Within the turnaround area service connections shall be connected to the terminal manhole whenever possible.

Service connections for industrial properties, and from any property requiring a connection greater than two pipe sizes smaller than the main, must enter the main at a manhole. Service connections entering manholes shall not be in an adverse direction to the flow in the mainline sewer nor shall the crown of the service connection be at a lower elevation than the crown of the highest mainline sewer.

The design elevation of the service connection for each property shall be specified on the design drawings. The invert of the service connection shall be such that:

- gravity connection to all known existing and proposed outlets is possible;
- drainage of all existing buildings if possible;
- the minimum depth of the service connection at property line shall provide 1.0 metre cover;
- where no dwelling exists, the invert of the service connection at the property line shall be 1.2 metres lower than the average ground elevation at the 7.5 metre setback from the front property line unless topographic constraints make this depth impractical.

### E.3.15 Pipe Joints

All storm sewer pipe joints shall be installed complete with gaskets except where the pipe is specifically designed to intercept subsurface drainage. In this case, the pipe shall be installed using drain rock and filter fabric in accordance with the Master Municipal Specifications.

### E.3.16 Catchbasins

Catchbasins shall be installed in accordance with Supplementary Detail Drawing SS-1 (side inlet) and shall be provided at regular intervals along roadways, at intersections, and at all low points. Double catchbasins, side inlet type, shall be provided at the low point of all downhill cul-de-sacs, each sized for the maximum tributary area.

With the exception of catchbasin leads in the turnaround area of cul-de-sacs, catchbasin leads shall be aligned, as near as is practical, perpendicular to the mainline storm sewer.

Catchbasins shall be spaced to drain a maximum area of 500 m2 of right-of-way on road grades up to 4% and 400 m2 of right-of-way on grades in excess of 4%.

Catchbasin grates shall be set 25 mm below the concrete gutterline. Where curb and gutter installation is not required, catchbasins and the immediately surrounding asphaltic pavement shall be shaped to form a dished apron around the catchbasin grate.

Catchbasin trapping hoods are to be cast iron type.

### E.3.17 Structural Design

The structural design of storm sewers shall be in accordance with the latest edition of ***ASCE Manuals and Reports on Engineering Practice No. 37 - Design and Construction of Sanitary and Storm Sewers***. Live loads on the sewer conduit shall include Highway H-20 loading and an impact factor of 1.5. Pipe shall generally be installed in accordance with Standard Detail Drawing G4. In cases where more stringent construction requirements are necessary to achieve the required field supporting strength of the sewer conduit, the Consulting Engineer shall specify installation requirements on the design drawings.

### E.3.18 Inlet and Outlet Structures

#### a) General

The structural, dimensional and erosion protection requirements for inlet and outlet structures shown on Standard Detail Drawings S13 and S14 are minimum requirements. The Consulting Engineer shall verify that these minimum requirements are adequate for any proposed inlet and outlet structures shown on the design drawings and, if necessary, shall provide additional or alternative inlet and/or outlet structures on the design drawings.

Special designs will be required for inlet and/or outlet structures which are substantially different than those shown on the Standard Detail Drawings.

#### b) Trash Screens and Safety Grillages

Trash screens and safety grillages as shown on Standard Detail Drawing S13 shall be installed at inlets and outlets respectively for all storm sewer pipes over 250 mm in diameter.

#### c) Safety Handrails

Handrails as shown on the Standard Detail Drawings shall be installed at inlets and outlets where the depth to the channel bottom exceeds 1.5 metres.

### E.3.19 Lot Grading

The Consulting Engineer shall ensure that adequate provisions are made to prevent the occurrence of drainage problems on adjoining properties caused by surface or subsurface flows.

Unless otherwise approved by the Director, each lot shall be graded to drain directly to the municipal drainage system. Lawn drains, swales and, if necessary, 'french' drains shall be installed to prevent surface runoff flowing onto adjacent lots. The lawn drains shall be

designed in conformance with the City's ***Sewer Connection Bylaw*** and as shown on Standard Detail Drawing S12 and shall be connected directly to the storm sewer service connection.

### E.3.20 Major System Design

#### a) Major Flow Routing

All overland major flows shall have specifically designed flow routes located within municipal rights-of-way. The major flow routing shall normally be along roads and in natural water courses. Design criteria include:

- HGL is to be at least 300 mm below the MBE of adjacent buildings.
- Maximum flow depth on roadways: 300 mm.
- One lane, or a 3.5 m width at the crown of each roadway, is to be free from flooding.
- Where a roadway is used as a major flow path, the road grades are to be designed to accommodate and control the flow at intersections.
- Flooding is not permitted on private property.
- Overflow routes are required at all sags and low points in roadways and other surface flow routes.
- Major flood routes are required at down-slope cul-de-sacs.

Flow capacity of road surfaces and swales can be calculated using the Manning formula, which is presented elsewhere. The following values of the Manning Roughness Coefficient “n” shall be used unless otherwise specified by the Director:

- 0.018 for paved roadway
- 0.03 for grassed boulevards and swales
- 0.04 to 0.10 for irregular or treed channels.

Design detail is to include consideration of flow velocities and the potential requirement for erosion control measures.

In some cases (i.e. at sags in roads) it may be necessary to provide additional designated municipal right-of-way to route the major flow to the nearest municipal right-of-way or downstream drainage facility.

In determining the routing for major flows, the Consulting Engineer shall consider enlarging of the pipes and culverts which form a part of the minor system to accommodate the major flow.

At intersections along the major flow route, lower the intersection to allow flows to pass over the cross street. Where the major flow route turns at intersections, ensure that the intersection grading design accommodates the major flow.

The one hundred year flood route shall be shown on the design drawings with the hydraulic grade line elevations shown in profile. Minimum basement elevations which shall be a minimum of 150 mm above the one hundred year hydraulic grade line shall also be shown on the profile drawings.

In areas where major flow routes cannot be provided overland, the minor system shall be increased in size to accommodate the major flows. Major flows across private properties shall be contained within a piped system.

**b) Stormwater Detention/Infiltration**

*GENERAL*

The goal of the City in managing storm water is to provide sustainable hydrologic systems that mimic natural systems, protect groundwater resources and minimize downstream flooding and erosion. The City supports and encourages volume reduction strategies and requires reduction of peak runoff rates through the use of storm detention facilities.

Post Development storm water runoff from all Developments is required to be controlled to prevent or mitigate flooding or environmental impacts to the satisfaction of the Director. These controls may be in the form of:

- Detention storage in surface ponds or underground pipes, chambers or tanks; and
- Infiltration systems designed to augment or reduce detention storage.

The City encourages innovative approaches to achieving control of post Development runoff. Groundwater recharge in the form of rain gardens, vegetated swales and infiltration galleries provide positive environment benefits. See Supplementary Detail Drawings SS-3 to SS-6in Schedule D for specifications. Prior to proceeding with designs, Consulting Engineers and Developers may consult with the Director to explore innovative approaches they may wish to utilize on their projects. The Director may require hydrological, geotechnical or other reports to consider suitability of these approaches. The Director may require innovative approaches in certain catchment or sub-catchment areas in support of other objectives.

*STORAGE FACILITY REQUIREMENTS*

Basic requirements for the temporary storage of stormwater include:

- a suitable location of defined area and volume; and
- a restricted outlet designed to maintain the discharge to the downstream drainage system at a pre-determined rate of the pre-development run-off for a ten year return period).

Outlet controls for storage facilities shall be designed using the standard orifice and weir equations unless otherwise approved by the Director.

***Orifice Equation:*** $Q = C\ A\ (2\ g\ h)^{0.5}$

Where: Q = release rate ($m^3/s$)
C = orifice coefficient (0.62 for sharp or square edge)
A = area of orifice ($m^2$)
g = gravitational acceleration (9.81 $m^2/s$)
h = net head on orifice (m)

***Weir Equation:*** $Q = C\ L\ H^{1.5}$

Where: Q = release rate ($m^3/s$)
C = weir coefficient
L = effective length of weir crest (m)
H = net head on weir crest (m)

Large storage facilities shall include provisions for discharges at rates greater than the design release rate. Rapid drawdown of the water level may be necessary for emergency purposes or to restore the available storage to accommodate subsequent storm events.

Provisions to accommodate higher discharges shall include over sizing the fixed openings and sewers connected to the control structure. Adjustable mechanisms such as slide gates or removable orifice plates shall be used to regulate design release rates unless otherwise approved by the Director. The extent of the over sizing shall depend on the capacity of the downstream drainage system.

Design of inlet and outlet structures shall include consideration of energy dissipation and erosion control. Safety grates are required over all inlet and outlet openings larger than 500 mm diameter. Locks for access hatches are required.

*STORAGE FACILTY TYPES*

The following are acceptable stormwater runoff control alternatives. Design details shall be in accordance with current technologies as outlined in ***Land Development Guidelines for the Protection of Aquatic Habitat*** (Canada/B.C.), and ***Best Management Practices Guide for Stormwater*** (Metro Vancouver), and related documents or as otherwise approved by the Director.

***Parking Lot Ponding:*** paved parking lots can be used as storage in many areas. The allowable depth is a function of safety and convenience to the users. Depths not

exceeding 150 mm are generally acceptable. Flow control chambers housing a relatively maintenance free flow control device complete with an emergency release spillway shall be used in conjunction with this storage.

***Dry Detention Basin:*** a detention basin will normally be designed as an off-stream facility. The basin shall have minimum freeboard of 0.3 metres and a maximum depth of 1.0 metres. The maximum side slope shall be 4 horizontal to 1 vertical. Flow control chambers as detailed in above shall be required.

***Underground Storage:*** underground facilities include tanks and oversized pipes, with outlet controls. Cross sections and inlet and outlet locations shall be designed to minimize maintenance requirements. Structural design to accommodate traffic and maintenance access provisions are required.

***Wet Detention Ponds:*** wet detention ponds are intended to provide detention storage and maintain a permanent minimum water level. Minimum catchment area of 20 ha to limit number of ponds. May accommodate recreational uses, overflow elevations to be coordinated with MBEs.

***Subsurface Disposal (Groundwater Recharge):*** subsurface disposal is intended to allow all hard surface runoff to percolate back into the ground, this method along with detention storage creates an effective way to achieve groundwater recharge. Suitable for high permeability soils with low groundwater elevation. Suitable for low detention volumes only, subsurface discharge of contaminated water is prohibited. See Supplementary Detail Drawings SS-3 to SS-6 in Schedule D.

Development in the urban area of the City will implement this type of Stormwater Runoff on site as ground conditions are favorable for this type of use. Geotechnical investigation is required.

### E.3.21 Perforated Drains

The Consulting Engineer shall determine the need for perforated drains behind the proposed curbs or sidewalks to intercept water and show requirements on the design drawings. Should the Consulting Engineer fail to identify the need for such drains, the Director may order them to be installed during construction or during the maintenance period should it become evident they are required. The costs associated with the installation when ordered by the Director shall be borne by the Developer.

### E.3.22 Ditches

#### a) Depth

Water level in ditches adjacent to traveled roadways shall not exceed 1 metre in depth.

**b) Shape**

Ditches shall be trapezoidal in shape having maximum side slopes of 1.5 Horizontal: 1 Vertical and a minimum bottom width of 0.5 metres.

The minimum grade of a ditch shall be 0.5%. The maximum velocity in an unlined ditch shall be 1 m/s. Higher velocities may be permitted where soil conditions are suitable or where erosion protection has been provided. On steep slopes, grade control structures shall be used.

**c) Ditch Right-of-Way**

Minimum right-of-way width for a ditch shall be 5.0 metres. Ditch right-of-way shall be sufficiently wide to provide a 2.5 metre access road for maintenance vehicles in addition to the width required for the ditch.

Ditches less than 10 metres in length shall be enclosed unless otherwise directed.

### E.3.23 Natural Watercourses

All proposals for works affecting watercourses shown on Supplementary Detail Drawing RAR-1 in Schedule D shall be forwarded by the Consulting Engineer to the following Federal and Provincial government agencies:

- Federal Fisheries and Oceans
- Provincial Fish and Wildlife Branch, Ministry of Environment
- Provincial Waste Management Branch, Ministry of Environment

Should siltation control other than or additional to the requirements set out herein be required by the above agencies, details of the proposed works shall be shown on the design drawings and shall be installed as part of the Works.

### E.3.24 Riparian Areas

Designated watercourses in Pitt Meadows fall under the Riparian Areas Regulation (RAR) to protect riparian areas from development. The regulations are in place to provide natural features, functions and conditions that support fish life processes. See Supplementary Detail Drawing RAR-1 in Schedule D for locations of watercourses that fall under the RAR guidelines. A Qualified Environmental Professional will be required on all development proposals that fall within the RAR areas to conduct an assessment to determine the Streamside Protection and Enhancement Area widths and measures.

# PART F: STREET LIGHTING

## F.1 GENERAL

Table F1: Minimum Standards for Lighting for Urban Roads shows the illumination levels and uniformity ratios for street lighting corresponding to the Road Classification and Land Use Zoning. Unless otherwise stated herein, the design of street lighting systems shall conform to ANSI/IES RP-8-00 ***American National Standard - Practice for Roadway Lighting*** and installation of lights and underground wiring shall be in accordance with the ***Canadian Electrical Code***, all bulletins issued by the BC Electrical Safety Branch and Provincial Inspection Amendments.

Street lights will only be installed on rural roads, as shown on Supplementary Detail Drawing 101F, at intersections and at the end of a cul-de-sac. Except at intersections with non-rural roads, rural street lights will be leased from BC Hydro and the rest of Part F does not apply.

Traffic signal installation to meet latest MMCD Specifications Section 16 and to the latest Ministry of Transport Specifications for signalized intersections.

Each intersection to have a minimum of one double headed “Opticom” Pre-emption device as supplied by 3M for emergency vehicles.

The design shall be sealed by a Professional Engineer practicing in the electrical engineering field and experienced in roadway lighting design.

## F.2 DESIGN CRITERIA TABLE

Design Drawings shall incorporate a Design Criteria Table which provides the following information:

a) **Location:** i.e., Smith Road from Jones Street to Johnson Street

b) **Land Use:** i.e., residential, commercial, etc.

c) **Road Classification:** i.e., local, collector, arterial, etc.

d) **Illumination:** level in average lux

e) **Minimum illumination:** level on roadway in lux

f) **Uniformity Ratios:** (average: minimum)

g) **Maximum pole spacing in meters**

h) **Type of Pole Spacing:** i.e., staggered, opposite, one side only

## F.3 POLE LOCATION

On roads with pavement width 11 meters or more, lighting shall be staggered on both sides of road. Care shall be taken to ensure that the spacing of lights allows the intersection and pedestrian walkways to be adequately lit.

On local residential streets, poles shall be located within two metres of property corners. All pole locations shall be such that no conflict occurs with driveways, fire hydrants and underground services.

Regardless of the minimum spacing required, all lighting shall be laid out in such a way that there is a street light within 6 meters of the intersection of streets or intersection of street and walkway, measured from the projection of the intersecting property lines.

## F.4 TRANSITION LIGHTING

Where connecting roadways have different requirements for levels or types of illumination, the spacing of poles shall change gradually to suit the change of levels of illumination.

## F.5 MAXIMUM NUMBER OF LUMINAIRES PER SERVICE

The number of luminaries shall not exceed 20 for each electrical service.

Where the number of luminaries does not exceed 6 and there is no potential for extension of the circuit, a 120 volt single phase mini-service may be installed.

## F.6 CLEARANCES TO OVERHEAD ELECTRICAL LINES

Ensure that minimum clearances between street light poles and overhead electrical lines comply with all requirements of B.C. Hydro and Power Authority and Work Safe BC.

## F.7 STREET LIGHT POLES

Poles shall be either the post-top or the davit type located in accordance with Supplementary Detail Drawings 101A to 101F and are to be CSA approved. Davit poles shall be octagonal, tapered, painted black, galvanized steel. Post top poles shall be in accordance with Supplementary Detail Drawing SE-1.

## F.8 CONDUIT

The two nominal sizes of conduits for use in street lighting systems shall be:

a) 50mm for conduit between the service pole base and B.C. Hydro's service box; and

b) 32mm for all other conduits between pole bases.

## F.9 LUMINAIRES *(BYLAW 2833, 2019)*

Luminaires shall be of the LED type and equivalent to the following high pressure sodium ratings: 100 watts for local roads, 150 watts for collector and 200 watts for arterial roads. Refer to Table F1 for lighting levels for each road classification. Luminaires shall be designed for mounting on the specified pole type and be IES Type 3 MC Distribution (Flat Glass). Preferred type of LED light to be determined and approved by the Director.

## F.10 STUBS FOR FUTURE SERVICING

A stub for future extension shall be provided at all temporary terminal street light poles.

## F.11 PRE-DUCTING FOR FUTURE SERVICING

In areas where road paving is required, provision shall be made for future extensions of the power distribution system to the opposite side of the roadway by providing ducts and fish-wires across the roadway before the roadway is paved and terminating in a junction box.

## F.12 NUMBERING OF STREET LIGHT POLES

The Consulting Engineer shall request the Director to provide numbering of each street light pole to be installed. Such numbering shall be clearly shown on the Design Drawings.

### F.12.1 Numbering of Poles

The poles shall be numbered on the road-side face of the pole, such numbers shall be determined as follows:

Example: 36
2

Where: 36 – Indicates the circuit the pole is a member of, all poles that are electrically linked to the same control box will have the same number, and;

2 – Indicates the number of the pole on the circuit ascending from 1, in numerical order, in sequence. Wherever possible, the lowest number will be placed along the major road and ascend numerically along the road, with higher numbers on minor roads and side streets except in one case noted below.

The streetlight that contains the control and light sensor for the circuit shall be given the number 0 to clearly indicate its location.

If a circuit is expanded by future development, the new streetlights will continue the numbers from the highest available digit, regardless of their location on the circuit.

If there is only one streetlight member of the circuit on the side street, the numbering will deviate onto the side street briefly. For example, the numbering could go: 6 on the main road south of the side road, 7 (on the side street), and finally 8 on the main road north of the side street.

The numbers shall be white in colour (painted on with stencil) and be placed a minimum of 2.1 meters above the top of the mounting base.

The minimum dimensions of each digit shall be 50 mm high and 25 mm wide.

***Table F1: Minimum Standards for Lighting for Urban Roads***

| **Road Type** | **1~3 family urban lots** lux | **Multi-family** lux | **Commercial & Institutional** lux | **Industrial** lux |
|---|---|---|---|---|
| Local | 4 | 6 | 9 | 4 |
| Collector | 6 | 9 | 12 | 6 |
| Arterial | 10 | 14 | 20 | 10 |

The table specifies the minimum Luminance in lux for average illumination on the roadway when light source is at lowest output and luminaire in dirtiest condition. Uniformity ratios of lighting shall be 3:1 average to minimum except 6:1 average to minimum on local roads in single family residential areas. On roads of pavement width 11 metres or wider, lights shall be staggered on both sides of road. Lights shall be located so as to ensure intersection and pedestrian walkways are adequately lit. Where roads have different land uses on each side, the higher of the applicable levels of lighting shall be provided.

Refer to latest edition of the MMCD Electrical Section 26 56 01 and Standard Drawings for additional criteria.

# PART G: OTHER UTILITIES

## G.1 GENERAL

Underground wiring is required to serve all properties except those fronting on rural streets. Underground wiring and gas pipelines must be located in accordance with Supplementary Detail Drawings 101A, 101B, 101C, 101D and 101E.

The Consulting Engineer shall provide the design drawings and all requirements of the City to B.C. Hydro, Fortis BC, Telus, Shaw Cable and any other local cable companies and shall ensure that the design drawings produced by those utility companies are compatible with the Consulting Engineer's design drawings and all City requirements.

The Consulting Engineer shall ensure that all utility company drawings are provided to the City for the City's review prior to construction.

## G.2 MATERIALS AND CONSTRUCTION SPECIFICATIONS

Underground wiring and natural gas pipelines shall be constructed in accordance with the applicable specifications of the respective utility company and in accordance with applicable sections of the Specifications in Schedule C.

# PART H: BOULEVARD LANDSCAPING

## H.1 GENERAL STREET TREE SPECIFICATIONS

### H.1.1 Street Tree Planting Requirement

All urban road boulevards shall be planted with trees as shown on Supplementary Detail Drawings 101A, 101B, 101C, 101D and 101E and SL-1. Unless otherwise shown on the Contract Drawings, the area between the back of curb and sidewalk shall be sodded with grass after trees have been planted. Other areas between the road and property line, apart from ditches beside rural roads, shall be graded in accordance with MMCD Standard Specification 31 22 01 – Site Grading.

The subdivision or development servicing of land, requires the developers of such land to prepare a street tree planting plan and install street trees in accordance with these specifications. The Developer shall provide a refundable deposit to the City for the cost to install, inspect and maintain the trees in accordance with these specifications.

### H.1.2 Street Tree Planting Plan

The Developer of land shall submit to the City, a plan drawn to a minimum scale of 1:500 of the proposed street tree design. Design of this plan shall be prepared by either a, Landscape Architect registered with the British Columbia Society of Landscape Architects (BCSLA) or Landscape Designer being a person whose major professional occupation and training is in landscape and planting design.

The street tree planting plan shall show:

a) The location of the proposed plant material with reference to:

- Curbs;
- Sidewalks;
- Underground utilities;
- Overhead utilities;
- Driveways;
- Mailboxes;
- Street lights;
- Fire hydrants;
- Utility kiosks;
- Street and lane intersections;
- Personnel access holes;
- Valve boxes; and
- All existing trees and shrubs within 6.0m of the front and exterior property lines.

In Commercial, Industrial, and Institutional zones include the following:

- Building projections, overhangs;
- Awnings, canopies; and
- Doorways, and signs.

b) A detail drawing as per the City street tree planting detail on Supplementary Detail Drawing SL-1.

c) Plant list showing quantity, botanical name, common name, and size of proposed trees.

d) Surface treatment of boulevard strip.

e) Notation on drawing that "Final location and species selection shall be to the satisfaction of the Director".

f) All additional information requested by the Director upon review of plans submitted.

## H.2 DESIGN CRITERIA FOR STREET TREE PLANTING

### H.2.1 Plant Spacing and Minimum Tree Planting Clearances

Street trees shall be spaced from 8m to 12m on centre depending on the species used in the design.

Trees should be planted a minimum distance of:

- 6.0 metres from lamp standards;
- 3.0 metres from utility poles;
- 2.0 metres from sidewalk crossings, catch basins, hydrants;
- 1.2 metres from valve box, services, manholes;
- 1.5 metres from sewer services;
- 7.5 metres from street corners;
- 2.0 metres from building for columnar trees; and
- 3.0 – 5.0 metres from building for spreading trees.

Trees may be placed above a utility provided the utility has a minimum 0.9m cover.

### H.2.2 Species Selection (Bylaw 2833, 2019)

Street tree selection shall be made from the list of street trees included in Table H1, H2, H3 and H4. Substitutions to this list will be considered when proposed by the Landscape Architect or Landscape Designer. If total number of trees is over 40 for any one development, there must be more than one species used, with no more than 50% of total number, of any one species.

Where trees are proposed to be planted within 5.0 metres of overhead conductors they shall have a maximum mature height of 6.0 metres or less.

### H.2.3 Origin

All plant material shall be nursery grown stock. Collected material is not acceptable.

All plant material shall comply with the B.C.S.L.A./B.C.N.T.A. (British Columbia Nursery Trades Association) Landscape standard.

### H.2.4 Tree Dimensions

Each tree shall be a minimum 6.0 centimetres calliper 2.0 metres standard and not less than 3.5 metres in overall height. Each tree shall have a sturdy, reasonably straight trunk. Minimum branch height on trees shall be considered in street tree designs so as to not obstruct pedestrian movement.

### H.2.5 Root system

Trees shall be of balled and burlapped, container grown stock, or bare root. The root system shall be strong, fibrous, and free of disease, insects, defects, girdling, or injuries and shall be sufficiently developed to guarantee successful transplanting.

### H.2.6 Condition

All plant material shall be of good health and vigor with no visible signs of disease, insect pests, damage or other objectionable disfigurements. All trees are to be inspected by a Certified Arborist or Certified Landscape Technician before planting. The Developer of land being subdivided or serviced is responsible for contacting the Maple Ridge-Pitt Meadows Parks Foreman prior to delivery on site with verification that the trees meet the City's specifications, and where the trees are coming from.

### H.2.7 Mulch

Shall be 25mm diameter and minus Douglas Fir or Hemlock bark chips and fines free of chunks and sticks, dark brown in colour, free of all soil, stones, roots, weed seeds and spores and other extraneous matter. The mulch applied around the tree base is not to be deeper than 2.5 cm. (1 inch) and is not to be touching the trunk of the tree.

## H.3 CONSTRUCTION

### H.3.1 Installation

All installation shall comply with BCNTA/BCSLA landscape standards, latest edition.

### H.3.2 Time of Planting

Planting work is to be completed during normal planting seasons as dictated by weather conditions. Planting in frozen ground or with a frozen root ball is not acceptable.

Planting is not be permitted during extremely hot, dry weather, or when rain has accumulated in the tree pit

All necessary precautions shall be taken to protect the plant material from severe weather conditions during transportation and planting.

Planting of trees on any development site shall not be carried out until building construction is a minimum 80% compete.

### H.3.3 Location of Planting

Street trees shall be located within the road right of way in the separated boulevard. Where boulevard width is less than 1.0 metre the trees may be located between the property line and the back of sidewalk or curb. Actual tree numbers, spacing and locations will vary according to existing site conditions and species selected. Locations shall be staked by the Landscape Architect/Designer or Developer according to the plans submitted to the municipality. The Developer shall request a review of the stake locations by the Parks Foreman prior to planting. Minor alterations in location can be performed by the Developer if obstructions are encountered. Obstructions requiring major alteration to the planting plan are to be reported to the Director for resolution.

### H.3.4 Preparation of Planting Area

The area in which the trees are to be planted must be properly prepared with a minimum of 100 cm depth of quality topsoil in a continuous strip of at least 2 meters width, or the width of the separated boulevard. The sub grade of this planting strip must be pervious to water.

### H.3.5 Tree planting procedures

All trees shall be planted as per Supplementary Detail Drawing SL-1 unless otherwise noted.

a) All planting pits should be dug by hand with care as underground services may exist near proposed street tree locations. The planting pits shall be large enough to accommodate the entire root ball and with an additional 30 cm of loosened native soil around the inserted rootball. If present, the top 1/3 rd of the burlap shall be folded back, top wire bent back below soil level, and ties removed.

b) The trees must be planted at the proper depth. Remove soil from the base of each tree until the first larger root is found. Cut all circling girdling roots that are obvious. Plant at the depth where the first root found is just below soil level.

c) The planting pit shall be back filled with the native surrounding soil, tamped and watered in layers to secure the tree and eliminate air pockets.

d) Refer to the B.C.N.T.A. Standards for procedures when planting trees grown in containers and wire baskets.

e) Upon installation trees that are unable to stand alone are to be securely staked as per Standard Drawing SL-1.

f) Trees shall be watered as required to ensure that no stress occurs to the trees during hot weather.

g) All excess soil, rock and debris shall be removed from the site on completion of planting.

h) After clean up the planting area shall be mulched with specified bark mulch (see H.2.7 above). The mulch shall not be piled at the base of the tree trunk, and shall be not be more than 2.5 cm (1 inch) in depth.

### H.3.6 Plant Maintenance

The Developer is responsible for following the establishment maintenance procedures necessary to maintain all trees in a healthy condition for a minimum one year period, as specified in the BCSLA/BCNTA landscape standard. Once installation is complete, the Developer shall submit a copy of Section H.5 (Installation Review) including the original Street Tree Plan with noted changes, to the Parks Foreman. This Section is to be completed by a Certified Professional. The maintenance period shall begin upon issuance of the Street Tree Installation Certificate Section H.6 by the Maple Ridge Pitt Meadows Parks staff.

Maintenance work shall include but not be limited to:

- Watering;
- Weeding;
- Pruning;
- Repair or replacement of vandalized trees;
- Treatment to control disease and pests; and
- Removal of tree staking materials at the end of the warranty period.

The City reserves the right to extend the Developer's maintenance responsibility for an additional year if, at the end of the initial period, leaf development, growth or overall vigor is not sufficient to ensure tree survival.

### H.3.7 Warranty

All trees shall be warranted against loss for one full year from the start of the maintenance period.

The Developer shall provide a written Warranty to the City, at the start of the maintenance period.

### H.3.8 Replacements

During the warranty period, the Developer shall replace all trees that die, are damaged or have failed to grow satisfactorily as determined by the Landscape/Planning Technician.

All replacements shall be with trees of the same species, variety, and size as the original planting plan.

The warranty on replacement trees shall extend for a period equal to the original warranty period.

The maintenance period ends when the Developer has submitted Section H.7, which is completed by a Certified Professional, to the Parks Foreman. A Final Inspection Certificate Section H.8 will be issued from the City and the refundable security for the Street Trees will be returned.

## H.4 STREET TREE SPECIES LIST
*(Bylaw 2833, 2019)*

The following list of street tree species may be further restricted at the discretion of the Director.

*Table H1: Trees for Wide Streets and No Overhead Wires (more than 10 meters tall)**

| Botanical Name | Common Name | Acceptable Variety |
|---|---|---|
| *Acer platanoides* | Norway Maple | Cleveland, Conzam, Crimson King, Emerald Queen, Ezestre |
| *Acer rubrum* | Red Maple | October Glory, Red Sunset (Franksred), Sun Valley |
| *Acer X freemanii Jeffersred* | Autumn Blaze Maple | |
| *Acer X truncatum Keithsform* | Norwegian Sunset Maple | |
| *Acer X truncatum Warrenred* | Pacific Sunset Maple | |
| *Aesculus arnoldiana Autumn Splendour* | Autumn Splendour Horse Chestnut | |
| *Aesculus carnea briotii* | Red Horse Chestnut | |
| *Fagus sylvatica* | Beech | |
| *Gleditisia triacnthos inermis* | Honey Locust | Christie, Skyline, Shademaster |
| *Metasequoia glyptostroboides* | Dawn Redwood | Gold Rush |
| *Nyssa sylvatica* | Black Tupelo, Black Gum | Green Gable |
| *Quercus macrocarpa* | Bur Oak | |
| *Quercus palustris* | Pin Oak | |
| *Quercus rubra* | Red Oak | |
| *Quercus garryiana* | Garry Oak | |
| *Ulmus americana* | American Elm | |

* Width of boulevard and proximity to underground / above ground utilities & driveways must be taken into consideration

*Table H2: Trees for Narrow Streets and No Overhead Wires:*

| Botanical Name | Common Name | Acceptable Variety |
|---|---|---|
| *Acer platanoides* | Norway Maple | Columnar |
| *Acer rubrum* | Red Maple | Armstrongii, Scarlet Sentinel |
| *Carpinus betulus Fastigiata* | European Hornbeam | |
| *Fraxinus pennsylvanica* | Ash | |
| *Pyrus calleryana Chanticleer* | Ornamental Pear | |
| *Prunus Kwanzan* | Kwanzan cherry | |
| *Quercus x robur* | Crimson Spire Oak(Crimschmidt) | Regal Prince Oak(Long) |

*Table H3: Trees for Streets with Overhead Wires: (less than 10 meters tall)*

| Botanical Name | Common Name | Acceptable Variety |
|---|---|---|
| *Acer ginnala* | Red November Amur Maple | |
| *Acer griseum* | Paperbark Maple | |
| *Acer platanoides Globosum* | Globe Norway Maple | |
| *Aesculus carnea briotii* | Red Horse Chestnut | |
| *Amelanchier x grandiflora* | Serviceberry | Autumn Brilliance, Princess Diana |
| *Carpinus betulus Globosum* | Globe European Hornbeam | |
| *Cornus kousa cultivars* | Kousa Dogwood | Satomi |
| *Cornus Nutalli* | Eddies White Wonder | |
| *Hibiscus Syriaca* | Tree Form Hibiscus | |
| *Magnolia* | | Galazy, Sprengeri, Vulcan |
| *Malus spp* | | Disease resistant cultivars |
| *Parrotia persica* | Persian Ironwood | Inges Ruby Vase |
| *Prunus serrulata* | Japanese Flowering Cherry | Kwanzan, Pink -Perfection, Shirofugen, Snowgoose |
| *Prunus subhirtella* | Flowering Cherry | Autumnalis, Whitcombi |
| *Prunus yeodensis* | Flowering Cherry | Akebono, Yoshino |
| *Styrax japonica* | Japanese Snowbell | |

*Table H4: Columnar Trees – Suitable for Locating in Confined Space*

| Botanical Name | Common Name | Acceptable Variety |
|---|---|---|
| *Acer Nigra* | Black Maple | |
| *Acer platanoids* | Columnar Norway Maple | Olmstead / Crismon Sentry and Cleveland |
| *Acer rubrum* | | Bowhall / Scarlet Sentinel |
| *Acer Freemanii* | | Armstrong |
| *Carpinus betulus Fastigiata* | European Hornbeam | |
| *Fagus Sylvatica* | Beech | Dawycki |
| *Parrotia persica* | Persian Ironwood | Inges Ruby Vase |

## H.5 STREET TREE INSTALLATION REVIEW

To be completed by a Landscape Architect, Certified Arborist, Landscape Technician, or Professional Forester.

Development Name/File #: _____

Address: _____ Date: _____

A copy of the original Street Tree Plan MUST accompany this document. On the plan will be noted the "AS PLANTED" list of street trees as they exist on the day of inspection. **The plan must indicate the number of trees, the location of each, the Genus, species and variety of each, the size and condition.** Any additional notes can also be made on the drawing.

All of the above trees have been inspected individually, and the following has been checked: (initial or note by each, as appropriate)

1. Trees planted at proper depth: _____
2. String/wire around base of trees has been removed: _____
3. No basket, burlap or other material from root ball is exposed: _____
4. Trees are staked with two wooden stakes and tied with proper tree tie: _____
5. Trees have no visible signs of disease or insect damage: _____
6. Trees have no obvious deformities or bad structure: _____
7. Base of trees has been mulched no thicker than 1 inch _____
8. Excess rock, soil and debris has been removed from base _____
9. Tree wrap, string and such have been removed from tree _____
10. Building construction in development is at least 80% complete _____
11. All trees are planted at appropriate spacing as specified in City of Pitt Meadows Tree Planting Specs. Section H.2 _____

Any other comments relating to the installation of these trees:

Signed and certified by:

_____
*Qualified Professional, designation and stamp* (if applicable)

Company name and phone number/email: _____

## H.6 STREET TREE INSTALLATION CERTIFICATE

For beginning of One Year Maintenance Period
To be completed by Maple Ridge Pitt Meadows Park Staff

File: _____ Engineering Project: _____

Security: _____ Receipt #: _____

Location: _____

The following trees have been planted in accordance with BCLNA and DMR standards (see attached checklist), and follow the submitted planting plan:

| Tree Type – Botanical Name & Variety | # | Size | Condition | Location |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Developer: _____ Telephone/FAX: _____

Contractor: _____ Telephone/FAX: _____

The Maintenance Period for these Street Trees will begin on: _____
and will conclude after one year on: _____.

***The Developer shall submit a final review by a qualified professional (Landscape Architect, Certified Arborist or Professional Forester) on conclusion of the Maintenance Period for the release of the refundable security.***

**Distribution -** Developer: _____
Contractor: _____
Planning: _____

_____
*Maple Ridge/Pitt Meadows Parks Foreman*

## H.7 STREET TREE FINAL REVIEW

To be completed by a Certified Arborist, Certified Landscape Technician or Professional Forester.

Development Name/File #: _____

Address: _____ Date: _____

All of the street trees pertaining to this file have been inspected individually, and the following has been checked:
(initial or note by each, as appropriate)

1. Trees are all alive and healthy: _____
2. Stakes, ties and other supports have been removed:_____
3. Trees have no visible signs of disease or insect damage:_____
4. Trees have no obvious deformities or bad structure:_____
5. Base of trees has been mulched and no signs of weed whipper damage_____
6. Excess rock, soil and debris has been removed from base_____
7. Building construction in development is at least 80% complete_____
8. A copy of the Street Tree Plan that was submitted with the Initial Installation Review must accompany this document **if there have been any significant changes**. On the plan will be noted the "AS PLANTED" list of street trees and any trees that have been replaced due to death, disease or damage since initial installation. The plan must indicate the number of trees, the location of each, the Genus, species and variety of each, the size and condition._____

Any other comments relating to the state of these trees or deviations from the original plan:

Signed and certified by:

_____
*Qualified Professional, designation and stamp* (if applicable)

Company name & phone number or email: _____

## H.8 STREET TREE FINAL CERTIFICATE

Final Review for Release of Refundable Security
To be completed by Maple Ridge Pitt Meadows Park Staff

This certificate is issued based on the best of the Environmental Technician/Arborist's knowledge, information and belief. It does not constitute acceptance of any work that is deficient or not in accordance with the requirements of the Subdivision and Servicing Bylaw.

File: _____ Engineering Project: _____

Security: _____ Receipt #: _____

Location: _____

The following trees have been inspected for health and vigor and that the numbers and type match that of the Installation Certificate for this file (see attached checklist).

| Tree Type – Botanical Name & Variety | # | Size | Condition | Location |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

*As the Environmental Technician/Arborist for the Maple Ridge Pitt Meadows Leisure Services, I am satisfied all conditions of development servicing with respect to street trees have now been completed the balance of refundable security $_____ on receipt #_____ shall be released.*

Deviations from the Installation Certificate are as follows: (state deviation and reason)

_____

_____

_____

_____ _____

Date *Environmental Technician/ Arborist*

**Distribution:**
Developer: _____ Finance: _____ Parks: _____

# SCHEDULE D: CONSTRUCTION REQUIREMENTS & SPECIFICATIONS

Table of Contents

***Note:*** *Schedules C and D are distributed to technical personnel and reference sources only and are available from the Development Services Department on request. The Master Municipal Construction Document is available through MMCD Suite 102 211 Columbia Street Vancouver, B.C. V6A 2R5 Tel. (604) 681-0295 email admin@mmcd.net.*

# SECTION 1: GENERAL REQUIREMENTS

## 1.1 Construction Requirements

All works shall be constructed in accordance with the Bylaw and Contract Drawings and any project specific supplementary specifications approved by the Director. Where there is an inconsistency or conflict between documents, they shall govern and take precedence in the following order:

1. any project specific supplementary specifications approved in writing by the Director;
2. the Contract Drawings stamped by the Director;
3. the supplementary specifications set out in Section 2 of this Schedule;
4. the supplementary detail drawings in Section 2.2 of this Schedule;
5. these General Requirements;
6. all other parts of this Bylaw;
7. MMCD Specifications;
8. MMCD Design Guideline Manual
9. MMCD Standard Detail Drawings.

Everything required to be done by the Developer in these General Requirements and in the Specifications shall be done entirely at the cost of the Developer.

## 1.2 Permission to Commence Construction

No land clearing, stripping of topsoil, excavation, placement of fill, construction or installation of any kind, other than required for site investigation, may be undertaken on the Subdivision or Development site until Permission to Commence Construction has been issued by the Director.

Before the Director issues Permission to Commence Construction, the design drawings must be stamped by the Director as approved (the Contract Drawings) and the following provided:

1. the name of the contractor(s) to be employed by the Developer for installation and construction of the Works and a summary of the projects completed by the contractor(s) that are similar in scope nature and value to the Works;
2. the name of the site superintendent who will supervise the construction of the Works and be on-site at all times throughout its progress and who will represent the Developer and his contractor during the Developer's absence, together with a resume of his/her related experience;

3. registered rights of way for works and services across lands owned by other parties;
4. amendments to existing, registered, rights of way and easements in favour of other parties to permit works and services in accordance with the Bylaw and Design Drawings;
5. a copy of the notification by the Developer's contractor to the Workers' Compensation Board of the proposed construction and installation of the Works;
6. approvals for crossings of provincial highways, railway tracks, high pressure gas distribution mains, oil pipelines, B.C. Hydro, Metro Vancouver and any other rights-of-way;
7. a Construction Permit from the Regional Public Health Engineer for the installation of any waterworks;
8. documentation to confirm that the Developer submitted a Notification application as required under the ***Water Act*** to the Ministry of Environment (MOE) at least 45 days prior to any scheduled in stream work such as installation of bridges, culverts, pipeline crossings and storm water outfalls and a Notification response letter from MOE including any project specific terms and conditions if received during the 45 day waiting period;
9. an Approval pursuant to Section 8 of the ***Water Act*** issued by the Ministry of Sustainable Resource Management (MSRM) for any project involving the temporary use or diversion of water from a stream;
10. a License pursuant to Section 7 of the ***Water Act*** issued by MSRM for any project involving the permanent use, storage or diversion of water from a stream;
11. documentation to confirm that the Owner has notified MOE that work is proposed in an Environmentally Sensitive Area, other than in or near a stream and the response (if any) from MOE;
12. a permit for disposal, including burying or dumping, of any solid or liquid wastes on-site issued under Section 10 of the ***Waste Management Act*** by MOE;
13. an authorization under Subsection 35(2) of the ***Fisheries Act*** issued by Fisheries and Oceans Canada for projects which have the potential to cause harmful alteration, disruption or destruction of fish habitat or to cause harm to fish, such as installation of a culvert, removal of streamside vegetation or other works in or about a stream;
14. a permit issued under Section 10 of the ***Waste Management Act*** by Metro Vancouver for any air emissions or discharges to the atmosphere of prohibited materials and particulates, which may not meet applicable provincial or regional criteria, or which require pollution control works in order to meet applicable criteria; and

15. any other approvals, licences, authorizations, permits or equivalent required by the Director.

The granting of Permission to Commence Construction by the Director does not constitute subdivision approval.

## 1.3 Pre-Construction Meeting

Before commencing construction of the Works, the Developer together with the Consulting Engineer and the Developer's prime contractor(s) shall attend a pre-construction meeting with the Director. The Developer shall then submit schedules as follows:

1. a construction schedule showing the completion dates of the various parts of the Works;
2. a maintenance and monitoring schedule and methodology and reporting procedure for the Drainage, Erosion and Sediment Control Plan;
3. the nature and frequency of proposed site meetings and site inspections to determine whether the Works are being constructed in accordance with the Bylaw and Contract Drawings;
4. the nature and frequency of proposed field and laboratory testing, including video inspection, of workmanship, materials and equipment.

The names, qualifications and emergency and regular contact information of the site superintendent, inspectors and any independent inspection and testing agencies must also be submitted at this time.

These schedules, personnel and testing agencies will be subject to acceptance by the Director.

Some variation in these schedules necessitated by unforeseen conditions or circumstances is acceptable, but the average rate of progress of each portion of work and the level of inspection and testing shall be maintained in close conformity with the schedule.

## 1.4 Survey Control

Survey control necessary for installation of the Works shall be the responsibility of the Developer. The survey control shall be carried out accurately and every care taken to avoid cumulative errors. All work shall be constructed to the lines and grades shown on the Contract Drawings.

Survey controls and/or installed Works may be checked by the Director at any time but such checks shall not relieve the Developer of responsibility for the installation of services to the alignments shown on the Contract Drawings.

## 1.5 Existing Utilities

At the commencement of construction, the Developer shall expose existing underground utilities to confirm the alignment, elevation and pipe material shown on the Contract Drawings with particular attention to proposed tie-in and crossing points.

## 1.6 Design Errors and Unknown Conditions

Any errors, inconsistencies or omissions discovered in the design and any discrepancies discovered in the location of existing utilities, whether or not they affect the design, shall immediately be reported to the Director.

If, as a result of errors, inconsistencies or omissions in design or of the discovery of previously unknown or concealed conditions, it becomes necessary, or in the opinion of the Director desirable, to make any change in the design, installation of the affected Works shall be stopped pending the Consulting Engineer's revision of the Contract Drawings and their acceptance by the Director.

The Developer shall, if necessary, reconstruct any Works previously installed by the Developer or others or pay for the City or utility company to reconstruct their existing works, in a manner satisfactory to the Director and in conformance with the Bylaw.

## 1.7 Materials

All materials required for the Works shall be supplied by the Developer and shall conform to the requirements of the Bylaw and Construction Drawings.

The Developer shall notify the Director of the source or sources of materials to be supplied. Such notifications shall be given sufficiently far in advance of delivery to enable the Director to make inspection of the materials at the source.

Any materials which, in the opinion of the Director, do not conform to the requirements of the Bylaw, or are unsuitable for the purposes for which they are intended, shall be rejected. Unless otherwise specified, all materials shall be new. Rejected materials shall not be incorporated into the required Works and shall be replaced by the Developer at his/her own expense with materials approved by the Director.

The Developer shall be responsible for all materials and store them safely until incorporated into the Works.

## 1.8 Hours of Work

Unless otherwise approved by the Director, the Developer shall not execute any work requiring the City's inspection outside the normal working hours of the City's inspectors.

## 1.9 Progress of Work

The Developer shall perform his/her work on each section of the Works continuously until completion.

For sanitary and storm sewer mains, the term "section" shall mean that portion of the work from manhole to manhole, inclusive.

For watermain, the term "section" shall mean that portion of the work between any adjacent line valves.

For roadway, sidewalk, curb and gutter, the term "section" shall mean that portion of the work between intersections.

## 1.10 Equipment

All equipment used and methods employed in the carrying out of the work shall be subject to the approval of the Director. Machines with steel tracks, cleats, lugs, flat steel pads, grousers or other gripping devices which may cause damage to any roadwork's will not be allowed on asphaltic pavements, curbs or sidewalks at any time. Care must be taken where heavy rubber-tired units are turning so that no damage occurs to the pavement.

All equipment must be in good working order and inspected to ensure there is no leakage of any contaminants.

## 1.11 Site Maintenance

The Developer shall at all times maintain the subdivision or development site and any other affected and adjacent lands free from accumulations of waste materials, debris and rubbish and not unreasonably encumber them with materials or equipment. Accumulations of waste materials which might constitute a fire hazard will not be permitted.

The Developer shall keep roads, lanes and walks affected by the work clean and free of all materials and unlicensed equipment at all times. Debris and mud, which is tracked or otherwise, deposited onto areas outside the construction site, and any spills, must be promptly cleaned up. Roadways shall be cleaned every day unless otherwise approved by the Director.

Dust preventatives shall be used on temporary haul roads when a dust nuisance is being created. Water may be used to control dust when a road is open to public access, when vehicular traffic is light and sediment control measures are in place.

Cuts in existing public roads shall be patched with asphalt at the end of each working day.

Clean up shall be a continuing process from the start of the work until final acceptance. If dust, mud and other debris under not kept under control to the satisfaction of the Director, the City will take the necessary steps to undertake the work and all costs incurred will be charged to the Developer.

## 1.12 Protection of Drainage Systems and Watercourses

The Developer shall ensure that no prohibited material, or water containing any prohibited material directly or indirectly enters the storm drainage system or any watercourse and that the Drainage, Erosion and Sediment Control Works are monitored, operated and maintained in order to function in accordance with their design.

Prohibited material means any sediment, earth, construction or excavation wastes, cement, concrete, pesticides, fertilizers, waste oil or any material or substance which is a "hazardous product", "contaminant", "toxic substance", "deleterious substance", "special waste", "dangerous good" or "reportable substance" identified or described in or defined by any applicable statute, regulation or law, including other bylaws of the City or that may constitute a hazard to the health of humans or animals or that may be detrimental to the environment.

All drainage facilities, including affected existing works, shall be maintained during construction and maintenance period and accumulations of sediment removed without flushing downstream.

## 1.13 Dewatering

The Developer shall ensure that excavations are continuously dewatered and take all possible precautions necessary to prevent flotation of any pipe or structure.

If well pointing is used to dewater excavations, pumping shall be continued until backfilling operations have been completed. Thereafter, pumping shall be gradually stopped for the portions backfilled to allow a gradual rise in the water table level.

## 1.14 Blasting

The Director, in giving permission for blasting, does not assume responsibility for resulting injury, loss of life or damage, and such consent shall not be constructed as approval of the methods employed by the Developer in blasting. Any damage caused by blasting shall be repaired by the Developer at his/her own expense.

## 1.15 Inspections

The Consulting Engineer will provide full Inspection Services to ensure compliance with the Bylaw and the Contract Drawings. The City will also have inspection done on a periodic basis to assure that the works being done conform to all applicable City Bylaws. The Contractor/Developer shall give the Consulting Engineer 24 hours advance notice when inspections of the work at the following stages are being made:

1. prior to covering of each underground utility and service connection;
2. at the completion of sub-grade preparation;
3. at the completion of base compaction;
4. prior to curbing and sidewalk construction;
5. prior to paving.

## 1.16 Test Samples

The Developer shall supply representative samples of material as and when requested by the Director for the purpose of testing, at no cost to the City.

## 1.17 Use of Fire Hydrants

Before operating any fire hydrant the Developer shall:

1. obtain a Hydrant Use Permit from the Development Services Department;
2. keep such permit at the construction site as proof that such permission has been obtained;
3. give the Director minimum 24 hours prior notice of the times and dates when the use of such hydrants will take place;
4. for testing of watermains and sewage forcemains, present valid test certificate for reduced pressure principle backflow prevention device conforming to AWWA C511.

Any fire hydrants so used shall not be opened and closed by the Developer without the supervision of the City's Public Works Foreman.

## 1.18 Testing of Water and Sewer Mains

Unless otherwise authorized by the Director, test results of all newly constructed water, sanitary or storm sewer mains shall be submitted to the City prior to connection to any existing City mains.

Testing of mains and service connections to the property line shall be done after road base construction.

## 1.19 Weather Conditions

If the Director determines that weather conditions may prevent proper completion of any portions of the Works, the Developer shall stop work on those portions, except to undertake any work necessary to protect them, and shall not re-commence until permission is received from the Director. The Developer shall have no claim against the City for such delays.

## 1.20 Safety and Protection of Property and Works

The Developer shall take all reasonable precautions to prevent injury to persons, to avoid damage to adjacent property and to avoid or minimize damage to completed and partly complete Works and survey monuments.

If, in the opinion of the Director, a potential safety hazard or risk of property damage or, in the case of work on public land, significant inconvenience to the City or the public may result from the Developer's work, the Director may require the Developer to undertake corrective action upon such notice as he or she deems appropriate. If the Director considers there is immediate danger or some other emergency situation, corrective action may be taken by the City without notice being sent to the Developer, and all related expenses shall be charged to the Developer.

Any damage to City property resulting from the activities of the Developer or the Developer's workmen, agents or contractors shall be reinstated by the City at the cost of the Developer unless otherwise approved by the Director. Reinstatement includes the supply and installation of new materials where existing material is deemed unsuitable for re-use by the Director and any necessary retesting and disinfection.

If survey monuments, property stakes and pins, or benchmarks are damaged or disturbed, the Developer shall employ a British Columbia Land Surveyor to re-establish them.

## 1.21 Suspension of Work by Director

The Director may suspend the work, or any part of it, at any time on written notice to the Developer for reasons of public health or safety; or for non-compliance with federal, provincial, municipal or other legislation, bylaws regulations or codes.

## 1.22 Use of Completed Works

The City has the right to take possession of any completed portion of the Works, but such possession shall not be deemed acceptance of the Works.

## 1.23 Releases at Completion of Works

On completion of construction and installation of the Works on, or affecting, private property, including rights of way and easements, the Developer must obtain from each affected property owner a formal release in writing verifying that all work and clean-up has been completed to their satisfaction and that the property owner has no further claim on the Developer or the City in connection with the work. In the case of a dispute, the Director's decision shall be final

## 1.24 Completion

On completion of the Works, except for boulevard landscaping and work that must be adjusted after completion of paving, all portions shall be inspected by the Developer, the Consulting Engineer and a representative of the City. Works not constructed in accordance with the Bylaw and the Contract Drawings shall not be accepted. The Developer shall, at his/her own expense correct any fault, defect or damage from any cause whatsoever which may prejudicially affect the strength, durability or appearance of any section of the Works.

All existing signs and posts, curbing, sidewalks, drainage ditches and culverts, shrubs, fences and other surface features that have been removed, damaged or disturbed by the construction process shall be restored or replaced by the Developer to a condition equivalent or better to that which existed before the work began.

The Developer shall ensure all new and affected downstream catch basins, manholes, and sewers are cleaned and made free from all granular, asphaltic, silt and other debris immediately after the Works have been completed.

After correction of any defects and deficiencies, the Consulting Engineer shall submit the releases referred to in Section 1.23 and all test results, video inspection tapes and reports and a copy of a certificate of inspection from the provincial electrical inspector that the street lighting system is approved. The Consulting Engineer shall then request an inspection by the Director.

If the Director is not satisfied with the submissions or that all defects and deficiencies have been corrected, the Director will issue a defects and deficiencies list and may require that all or a portion of said section of the Works be removed and subsequently reconstructed in accordance with the Bylaw and the Contract Drawings. The Consulting Engineer must resubmit any additional test and video inspection results when corrections have been made.

When of the opinion that the requirements of this section have been satisfactorily completed, the Director will issue a Letter of Substantial Completion.

## 1.25 Maintenance Period

The maintenance period shall commence on the date of issuance of the Letter of Substantial Completion except that the maintenance period for any work completed, or deficiencies or defects corrected, after the Letter of Substantial Completion is issued will commence from the date the Director accepts such completion or remedial work.

The maintenance period will be for one year from the date of commencement or until, for Works within a Subdivision, the Subdivision plan has been registered in the Land Title office, whichever is later.

Any remaining restoration on public land shall be completed not later than twenty working days following issuance of the Letter of Substantial Completion otherwise the City may complete the restoration and charge the cost to the Developer.

Within two months of the Letter of Substantial Completion being issued, the Consulting Engineer will deliver to the Director all remaining project record documents including complete sets of as-constructed drawings, service record cards and operation and maintenance manuals all in accordance with Schedule C Section A.4. Within three weeks of receiving the Director's comments on these records, the Consulting Engineer shall deliver final corrected sets to the Director.

As soon as possible after completion, and in any case before final acceptance of the work, the Developer shall remove or otherwise dispose of all rubbish, surplus or discarded material, false work, forms, temporary structures and all equipment and machinery, and shall leave the work in a clean and tidy condition.

The Developer shall promptly correct any defects, imperfections, settlement, damage, acts of vandalism, or deficiencies in the Works that appear during the maintenance period, regardless of cause, and shall notify the Director when they have been corrected.

The Developer shall ensure that roadways, sidewalks and walkways are kept clean and free of dirt and debris during the maintenance period and continue to maintain the Drainage, Erosion and Sediment Control works.

Not more than one month prior to the expiry of the maintenance period, the Developer shall flush all sanitary and storm sewers, and conduct a video inspection and repair any deficiencies which become evident.

## 1.26 Letter of Final Acceptance

A Letter of Final Acceptance will be issued by the Director upon expiration of the maintenance period provided all deficiencies and defects, except for normal wear and tear, have been remedied to his or her satisfaction and all requirements of 1.25 have been met.

The Developer shall continue to be fully responsible for the condition of Works until such time that they are accepted by the City.

## 1.27 Completion and Acceptance of Boulevard Landscaping

On completion of planting of street trees and other planting, seeding or sodding of the boulevard required in the Contract Drawings they shall be inspected by the Developer and the Landscape Architect. After correction of any defects and deficiencies, the Landscape Architect shall request an inspection by the Director.

When satisfied that the Landscaping has been satisfactorily completed, the Director will issue a Street Tree Installation Certificate.

Maintenance will be carried out in accordance with MMCD 32 92 20.3.6, 32 92 19.3.8, 32 92 23.3.4 and 32 93 01.3.9.

The maintenance period for landscaping will continue until the end of the next growing season after planting, or until the Subdivision plan has been registered in the Land Title office, whichever is later. All seeded and sodded areas and all trees and plants determined by the Director to be dead or failing shall be replaced at the next appropriate season as determined by the Director and the maintenance period extended until the end of the next growing season after replacement. If at the end of the maintenance period, leaf development and growth of trees, shrubs and ground cover apart from grass is not sufficient, in the opinion of the Director, to ensure future survival the maintenance period shall be extended for a further year.

A Street Tree Final Certificate will be issued by the Director upon expiration of the maintenance period provided the conditions set out in MMCD 32 92 20.3.7, 32 92 19.3.9, 32 92 23.3.5 and 32 93 01.3.10 exist and the subdivision or development site is in a clean and tidy condition.

## SECTION 2: SPECIFICATIONS AND DETAIL DRAWINGS

### 2.1 Master Municipal Specifications and Standard Detail Drawings

The Specifications and Standard Detail Drawings of the latest edition and the Design Guideline Manual of the Master Municipal Construction Documents Association (MMCD) are incorporated into the City of Pitt Meadows Subdivision and Development Servicing Bylaw.

MMCD is written to form part of a contract between an owner and a contractor, and the MMCD Specifications, either directly or by reference to the General Conditions, include references to the respective responsibilities of the Owner, the Contractor and the Contract Administrator. The applicability of MMCD in connection with this Bylaw is with respect to technical specifications and construction details only, and does not involve the City in the contractual relationship that the Owner has with the contractor(s) hired by the Owner or that the Owner has with professional staff, consultants or other agents. Except as specified elsewhere in this Bylaw, the City places full responsibility for design, construction, installation, inspection, testing and record keeping of Works on the Developer (the Owner) who is required to hire the Consulting Engineer (the Contract Administrator) to undertake duties in accordance with the Bylaw, and MMCD must be interpreted in this way.

MMCD Specifications, Standard Detail Drawings and Design Guidelines are supplemented by this Section. In case of inconsistency, the Bylaw and Schedules take precedence over MMCD.

This Section may be further supplemented by supplementary specifications and drawings submitted in connection with a specific project and approved by the Director.

The Supplementary Specifications in this Schedule include global supplements and supplements to individual sections of MMCD. The latter are integrated into MMCD using the same numbering system as in that document.

### 2.2 Supplementary Specifications

**All Sections**

*Delete or replace as follows except where required otherwise in subsequent sections*:

(a) delete references to General Conditions;
(b) delete references to “payment” and “measurement and payment”;
(c) replace “Contract Administrator” with “Consulting Engineer” except in MMCD Specification 01 55 00, 32 92 20, 32 92 19 and 32 92 23;
(d) in MMCD 01 55 00 replace “Contract Administrator” with “Director”;

(e) in MMCD 32 92 20, 32 92 19 and 32 92 23 replace “Contract Administrator” with “Landscape Architect, or if a Landscape Architect is not required by the Director, Consulting Engineer”;
(f) replace “Contractor” with “Developer”;
(g) replace “Contract Documents” with “this Bylaw and the Contract Drawings;
(h) replace “Supplementary Specifications” with Schedule D of this Bylaw and supplementary specifications approved for construction by the Director”.

“**Inspection and Testing**”

*replace text in the General Conditions Section 4.12 which is applied to all Sections*

“Testing must be carried out in accordance with schedule provided to, and accepted by, the Director at the pre-construction meeting in accordance with 1.1.3 of the General Requirements or as otherwise required by the Director.

“The source and material characteristics of granular products and asphalt must be approved as meeting the required specifications by an independent testing agency based on their own tests prior to receipt of the materials on site.

“Concrete mix design and constituents must be confirmed and approved prior to delivery by an independent testing agency, and periodic sampling of the mix must be carried out in accordance with CAN 3 A23.

“Testing of the compaction of fill and asphalt and the strength of in-situ concrete must be undertaken by an independent, competent agency specialized in such testing as required by the Consulting Engineer to satisfy his responsibility for review and interpretation.

“Testing carried out by the Developer’s contractor must be undertaken in the presence of the Consulting Engineer who will confirm the results.

“All test and reports will be submitted to the Consulting Engineer for review and interpretation to determine if the Works have been constructed in accordance with the Bylaw and the Contract Drawings and he or she will provide the reports to the Director”

## Section 01 57 01 Environmental Protection

### 1.2.1 Drainage

1.2.1.1 *Delete and replace with:*

#### 1.2.1.1 Drainage, Erosion and Sediment Control

"Properly drain all portions of the site. Protect the site and the watercourses to which it drains, directly or indirectly, against erosion and siltation in accordance with the Sediment Control Plan approved by the Director during construction and until the maintenance period is completed. Ensure no silt, gravel, debris or other deleterious substance resulting from construction activity discharges into existing drainage systems or watercourses or onto highways or adjacent property. The Developer is responsible for all damage that may be caused by water backing up or flowing over, through, from or along any part of the work or otherwise resulting from his operations.

"Keep existing culverts, drains, ditches and watercourses affected by the work clear of excavated material at all times. When it is necessary to remove or alter an existing drainage structure, provide suitable alternative measures for handling the drainage. Adequately support culverts and drainpipes across trenches to prevent displacement and interference with the proper flow of water due to trench settlement.

"Sweep streets, and clean catch basins, manhole sumps, detention tanks, and maintain siltation controls as often as the Director deems necessary.

"Follow all Federal and Provincial regulations and guidelines respecting protection of fish, fish habitat, and watercourses.

"The Consulting Engineer is responsible for monitoring ongoing compliance with this section."

### 1.4.3 Pollution Control

*Add:*

.5 Immediately contain and clean up any leaks and spills of prohibited materials on the job site.

.6 Ensure that a well-stocked spill kit is on-site at all times and that the Contractor's employees are familiar with appropriate spill response techniques.

.7 Immediately notify the Consulting Engineer and the Director of any leaks or spills of prohibited materials that occur on the job site.

.8 Ensure that any fuel stored on-site is located at least 15 metres from the nearest stream, and is placed within a bermed and lined area, in order to prevent leaks or spills into the environment.

.9 Ensure that no equipment fueling or servicing is conducted within 15 metres of a stream."

### 1.9 Archaeological/Historical Resources

*Add*:

Immediately cease work and inform the Consulting Engineer and the Director, if any archaeological or historical resources are encountered during construction. Leave these resources in-place and do not disturb them in any way.

## Section 01 55 00 Traffic Control, Vehicle Access and Parking

### 1.0 General

1.03 *Delete and replace with*: "Unless alternative arrangements satisfactory to those adversely affected have been made by the Developer, pedestrian and vehicular access to affected properties shall be maintained at all times."

### 1.1 Temporary Access Roads

1.2.1 *Delete and replace with*: "Do not close any lanes of road or highway without approval of the Director. Before re-routing traffic erect suitable signs and devices as approved by the Director. Provide sufficient cold mix to ensure a smooth riding surface during work."

### 1.4 Traffic Control

1.4.3 *Delete and replace with*: "Supply and erect sign, delineators, barricades and miscellaneous warning devices as specified in the Ministry of Transportation and Highways publication 'Traffic Control Manual for Work on Roadways'."

### 1.4.10 Control of Traffic Using Flaggers

1.4.10.1 *Delete and replace pre-amble with*: " Provide flag persons, who have written proof of having received Traffic Control Persons Training

approved by the Workers Compensation Board and who are properly equipped for the following situations:…"

## Section 01 33 01 Project Record Documents

### 1.7 Recording Actual Site Conditions

1.7.2.1 After "appurtenances" insert: "including exact location of wyes along sanitary sewers and storm drains and elevations of service connections at property lines."

## Section 31 23 17 Rock Removal

### 1.5. Blasting Operation Proposal

1.5.4 *Add new sentence*: "Submit certificate of insurance for $5,000,000 to cover any injury, loss of life or damage to property that may result from blasting operations and including the City and its officers and employees as named insured's."

1.5.3 *Add after Contract Administrator*: "and the Director"

## Section 31 23 01 Excavating, Trenching and Backfilling

### 3.3 Excavation

3.3.1.2 *Delete and replace first sentence with*: "Connections to existing waterworks system to be made by the Developer unless otherwise determined by the Director."

3.3.1.3 *Remove last sentence and Add*: "Make connection in presence of Consulting Engineer and a representative of the Director."

### 3.5 Backfill and Compaction

3.5.3.4 *Add the following sentence*: "Native backfill to be protected from contamination, segregation and weather."

## Section 31 05 17 Aggregate and Granular Materials

### 2.7 Granular Pipe Bedding and Surround Material

2.7.1 *Delete and replace text with*: "Crushed or graded gravel to conform to Type 1 gradation as specified on chart in clause 2.7.1."

## Section 32 11 23 Granular Base

### 3.5 Proof Rolling

3.5 *Delete and replace with Benkelman Beam*: “Take Benkelman Beam measurements on finished granular base as required to verify adequacy of original design and constructed granular materials. Adjust design of pavement if required to compensate for any observed deficiencies in granular materials. Submit all data to the Director for approval prior to placing final lift of pavement. Beam centerline, gutter line and centerline of travel lane.”

## Section 32 11 16.1 Granular Sub-base

### 3.1 Inspection of Underlying Sub-grade Surface

3.1.1 *Delete first sentence and replace with*: "Underlying sub-grade surface to be true to cross-section and grade, and of the specified material compacted to 95% Modified Proctor Density in compliance with ASTM D1557."

## Section 31 15 60 Dust Control

### 2.1 Materials

2.1.7 *Add*: "Resin and Water: to Engineer's approval."

2.1.8 *Add*: "Dust Control materials to be environmentally friendly."

## Section 32 12 16 Hot Mix Asphalt Paving

3.3.2 Replace with “Adjust existing castings to flush with the lower course of asphalt paving, unless directed otherwise by the Director, and protect from asphaltic mix.

## Section 03 30 20 Concrete Walks, Curbs and Gutters

### 3.9 Expansion Joints

3.9.4 *Replace with*: “Expansion joint material shall not be used between curb and gutter and abutting parallel sidewalks. Use bond break compound.”

### 3.12 Finishing

3.12.9 *Add*: “Stamp the upper face of the curb to mark locations of service connections: “W” for water, “D” for storm sewer and “S” for sanitary sewer using appropriate City owned stamps.”

## Section 33 11 01 Waterworks

### 2.2 Mainline Pipe, Joints and Fittings

2.2.2 *Delete and replace*: “PVC pipe is not permitted.”

2.2.4.10.1 *Delete and replace first and second sentence with*: “Tie rods to be continuously threaded stainless steel.”

2.2.4.10.2 *Delete and replace last sentence with*: “Nuts and washers to be stainless steel.”

### Valves and Valve Boxes

2.3.4 *Add*: Temporary blow-off assembly to be installed in accordance with supplementary detail drawing SW-4

2.3.6.1 *Delete and replace with*: "Mainline Valve Boxes: to be Maple Ridge #1 type telescoping, cast iron, flat top flange type service box with cover marked 'Water'” A reversed 150mm PVC cap with a 19mm drilled hole placed on top of the valve stem nut to be placed at time of installation.

2.3.7.1 *Delete and replace with*: "Curb Stop Valve Boxes at property line for 25mm or less in driveways or sidewalks; to be Mueller A-726 or Daigle extendible curb stop box or approved equal."

### 2.5 Service Connections, Pipe, Joints and Fittings

2.5.1 *Add*: “Polyethylene to be used only where specified by the Consulting Engineer because of corrosive soils.

2.5.3.3 *Delete and replace with*: “Nuts and bolts only to be Mueller or Robar double stainless steel strapped and epoxy/nylon coated

2.5.5 *Delete and replace with*: "Copper Tubing Joints to be compression type suitable for 1100 KPa working pressure."

### 2.6 Hydrants

2.6.1 Fire Hydrants to be Terminal City # C71P compression style hydrants c/w a ‘Storz’ connection on one port.

2.6.1.3 *Delete and replace with*: "Bury Length: Nominal bury length 1.1m or as shown on Contract Drawings."

2.6.2 *Delete and replace with*: "Finish painting above ground line to be Bapco #22-370 marine enamel ensign red and Bapco #22-310 white or approved equal applied with a brush, white body, red bonnet, nozzle caps and riser." Apply reflective tape on approach side of hydrant.

**2.7 Underground Service Line Valves and Fittings**

2.7.3.1 *Delete and replace with*: "19mm or less: red brass to ASTM B62, compression type L having threads to AWWA C800 to be Mueller H-15008, Ford or Jones."

2.7.3.2 *Delete and replace with*: "25mm brass inverted key type: red brass to ASTM B62, compression type without drains to be Mueller H-15209 Jones or approved equal."

**3.10 Service Connection Installation**

3.10.1 *Add sentence*: “The personnel installing service connections shall be certified as being fully trained to minimum level II and competent in tapping watermains”

3.10.13 *Add*: "Service Connections which are adjacent to concrete curbing not stamped in accordance with 03 30 20.3.12.9 shall have a 'W' scribed into the surface of the concrete on the service connection alignment."

**3.21 Disinfection and Flushing Procedures**

3.21.9 *Renumber 3.21.9 as 3.21.10 and add the following as 3.21.9*: “Following the specified disinfection and flushing procedures, the Developer shall submit to the Director a detailed water analysis report showing the coliform count. Samples shall be obtained from each extremity of the newly installed watermains. Samples shall be obtained and tested by an approved independent testing agency or as otherwise approved by the Director.”

3.21.10 *Add after flushing*: “and satisfactory test results in accordance with 3.21.9”

**3.23 Connections to Existing Mains**

3.23.1 *Delete and replace with*: “The maximum size water service connection shall be 25 mm. Service connection criteria to meet specifications as

outlined in the City of Pitt Meadows Water Works Bylaw 2343, 2007 Section 5 and its amendments. All service connections to be installed by City forces".

## Section 33 40 01 Storm Sewers

### 2.1 Concrete Pipe

2.1.1 Change the figure "900mm" in line two to "375mm".

2.1.2 Change the figure "900mm" in line two to "375mm".

### 2.5 Spiral Rib Steel Pipe

2.4 *Delete and replace with*: "Steel pipe is not permitted".

### 2.6 Service Connections

2.6.1 *Delete and replace with*: "To be 150mm diameter unless specified otherwise."

### 3.3 Trenching

3.3.3 *Add*: "Locate, connect and record locations of all existing functional storm drain outfalls. Costs of connecting existing drainage connections into new storm sewer to be borne by the Developer. The Developer shall be liable for any damage which may result from failure to connect such drains. Existing drains from an adjoining property suspected of discharging sewage shall be reported to the Director."

### 3.10 Service Connection Installation

3.10.2 *Add to second sentence*: "and mark 'Storm'."

3.10.3 Remove last sentence and replace with:

"If an Inspection Chamber is located in a driveway, lane or paved surface that a cast iron lid be installed as shown on Supplemental Drawing SS-9 as applicable." **(Bylaw No. 2672, 2015)**

3.10.4 *Delete and replace with*: "Service Connections which are adjacent to concrete curbing not stamped in accordance with 03 30 20.3.12.9 shall have a 'D' scribed into the surface of the concrete on the service connection alignment."

## 3.11 Cleaning and Flushing

3.11.7 *Add*: "All flushing and testing operations to be witnessed by the Consulting Engineer. Uncontaminated flushing water may be discharged to City storm sewers provided that all gravel, sand and other debris is first screened or filtered out. Water containing disinfectant shall be discharged to City sanitary sewers."

## 3.12 Inspection and Testing

*Replace entire section with*:

3.12.1 Video Inspection

1.1 Immediately upon completion of installation, including all backfilling and compaction and prior to paving, and again immediately prior to expiration of the one year maintenance period, an independent contractor specialized in such work must undertake video inspection of the sewer and submit a report and the video tapes to the Consulting Engineer and the Director.

1.2 Prior to video inspection, thoroughly clean sewers by flushing so any defects can be observed.

1.3 Immediately prior to video inspection, cause water to flow through the entire length of all sewers with grades of less than 1%. Do not add water during video inspection.

1.4 Video inspection must be continuous between manholes.

1.5 The picture must include the entire circumference of the pipe, be in colour and of a quality and definition acceptable to the Director.

1.6 The picture must show the depth of ponding in mm, the distance from the upstream manhole in metres and the date.

1.7 An audio commentary must identify test sections, manhole numbers, location, service connections, types of defects and depth and length of ponding.

3.12.2 The report must include:

2.1 the name, address and phone number of the inspection contractor and the names of the technician in charge of the video inspection and responsible for the commentary and report and of

the installation contractor, the Consulting Engineer and the Developer;

2.2 a schematic plan showing sewers, manholes, manhole numbers corresponding to the design and record drawings and road names;

2.3 a table of contents with upstream and downstream manhole numbers and corresponding page numbers;

2.4 a log for each sewer section between manholes showing street name, manhole numbers, length of section, type and diameter of pipe, technician's name, and each service connection, defect and area of ponding with corresponding distance and tape count, description of defect, length and depth of ponding;

2.5 still photos of all defects and ponding."

**3.15 Perforated Drain Pipe**

3.15.1 Replace with: "Where shown on Contract Drawings or where subsurface water is encountered during construction and, in the opinion of the Consulting Engineer or the Director, requires the installation of subsurface perforated drainage systems, the Developer shall comply with such instructions as may be issued by the Director and install such drainage systems at the Developer's cost. Such drainage system shall be connected to the boulevard side of the nearest downstream catchbasin.

## Section 33 42 13 Pipe Culverts

**2.2 Concrete Pipe**

2.2.1 Change figure "900mm" on line two to "375mm".

2.2.2 Change figure "900mm" on line two to "375mm".

**3.10 End walls**

3.10.2 *Add*: "Where approved by the Director or specified on Contract Drawings, concrete sand bags consisting of a jute or burlap bag filled to two-thirds capacity with a mixture of one part Portland cement to two parts sand, thoroughly mixed may be used. Commercially prepared equivalent products may be used subject to approval of the Director."

## Section 33 44 01 Manholes and Catch Basins

### 2.1 Materials

2.1.6 *Add:* “Lifting holes in sanitary manhole lids shall be plugged with bolts.”

2.1.11 *Delete and replace with*: "Catch basin leads to be a minimum 200mm diameter PVC, DR 28."

### 3.4 Cleanout Installation

3.4 *Replace with*: “Cleanouts are not permitted.”

### 3.7 End wall Installation

3.7.1 *Delete*

3.7.2 *Delete*

### 3.9 Adjusting Tops of Existing Units

3.9.2.2 *Replace with*: “When amount of raise is less than 300mm use precast riser rings. Bricks are not to be used.”

3.9.5 *Replace first sentence with*: “Re-set gratings and frames to required elevations on not more than 3 riser rings. Bricks are not to be used.

## Section 33 30 01 Sanitary Sewers

### 2.1 Concrete Pipe

2.1.1 *Delete and replace with*: “Un-reinforced concrete pipe is not permitted.”

### 3.10 Service Connection Installation

3.10.2 *Add to second sentence*: “and mark 'Sanitary'."

3.10.4 *Delete and replace with*: "Service Connections which are adjacent to concrete curbing not stamped in accordance with03 30 20.3.12.9 shall have a 'S' scribed into the surface of the concrete curb on the service connection alignment."

3.11.7 *Add*: “All flushing and testing operations to be witnessed by the Consulting Engineer. Uncontaminated flushing water may be

discharged to City storm sewers provided that all gravel, sand and other debris is first screened or filtered out. Water containing disinfectant shall be discharged to City sanitary sewers."

**3.18 Video Inspection**

Replace with: "Video Inspection as 33 40 01.3.12"

**Section 33 34 01 Sewage Forcemains**

**2.2 Pipe, Joints and Fittings**

2.2.1 *Delete and replace*: "Ductile Iron Pipe is not permitted".

2.2.2 *Delete and replace*: "PVC Pipe is not permitted".

2.2.3 *Delete*

2.2.6 *Delete and replace*: "Pre-stressed concrete pipe is not permitted".

2.2.7 *Delete and replace*: "Steel Pipe is not permitted".

**Section 32 92 20 Seeding**

**3.6 Grass Maintenance**

3.6.1 *Delete* "Certificate of Total Performance" and replace with "Street Tree Final Certificate".

**3.7 Condition of Total Performance**

3.7.1 *Delete and replace preamble only with*: "A Street Tree Final Certificate will not be issued unless the following conditions exist:…."

**3.8 Guarantee/Maintenance**

3.8 *Delete 3.8*

**Section 32 92 19 Hydraulic Seeding**

**3.8 Grass Maintenance**

3.8.1 *Delete* "Certificate of Total Performance" and replace with "Street Tree Final Certificate".

**3.9 Condition of Total Performance**

3.9.1 *Delete and replace preamble only with*: "A Street Tree Final Certificate will not be issued unless the following conditions exist: …"

**3.10 Guarantee/Maintenance**

3.10 *Delete 3.10*

**Section 32 92 23 Sodding**

**3.4 Grass Maintenance**

3.4.1 *Delete* "Certificate of Total Performance" and replace with "Street Tree Final Certificate".

**3.5 Condition of Total Performance**

3.5.1 *Delete and replace preamble only with*: "A Street Tree Final Certificate will not be issued unless the following conditions exist:…"

**3.6 Guarantee/Maintenance**

3.6 *Delete 3.6*.

**Section 32 93 01 Planting of Trees, Shrubs and Ground Covers**

Throughout Section 32 93 01: Replace "Contract Administrator" with "Landscape Architect" except in 2.1.1, 3.2.3, 3.3.3, 3.9.1.5 and 3.10.6 replace with "Director"

**1.4 Scheduling**

1.4.1 *Add at beginning*: "Planting must not commence until the Director issues written permission to proceed. Schedule planting between October 1 and May 31 unless otherwise approved by the Director."

**2.1 Plant Materials**

2.1.2.1 *Delete and replace with*: "All plant material to be nursery grown stock and meet BCSLA/BCNTA standards. All plants to be ball and burlap, machine dug into wire basket or container grown stock. Bare root trees are not acceptable. Trees shall be 4 to 5 cm caliper and not less than 3 m in overall height.

**2.13 *Add*: "2.13 Root Barrier"**

*Add*: "Root barriers to be DEEP ROOT products or similar."

### 3.3 Planting

3.3.4.1 *Add*: "All trees planted in boulevard shall have root barrier placed around root ball."

### 3.9 Maintenance

3.9.1 *Replace* "Certificate of Total Performance' with "Street Tree Installation Certificate."

### 3.10 Conditions for Total Performance

3.10.1 *Delete and replace preamble only with*: "A Street Tree Final Certificate will not be issued unless the following conditions exist:…"

### 3.11 Guarantee/Maintenance

3.11 *Delete 3.11*

## Section 25 56 01 Electrical

### 3.3 Concrete Bases

3.3.5 *Add*: "Service pole bases and street lighting pole bases shall be pre-cast with minimum compressive strength of 30 Mpa."

### 3.6 Poles and Related Equipment

3.6.2 *Add second sentence*: "Where existing overhead utilities or obstructions must be temporarily or permanently removed, raised or lowered to avoid conflict with street light poles, the Developer shall make the necessary arrangements with the utility or authority concerned. The expense of such removal, raiding or lowering, shall be borne by the Developer."

## 2.3 Supplementary Detail Drawings

The following City of Pitt Meadows Supplementary Detail Drawings supersedes or augments the Master Municipal Specifications and Standard Detail Drawings.

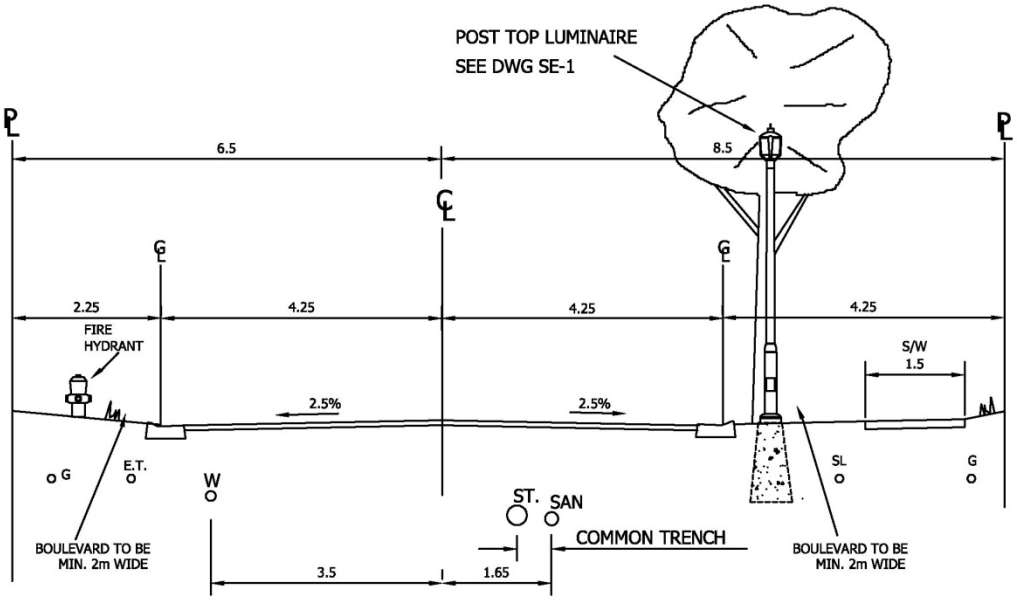
101A Road & Utility Locations for 8.5 m Road on 15 m Right-of-Way
101B Road & Utility Locations for 8.5 m Road on 12 m Right-of-Way
101C Road & Utility Locations for 11.0 m Road on a 20 m Right of Way
101D Road & Utility Locations for 14.0 m Road on a 22 m Right of Way
101E Road & Utility Locations for 20 m Road on a 30 m Right of Way
101F Road & Utility Locations for Rural Roads
101G Typical Lane Cross Section

SS-1 Side Inlet Catchbasin
SS-2 Rural Driveway Culvert
SS-3 Infiltration Trench **(Bylaw No. 2672, 2015)**
SS-4 Absorbent Topsoil **(Bylaw No. 2672, 2015)**
SS-5 Pervious Paving **(Bylaw No. 2672, 2015)**
SS-6 Rain Garden **(Bylaw No. 2672, 2015)**
SS-7 Dry Well **(Bylaw No. 2672, 2015)**
SS-8 Rainwater Cistem **(Bylaw No. 2672, 2015)**
SS-9 Standard Detail for Driveway Services **(Bylaw No. 2672, 2015)**

SR-1 Corner Lot Driveway Locations
SR-2 Typical Harris Road Intersection Letdown Design
SE-1 Decorative Post Top Street Light
SW- 4 Temporary Thrust Block Detail & Blow-off Assembly
SL-1 Typical Tree Planting Detail

RAR-1 Waterways Impacted by Riparian Area Regulations

## 101A Road & Utility Locations for 8.5 m Road on 15 m Right-of-Way




8.5m ROAD - 15m ROW

## NOTES:

1. ALL DIMENSIONS ARE IN METERS
2. SPECIAL CONSIDERATIONS SHALL BE MADE BY THE CONSULTING ENGINEER TO FIT ALL UTILITIES WITHIN THE BOULEVARD AREA AT THE BULB END OF CUL-DE-SACS.
3. THE STRUCTURAL ROAD ELEMENTS SHOWN SHOULD BE AS PER SCHEDULE C SECTION 4.5.4 AND ARE THE MINIMUM REQUIREMENTS. BENKLEMAN BEAM TEST RESULTS OR AND EQUIVALENT TECHNIQUE SHALL BE USED TO DESIGN THE ROAD STRUCTURE.
4. STREET TREES ARE TO BE PLACED IN THE BOULEVARD STRIPS. TYPE OF TREE AND SPACING TO CONFORM TO SECTION 9 OF SUBDIVISION & DEVELOPMENT SERVICING (TYP)
5. NUMBER OF SIDEWALKS DEPENDS ON PREDOMINANT LAND USE - SEE SCHEDULE C, SECTION 4.3.2, TABLE 1.

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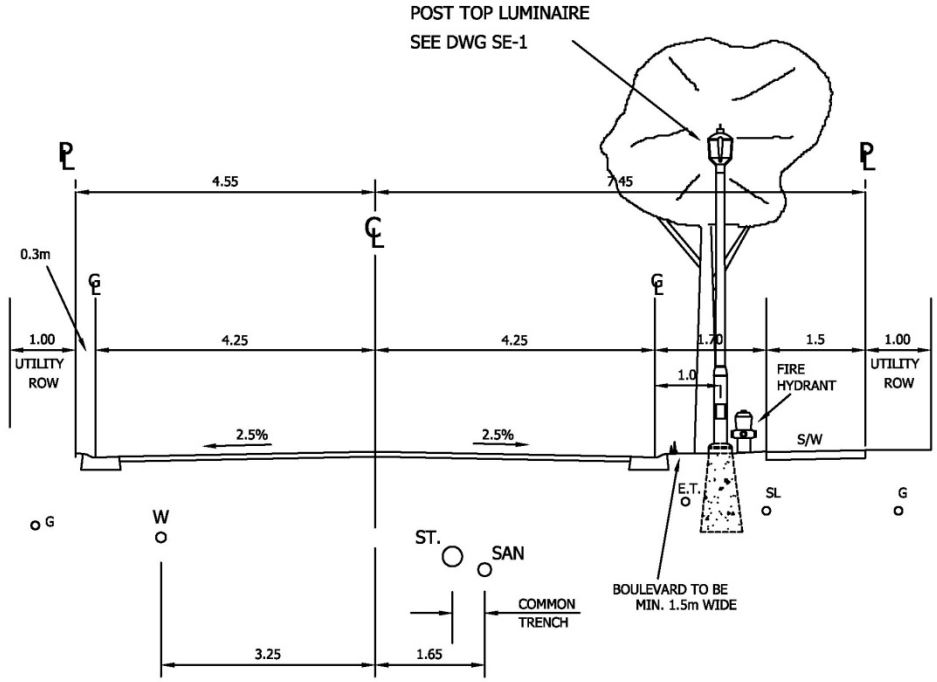
*Engineering Department*

| | |
|---|---|
| DESIGNED – ydb | ROAD & UTILITY LOCATIONS FOR 8.5M ROAD 15M ROW |
| DRAWN – ydb | |
| SCALE H- NTS V- | |
| APPROVED – | |
| DATE – APRIL 2011 | |

DRAWING No. 101A
101A.DWG
SHEET 1 of 1

## 101B Road & Utility Locations for 8.5 m Road on 12 m Right-of-Way




8.5m ROAD - 12m ROW

## NOTES:

1. 12m ROW WIDTH ONLY FOR DESIGNATED COMPACT HOUSING DEVELOPMENTS WITH 25 UNITS/HA OR MORE.
2. ALL DIMENSIONS ARE IN METRES
3. SPECIAL CONSIDERATIONS SHALL BE MADE BY THE CONSULTING ENGINEER TO FIT ALL UTILITIES WITHIN THE BOULEVARD AREA AT THE BULB END OF CUL-DE-SACS.
4. THE STRUCTURAL ROAD ELEMENTS SHOWN SHOULD BE AS PER SCHEDULE C SECTION 4.5.4 AND ARE THE MINIMUM REQUIREMENTS. BENKLEMAN BEAM TEST RESULTS OR AND EQUIVALENT TECHNIQUE SHALL BE USED TO DESIGN THE ROAD STRUCTURE.
5. STREET TREES ARE TO BE PLACED IN THE BOULEVARD STRIPS. TYPE OF TREE AND SPACING TO CONFORM TO SECTION 9 OF THE SUBDIVISION BYLAW

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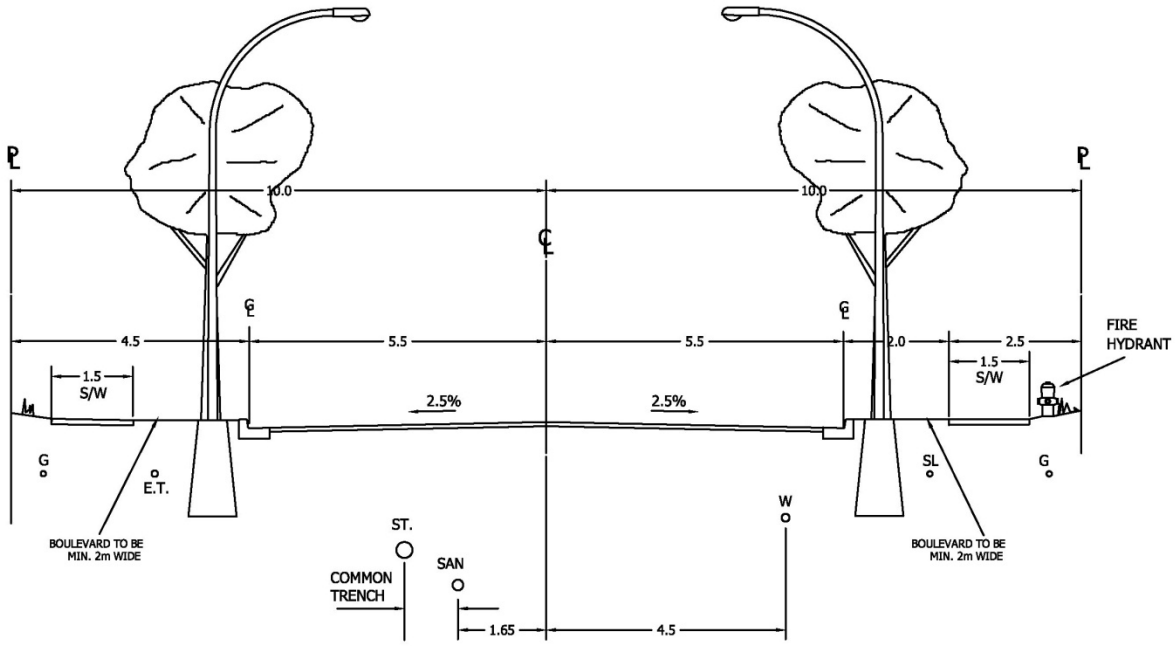
*Engineering Department*

| | |
|---|---|
| DESIGNED – ydb | ROAD & UTILITY LOCATIONS FOR 8.5M ROAD 12M ROW |
| DRAWN – ydb ✓ | |
| SCALE H- NTS V- | |
| APPROVED – | |
| DATE – APRIL 2011 | |

DRAWING No. 101B
101B.DWG
SHEET 1 of 1

## 101C Road & Utility Locations for 11.0 m Road on a 20 m Right of Way




11m ROAD - 20m ROW

## NOTES:

1. ALL DIMENSIONS ARE IN METRES
2. THE STRUCTURAL ROAD ELEMENTS SHOWN SHOULD BE AS PER SCHEDULE C SECTION 4.5.4 AND ARE THE MINIMUM REQUIREMENTS. BENKLEMAN BEAM TEST RESULTS OR AN EQUIVALENT TECHNIQUE SHALL BE USED TO DESIGN THE ROAD STRUCTURE.
3. STREET TREES ARE TO BE PLACED IN THE BOULEVARD STRIPS. TYPE OF TREE AND SPACING TO CONFORM TO SECTION 9 OF THE SUBDIVISION BYLAW
4. NUMBER OF SIDEWALKS DEPENDS ON PREDOMINANT LAND USE - SEE SCHEDULE C, SECTION 4.3.2, TABLE 1.
5. SIDEWALK WIDTHS - SEE SCHEDULE C, SECTION 4.3.2, TABLE 1

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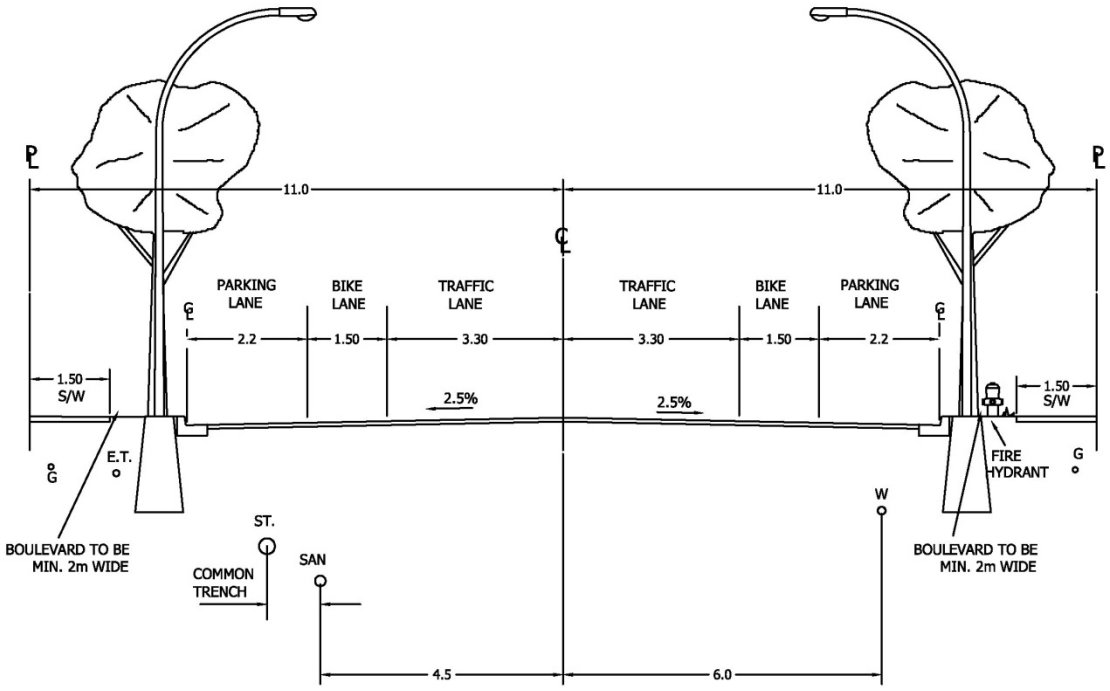
| | | |
|---|---|---|
| DESIGNED – ydb | ROAD & UTILITY LOCATIONS FOR 11M ROAD 20M ROW | DRAWING No. 101C |
| DRAWN – ydb ✓ | | |
| SCALE H- NTS V- | | 101C.DWG |
| APPROVED – | | SHEET 1 of 1 |
| DATE – APRIL 2011 | | |

## 101D Road & Utility Locations for 14.0 m Road on a 22 m Right of Way




14m ROAD - 22m ROW

## NOTES:

1. ALL DIMENSIONS ARE IN METRES

2. DIMENSIONS OF BIKE LANES ARE DERIVED FROM THE DISTRICT OF MAPLE RIDGE AND CITY OF PITT MEADOWS BIKEWAYS PLAN AS PREPARED BY URBAN SYSTEMS (DEC 1994)

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*Engineering Department*

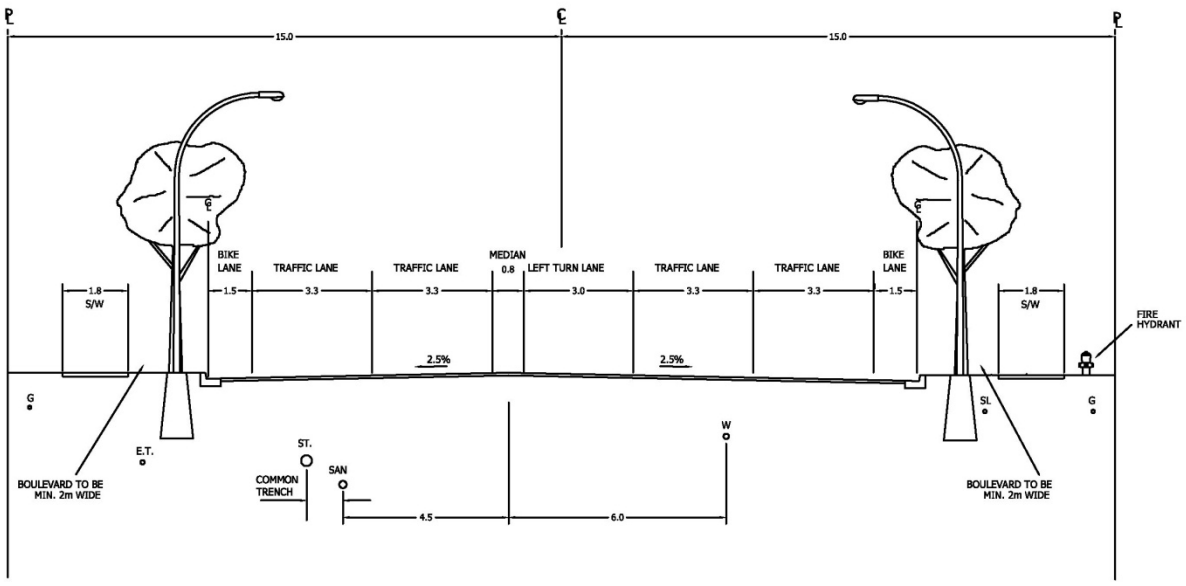
| | |
|---|---|
| DESIGNED – ydb | ROAD & UTILITY LOCATIONS FOR 14M ROAD 22M ROW |
| DRAWN – ydb ✓ | |
| SCALE H- NTS V- | |
| APPROVED – | |
| DATE – APRIL 2011 | |

DRAWING No. 101D

101D.DWG

SHEET 1 of 1

## 101E Road & Utility Locations for 20 m Road on a 30 m Right of Way




20.0m ROAD - 30m ROW

## NOTES:

1. ALL DIMENSIONS ARE IN METRES
2. SPECIAL CONSIDERATIONS SHALL BE MADE BY THE CONSULTING ENGINEER TO FIT ALL UTILITIES WITHIN THE BOULEVARD AREA AT THE BULB END OF CUL-DE-SACS.
3. THE STRUCTURAL ROAD ELEMENTS SHOWN SHOULD BE AS PER SCHEDULE C SECTION 4.5.4 AND ARE THE MINIMUM REQUIREMENTS. BENKLEMAN BEAM TEST RESULTS OR AN EQUIVALENT TECHNIQUE SHALL BE USED TO DESIGN THE ROAD STRUCTURE.
4. STREET TREES ARE TO BE PLACED IN THE BOULEVARD STRIPS. TYPE OF TREE AND SPACING TO CONFORM TO SECTION 9 OF THE SUBDIVISION BYLAW
5. NUMBER OF SIDEWALKS DEPENDS ON PREDOMINANT LAND USE - SEE SCHEDULE C, SECTION 4.3.2, TABLE 1.
6. SIDEWALK WIDTHS - SEE SCHEDULE C, SECTION 4.3.2
7. LOCATION OF MANHOLES TO BE OUSIDE OF WHEEL PATHS

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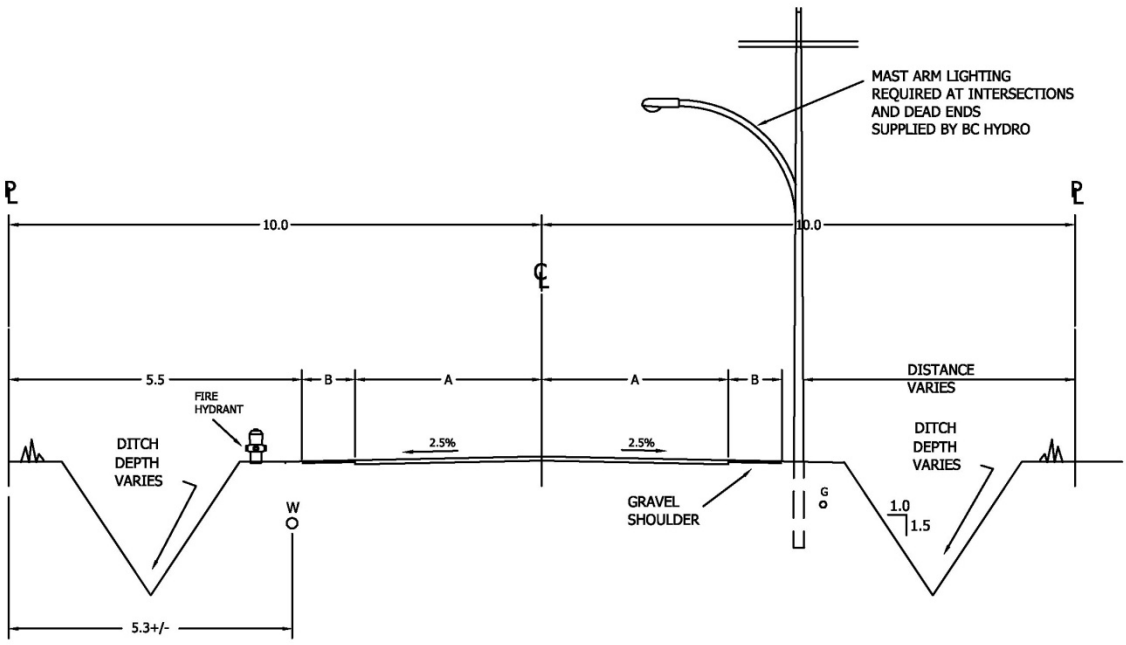
Engineering Department

| | | |
|---|---|---|
| DESIGNED – ydb | ROAD & UTILITY LOCATIONS FOR 20.0M ROAD 30M ROW | DRAWING No. 101E |
| DRAWN – ydb ✓ | | 101E.DWG |
| SCALE H- NTS V- | | SHEET 1 of 1 |
| APPROVED – | | |
| DATE – APRIL 2011 | | |

## 101F Road & Utility Locations for Rural Roads




| RURAL | PAVEMENT WIDTH (A) | BIKE PATH WIDTH (B) |
|---|---|---|
| LOCAL | 3.5 | - |
| COLLECTOR | 3.5 | - |
| ARTERIAL | 3.3 | 1.5 |

## NOTES:

1. ALL DIMENSIONS ARE IN METRES
2. SPECIAL CONSIDERATIONS SHALL BE MADE BY THE CONSULTING ENGINEER TO FIT ALL UTILITIES WITHIN THE BOULEVARD AREA AT THE BULB END OF CUL-DE-SACS.
3. THE STRUCTURAL ROAD ELEMENTS SHOWN SHOULD BE AS PER SCHEDULE C SECTION 4.5.4 AND ARE THE MINIMUM REQUIREMENTS. BENKLEMAN BEAM TEST RESULTS OR AN EQUIVALENT TECHNIQUE SHALL BE USED TO DESIGN THE ROAD STRUCTURE.
4. SHOULDER TO BE MAXIMUM 1.0M ON BOTH SIDES (WHERE POSSIBLE) AND PAVED ON BICYCLE ROUTES DESIGNATED ON SCHEDULE B.

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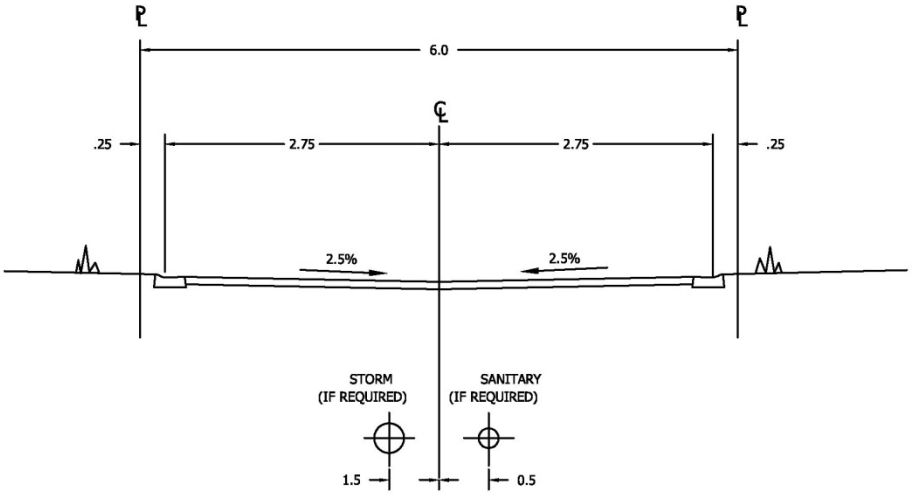
| | |
|---|---|
| DESIGNED – ydb | |
| DRAWN – ydb ✓ | |
| SCALE H- NTS V- | |
| APPROVED – | |
| DATE – APRIL 2011 | |

ROAD & UTILITY LOCATIONS FOR RURAL ROADS

DRAWING No. 101F
101F.DWG
SHEET 1 of 1

## 101G Typical Lane Cross Section




5.5m LANE WIDTH - 6.0m ROW

## NOTES:

1. ALL DIMENSIONS ARE IN METRES
2. THE STRUCTURAL ROAD ELEMENTS SHOWN SHOULD BE AS PER SCHEDULE C SECTION 4.5.4 AND ARE THE MINIMUM REQUIREMENTS. BENKLEMAN BEAM TEST RESULTS OR AN EQUIVALENT TECHNIQUE SHALL BE USED TO DESIGN THE ROAD STRUCTURE.

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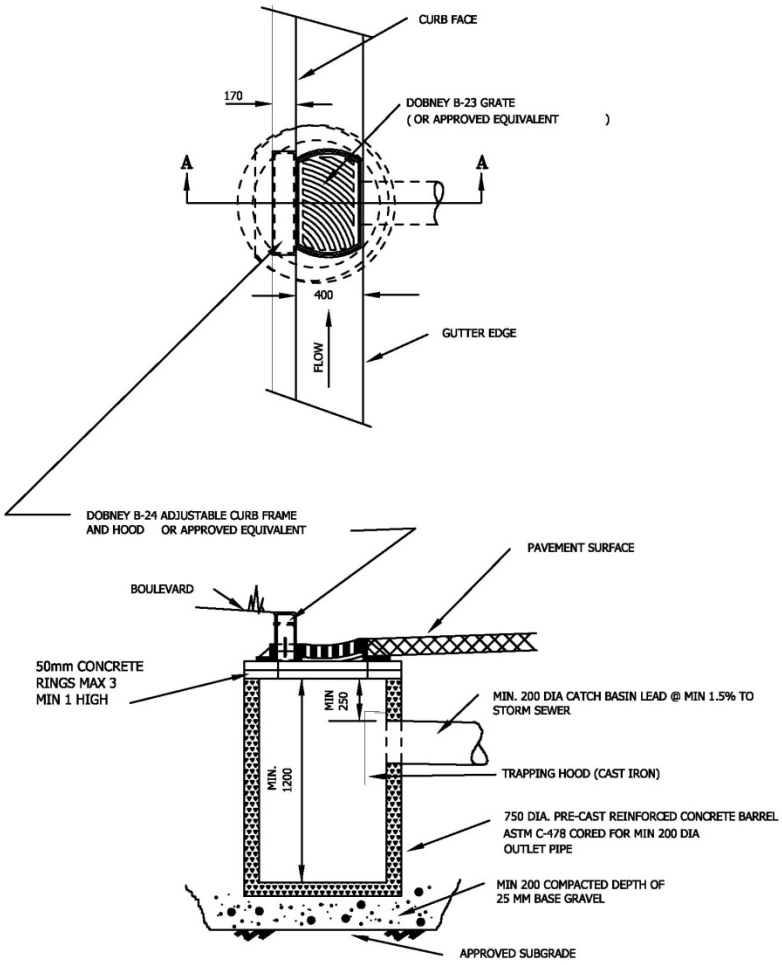
| | |
|---|---|
| DESIGNED – ydb | TYPICAL LANE CROSS SECTION |
| DRAWN – ydb ✓ | DRAWING No. 101G |
| SCALE H- NTS V- | 101G.DWG |
| APPROVED – | |
| DATE – APRIL 2011 | SHEET 1 of 1 |

## SS-1 Side Inlet Catchbasin




SECTION A-A

NOTES:

1. CATCH BASIN GRATE SHALL SLOPE TOWARDS CURB FACE
2. CATCH BASIN FRAME TO BE INSTALLED 13mm BELOW GUTTER GRADE WITH APRON SLOPED TO MEET TOP OF FRAME AND TROWELLED SMOOTH
3. CATCH BASIN LEADS INSTALLED AT GREATER THAN 1.5% MAY USE SMALLER DIAMETER PIPE IF APPROVED BY THE DIRECTOR
4. TRAPPING HOOD TO BE CAST IRON

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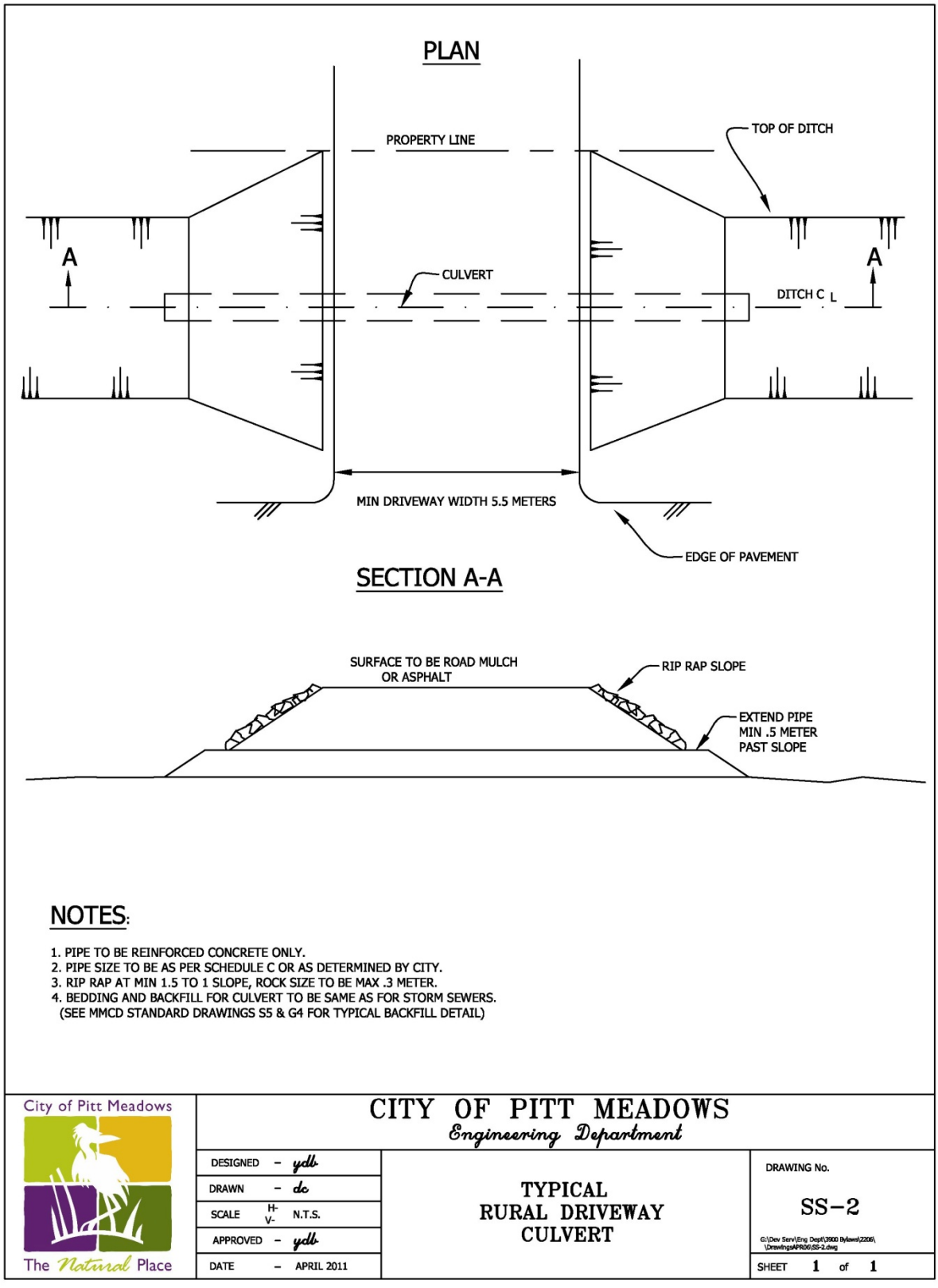
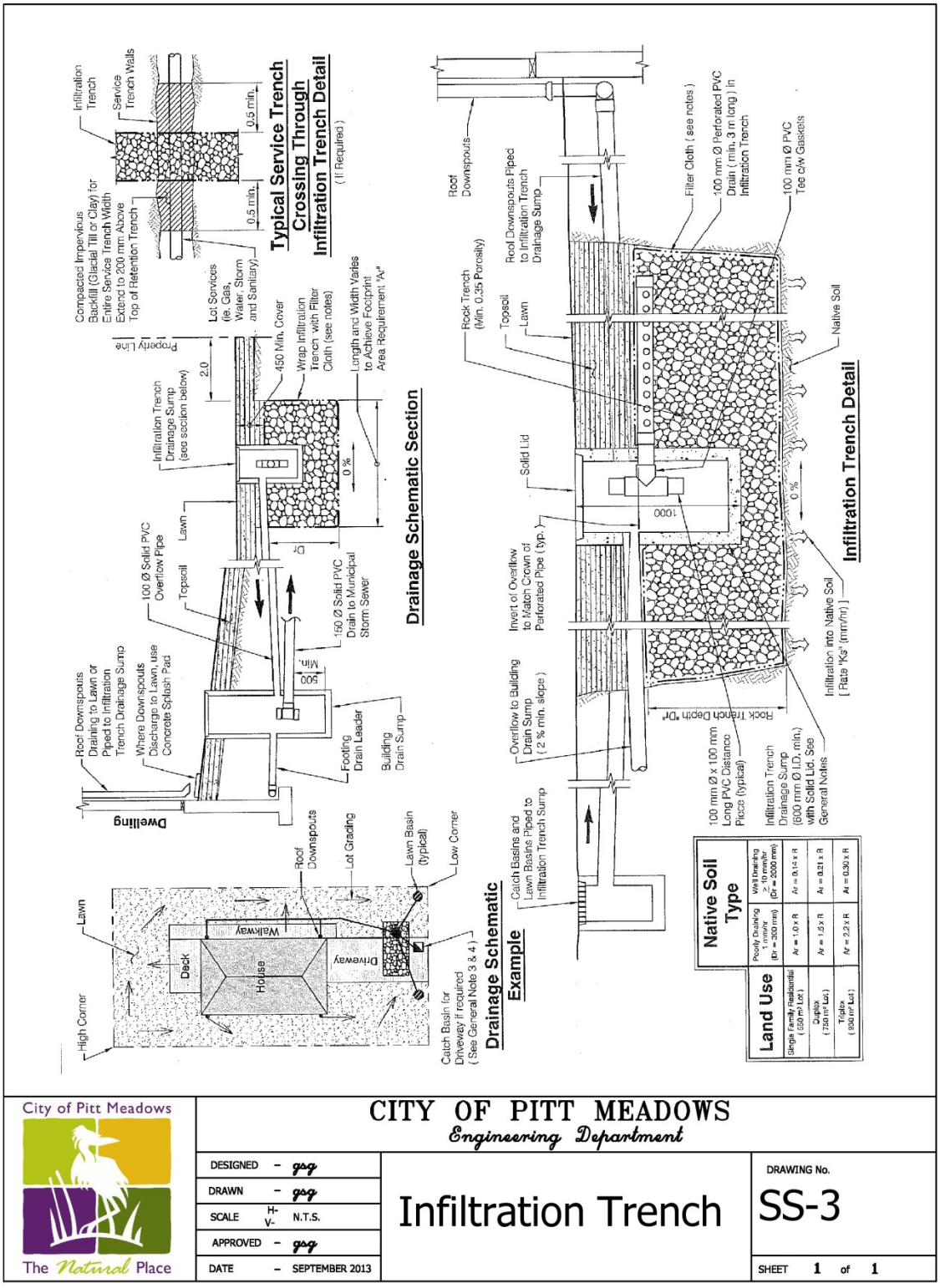
*Engineering Department*

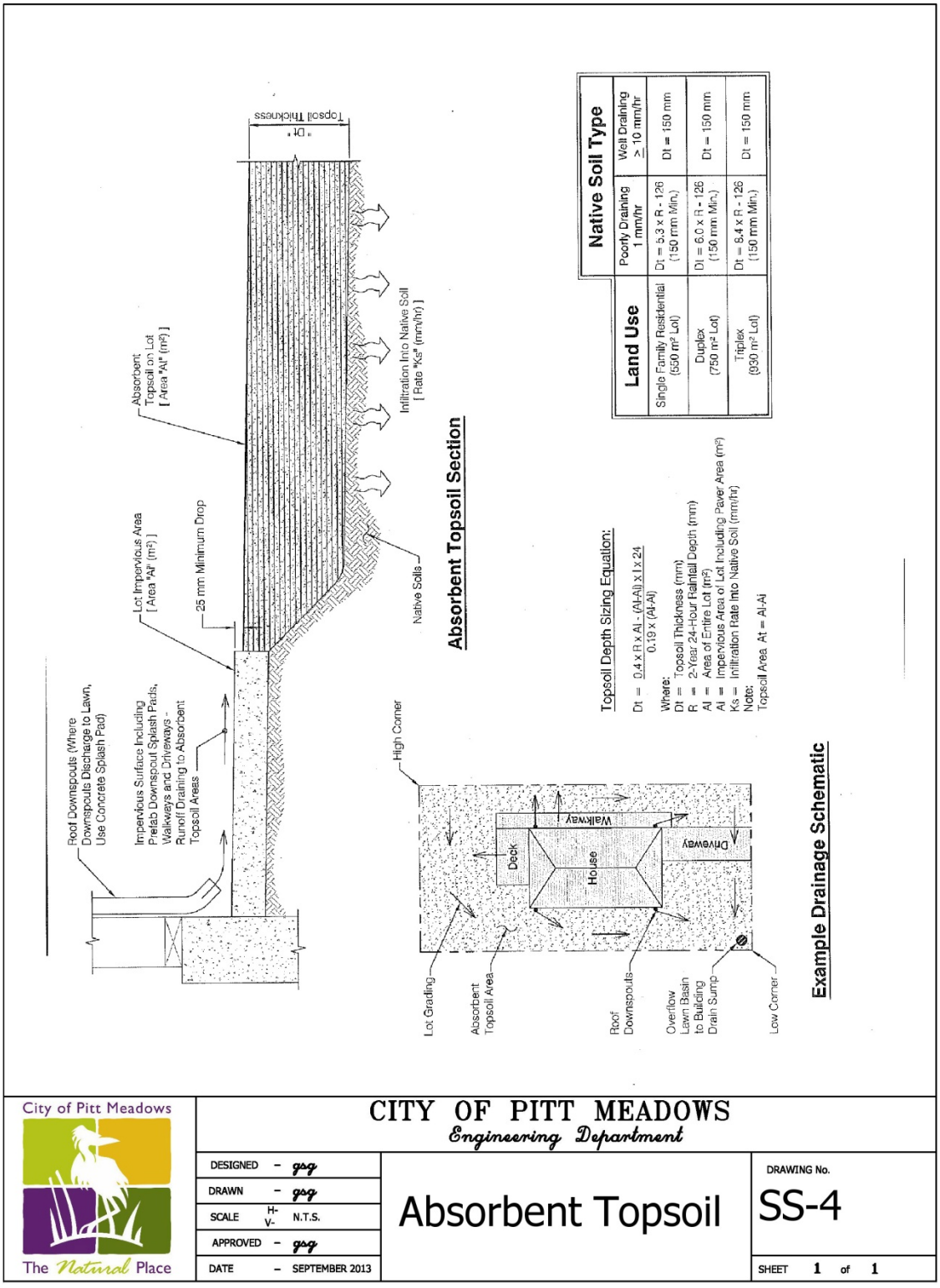
| | | |
|---|---|---|
| DESIGNED – ydb | SIDE INLET CATCH BASIN | DRAWING No. SS-1 |
| DRAWN – ydb ✓ | | |
| SCALE H- NTS V- | | |
| APPROVED – | | |
| DATE – OCTOBER 2011 | | SHEET 1 of 1 |

## SS-2 Rural Driveway Culvert

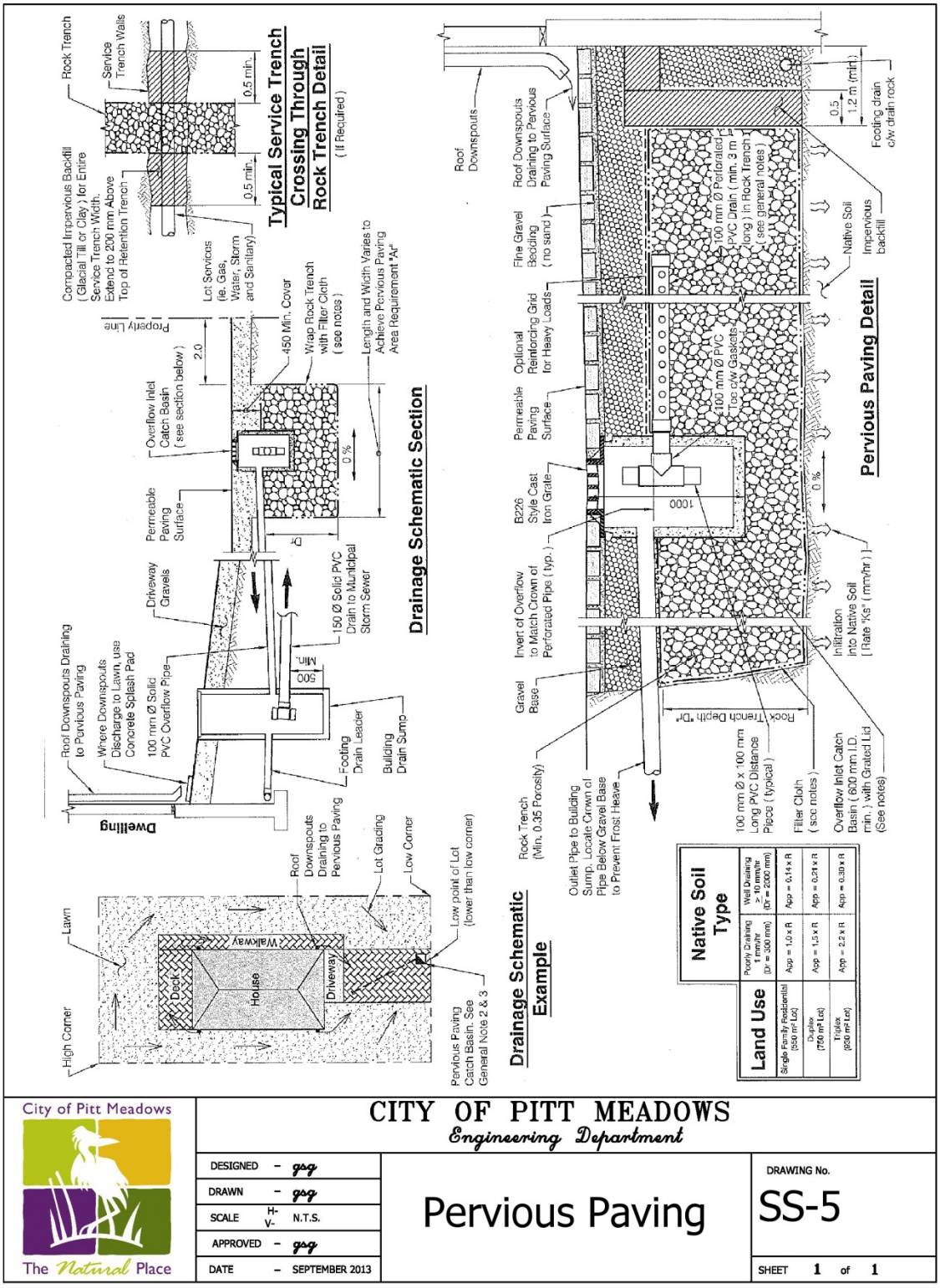




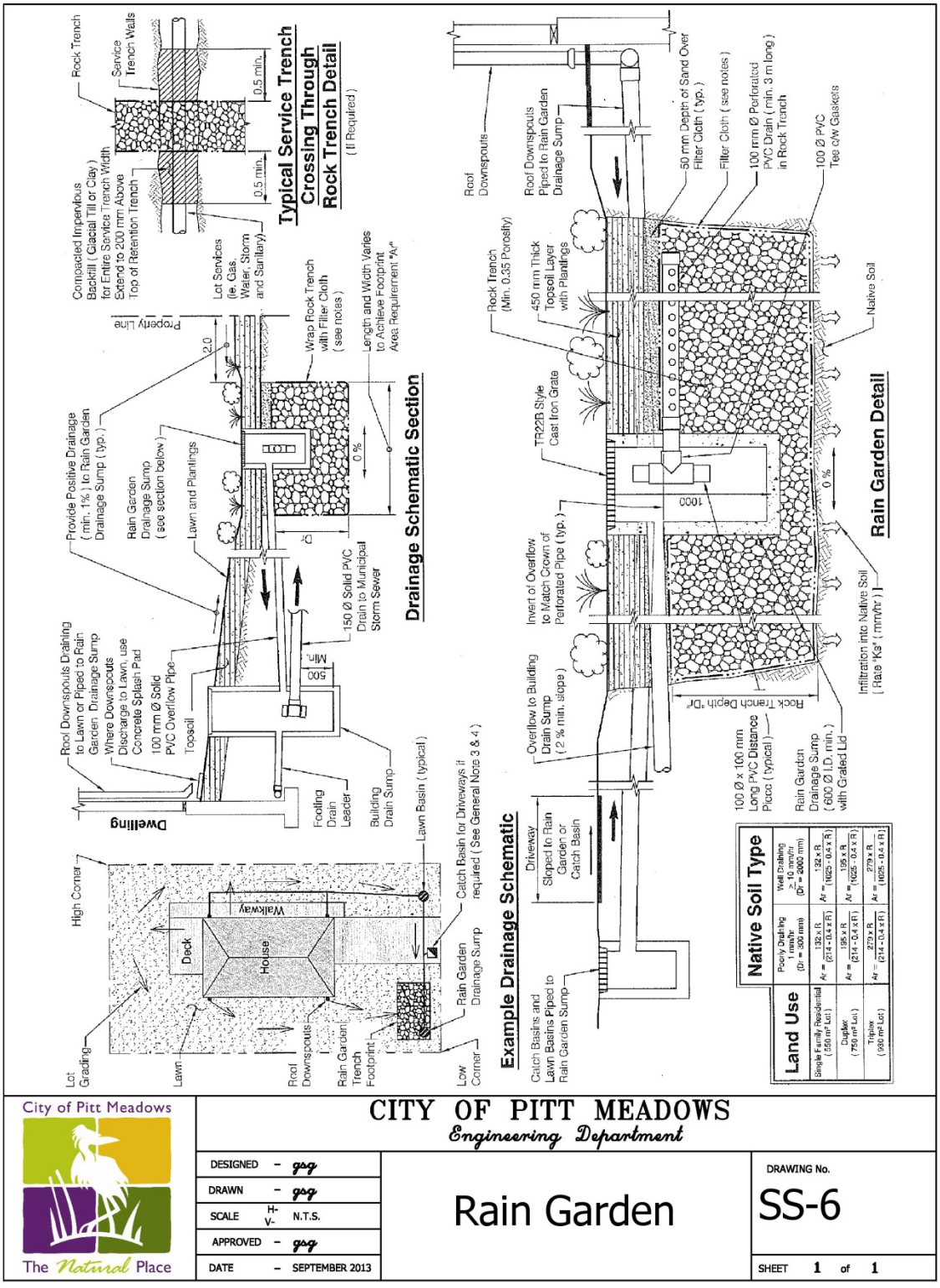

**(Bylaw No. 2672, 2015)**



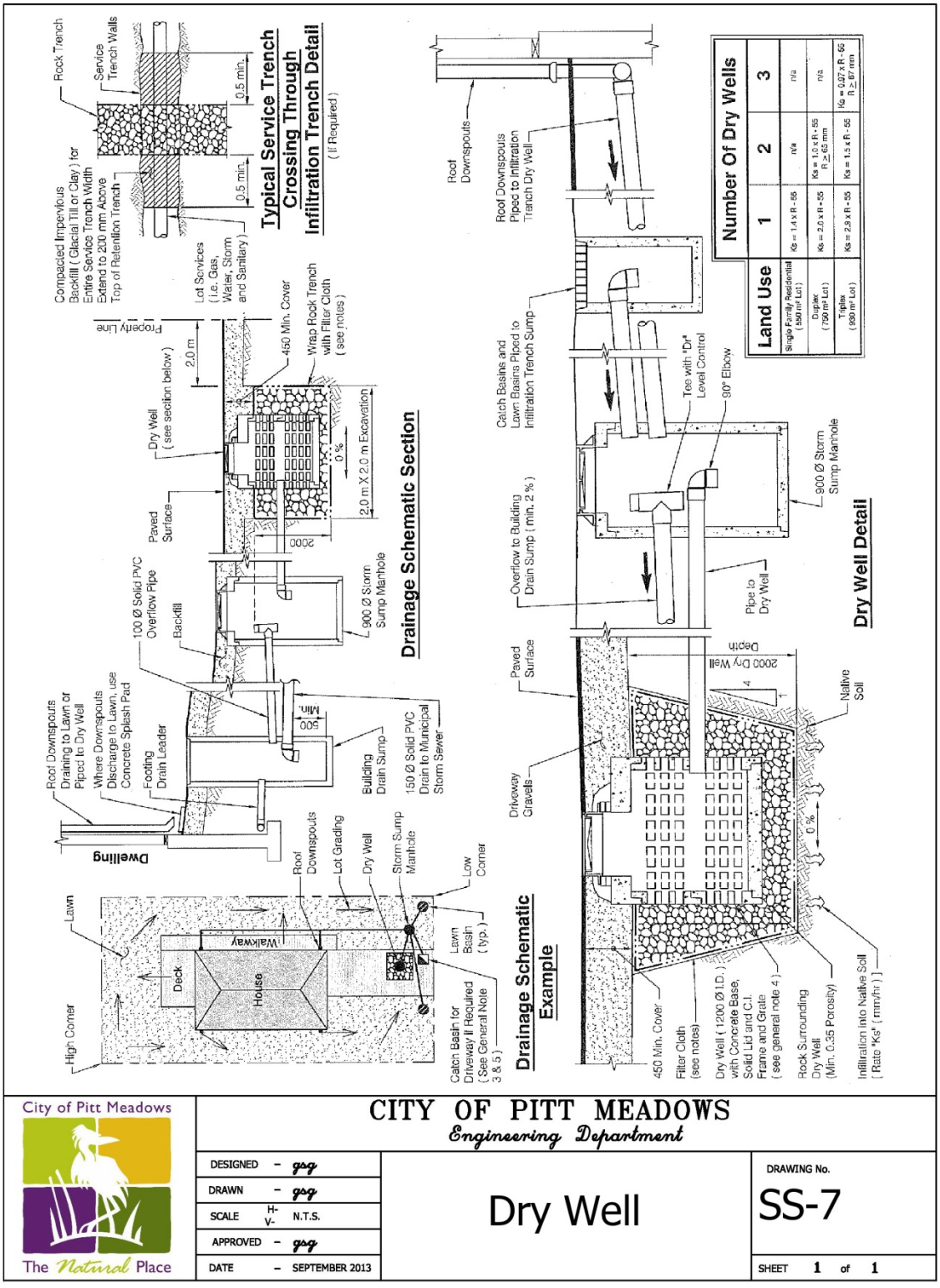

**(Bylaw No. 2672, 2015)**



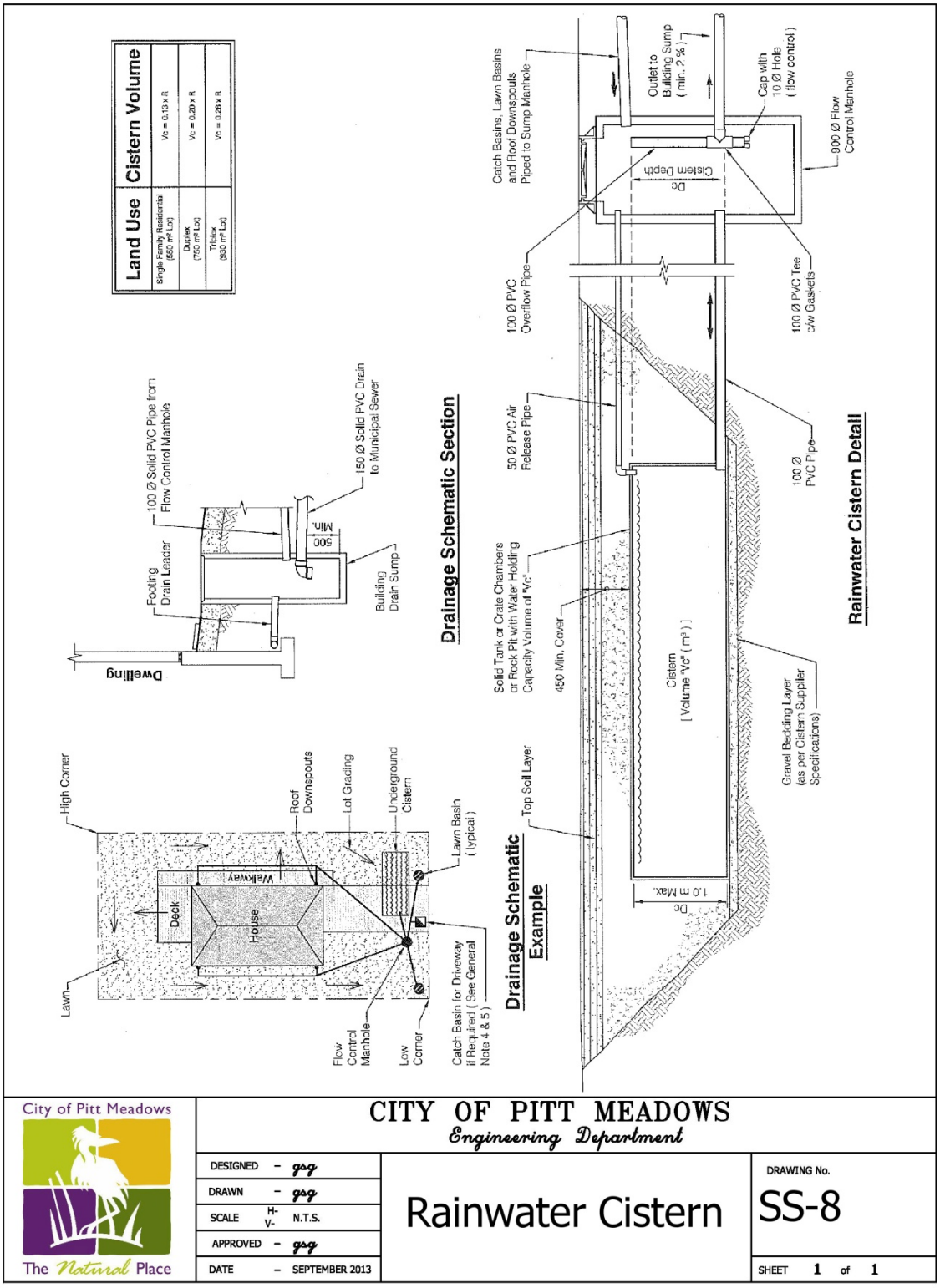

**(Bylaw No. 2672, 2015)**



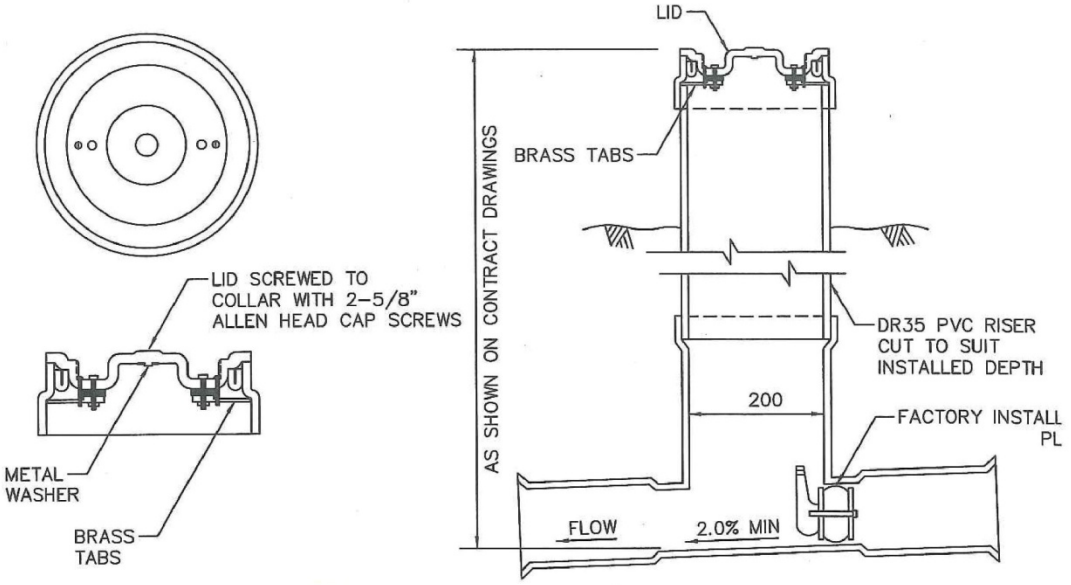

**(Bylaw No. 2672, 2015)**

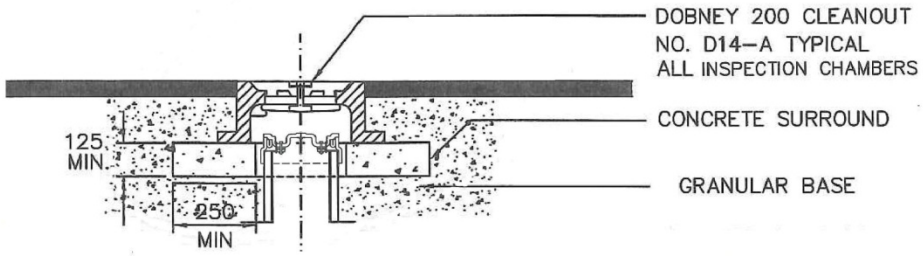



**(Bylaw No. 2672, 2015)**




**(Bylaw No. 2672, 2015)**




INSTALLATION IN DRIVEWAY AND ROAD

NOTE: 1. REFER TO DRAWING S7 FOR INSTALLATION REQUIREMENTS.

2. INSPECTION CHAMBER TO BE APPROVED MANUFACTURED FITTING.

3. REFER TO CONTRACT DRAWINGS FOR SITE SPECIFIC DIMENSIONS. REFER TO SECTION 33 30 01 FOR DETAILED SPECIFICATIONS.

NOT TO SCALE

City of Pitt Meadows
The Natural Place

**CITY OF PITT MEADOWS**
*Engineering Department*

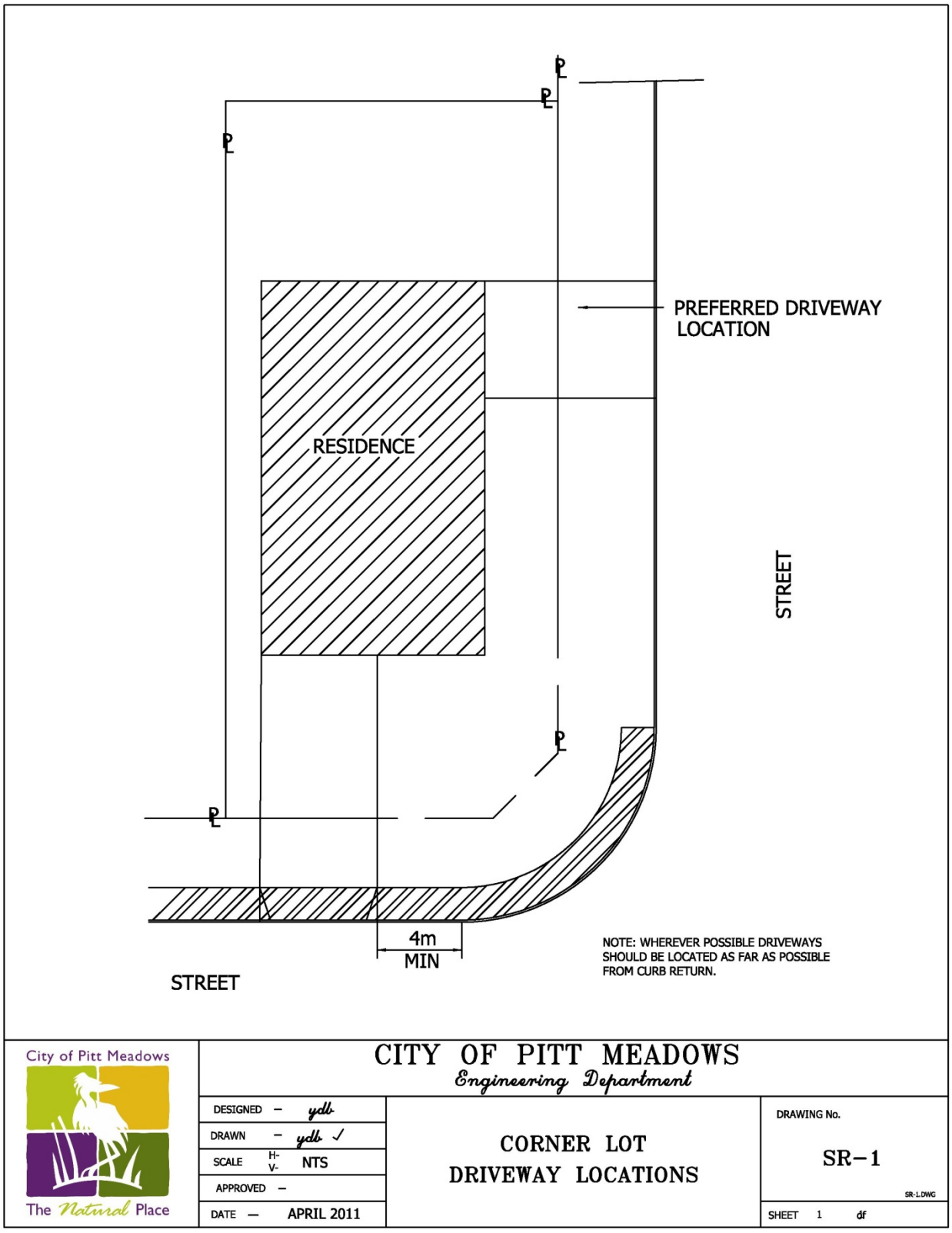
| | |
|---|---|
| DESIGNED – gsg | |
| DRAWN – gsg | |
| SCALE H- N.T.S. V- | **STANDARD DETAIL FOR DRIVEWAY SERVICES** |
| APPROVED – gsg | |
| DATE – SEPTEMBER 2013 | |

DRAWING No. **SS-9**

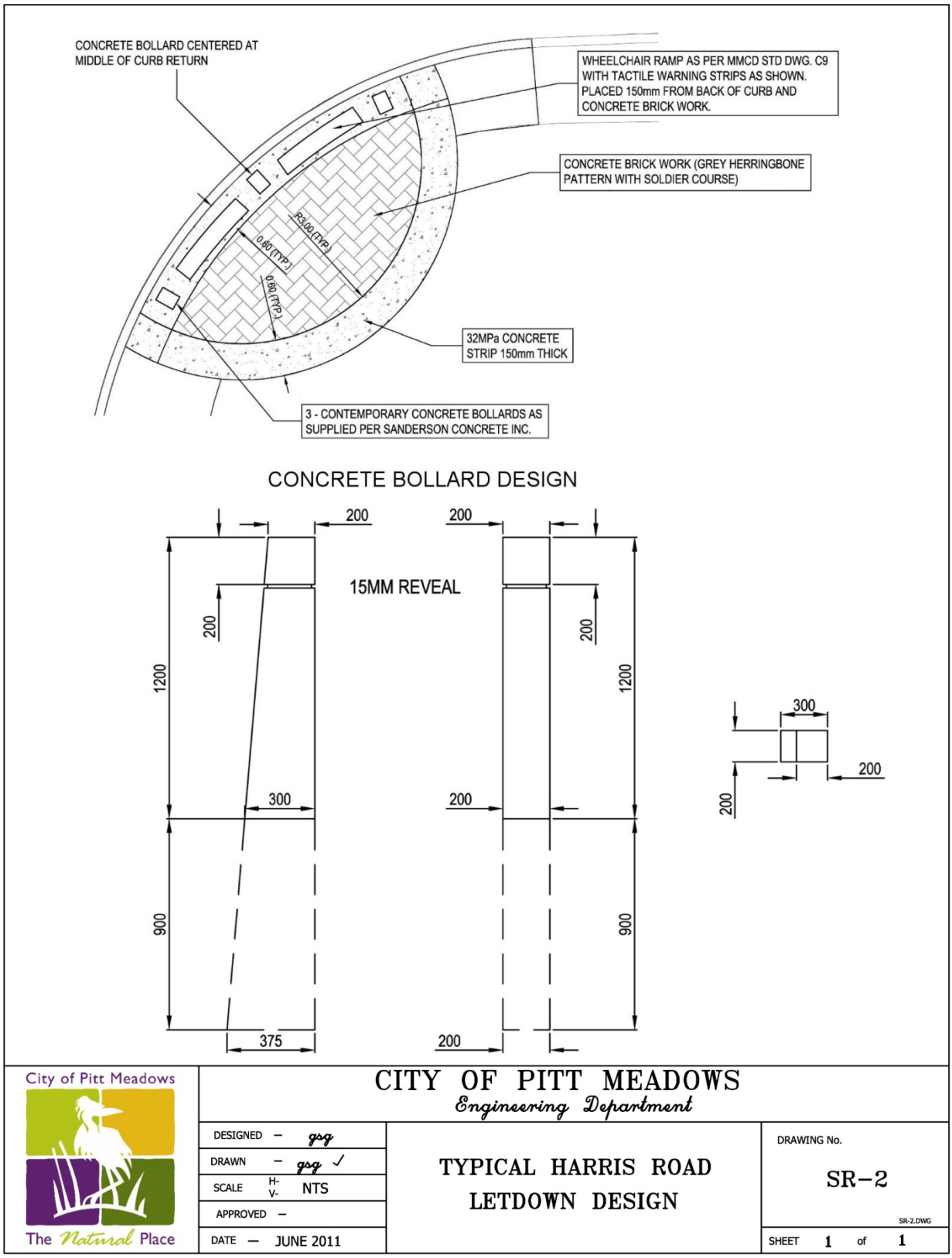
SHEET 1 of 1

**(Bylaw No. 2672, 2015)**

## SR-1 Corner Lot Driveway Locations



## SR-2 Typical Harris Road Intersection Letdown Design

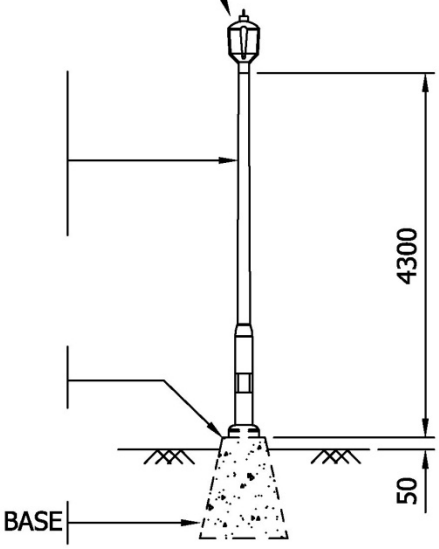


## SE-1 Decorative Post Top Street Light

LUMCA MODEL PR310 POST TOP
LUMINAIRE OR APPROVED EQUAL.
100W/175W METAL HALIDE
OR HPS LAMP C/W IES TYPE 3
SYMMETRICAL DISTRIBUTION.
MOGUL BASE AND LUMINAIRE SHALL
BE SUPPLIED BLACK.

POST-TOP POLE AND
DECORATIVE BASE TO
BE OF STEEL CONSTRUCTION.
COLOUR SHALL MATCH
LUMINAIRE.

REFER TO POLE MANUFACTURER
ANCHORING DETAILS.




TYPICAL POST TOP STREETLIGHT

N.T.S.

NOTES:

- FOR LUMINAIRE AND POLE SPECIFICATION SEE SECTION CE 1.2
- FOR POLE BASE DETAILS SEE MMCD DRAWING 255601

City of Pitt Meadows
The Natural Place

CITY OF PITT MEADOWS
*Engineering Department*

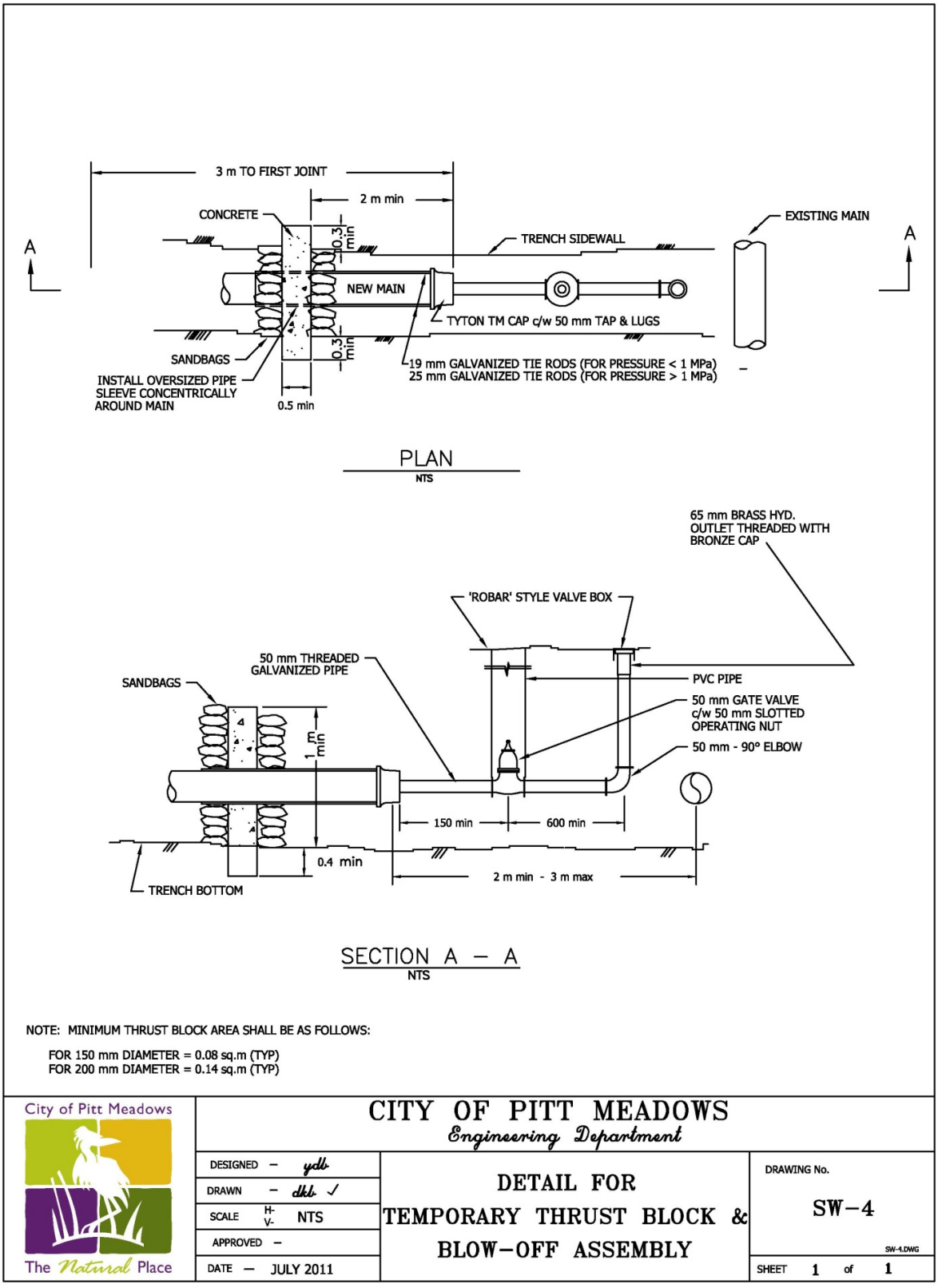
| | |
|---|---|
| DESIGNED – ydb | DECORATIVE POST TOP STREET LIGHT |
| DRAWN – ydb ✓ | |
| SCALE H- V- NTS | |
| APPROVED – | |
| DATE – APRIL 2011 | |

DRAWING No. SE–1

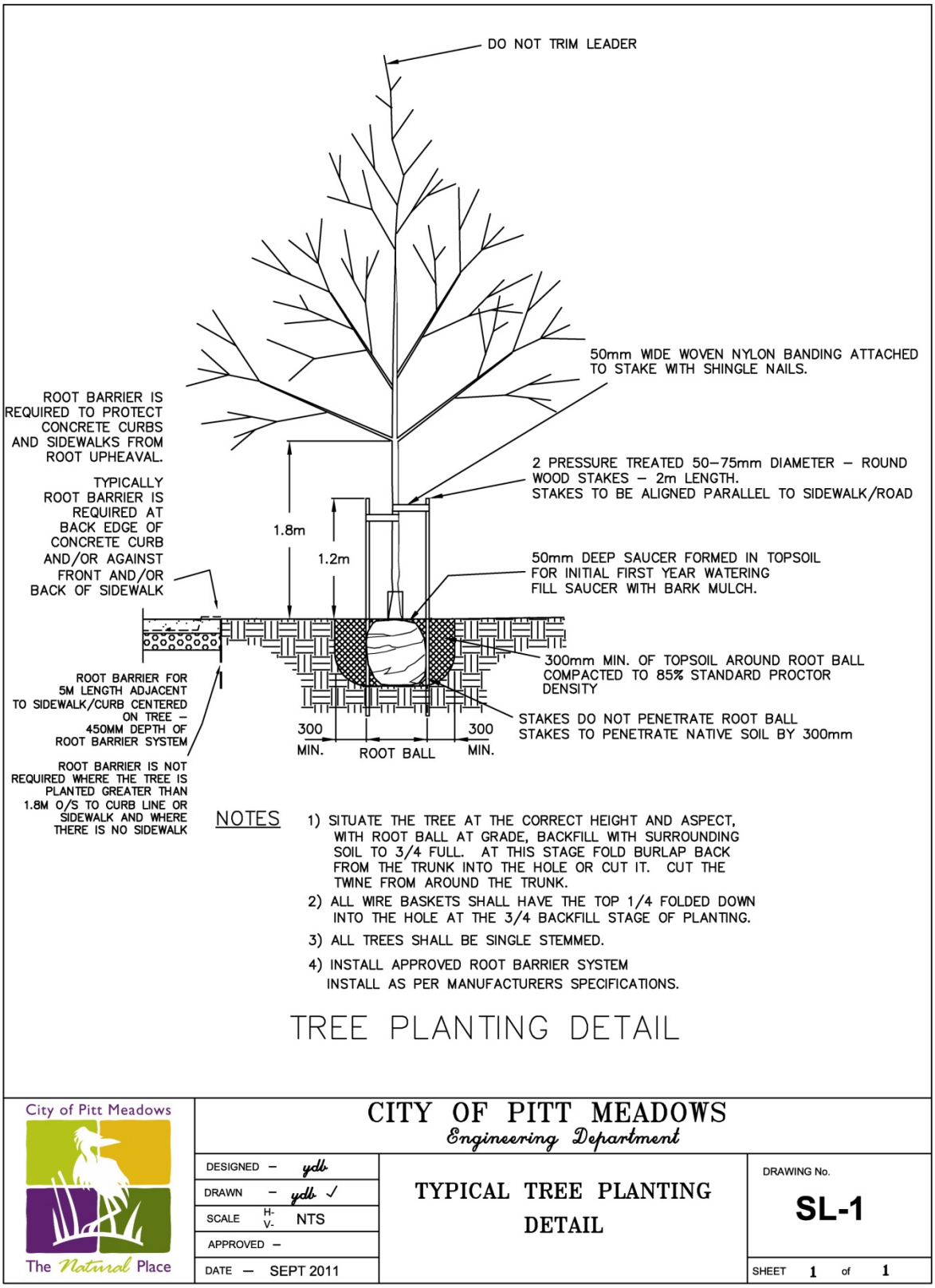
SE-1.DWG

SHEET 1 of 1

## SW-4 Temporary Thrust Block Detail & Blow-off Assembly



## SL-1 Typical Tree Planting Detail




NOTES

1) SITUATE THE TREE AT THE CORRECT HEIGHT AND ASPECT, WITH ROOT BALL AT GRADE, BACKFILL WITH SURROUNDING SOIL TO 3/4 FULL. AT THIS STAGE FOLD BURLAP BACK FROM THE TRUNK INTO THE HOLE OR CUT IT. CUT THE TWINE FROM AROUND THE TRUNK.
2) ALL WIRE BASKETS SHALL HAVE THE TOP 1/4 FOLDED DOWN INTO THE HOLE AT THE 3/4 BACKFILL STAGE OF PLANTING.
3) ALL TREES SHALL BE SINGLE STEMMED.
4) INSTALL APPROVED ROOT BARRIER SYSTEM INSTALL AS PER MANUFACTURERS SPECIFICATIONS.

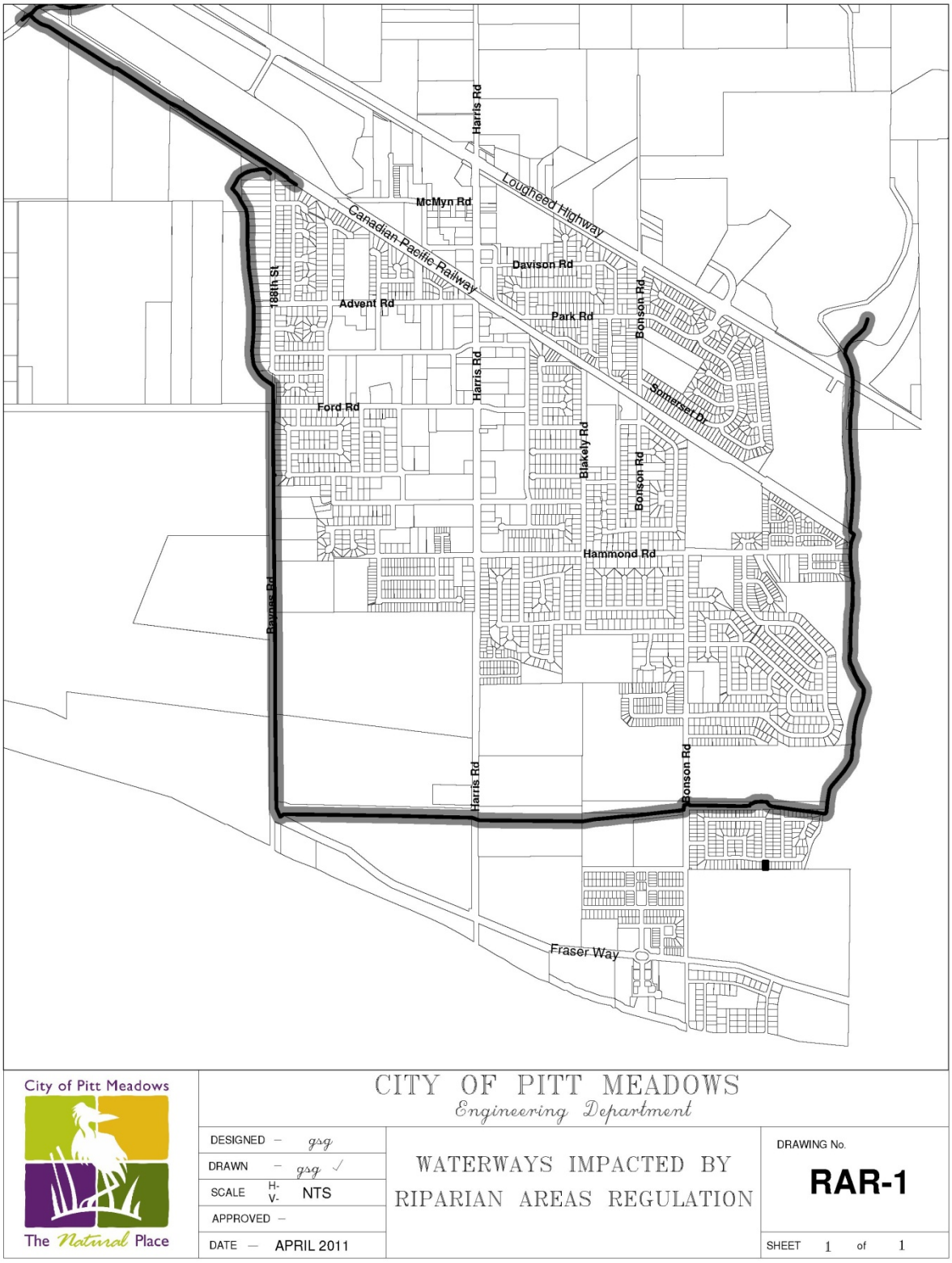
TREE PLANTING DETAIL

City of Pitt Meadows
The Natural Place

CITY OF PITT MEADOWS
*Engineering Department*

| | | |
|---|---|---|
| DESIGNED – ydb | TYPICAL TREE PLANTING DETAIL | DRAWING No. SL-1 |
| DRAWN – ydb ✓ | | |
| SCALE H- NTS V- | | |
| APPROVED – | | |
| DATE – SEPT 2011 | | SHEET 1 of 1 |

## RAR-1 Waterways Impacted by Riparian Area Regulations



# SCHEDULE E: SAMPLE SERVICING AGREEMENT

# THE CITY OF PITT MEADOWS

## SERVICING AGREEMENT

THIS AGREEMENT made the _____ day of _____, 20___.

BETWEEN:

THE CORPORATION OF THE CITY OF PITT MEADOWS, a municipal body corporate under the Municipal Act having its municipal office at 12007 Harris Road, in the City of Pitt Meadows, British Columbia, V3Y 2B5.

(The "City")

OF THE FIRST PART

AND:

**Developer**
**Address Line 1**
**Address Line 2**
**Address Line 3**

(the "Developer")

OF THE SECOND PART

WHEREAS:

A. The Developer is the registered owner of, and desires to develop, the Lands.

B. In order to develop the Lands and obtain the approval of the City for the development of the Lands in conformity with the preliminary development plan attached as Schedule "B" hereto, the Developer is required to construct and install certain works and services within the vicinity of the Lands;

C. The Developer has requested approval of the subdivision of the Lands by the Approving Officer prior to the construction and installation of the works and services and is agreeable to entering into this Agreement pursuant to the Local Government Act and to depositing the security herein specified.

NOW THEREFORE THIS AGREEMENT WITNESSETH that, in consideration of the premises contained herein and the agreement by the City to permit the construction of the works and services, and of the sum of ONE DOLLAR ($1.00) now paid by the City to the Developer, the receipt and sufficiency of which is hereby acknowledged, and of other good and valuable consideration, the parties hereto agree each with the other as follows:

## DEFINITIONS

1.1 In this Agreement:

"Acceptance" means the final approval of the Works acknowledged by the issuance of a written Letter of Final Acceptance of the Works signed by the Director following Completion and the Warranty Period;

“Bond” means a clean, unconditional and irrevocable standby letter of credit in the form attached as Schedule "E" or in such other form as may be agreed to by the Developer and the City;

"Complete" or "Completion" or any variation of these words when used with respect to the Works means completion of the Works by the Developer to the standards and specifications set out in the bylaws of the City and this Agreement evidenced by the issuance of a Letter of Substantial Completion signed by the Director. A separate Street Tree Installation Certificate is issued by the Director for all boulevard landscaping;

"Director" means the Director of Operations and Development Services for the City and duly authorized assistants, or such consulting or other professional engineers as may be appointed to act for the City in that capacity;

“Drawings” means the civil drawings of the Works prepared by **Consultant Name Sheets __ of __**, which drawings were reviewed by the Director in **Date 201_**, and are hereby, incorporated as part of this Agreement;

“Lands” means those lands and premises located within the City of Pitt Meadows, in the Province of British Columbia, more particularly described in Schedule "A";

"Subdivision Bylaw" means the City of Pitt Meadows Subdivision and Servicing Bylaw No. 2589, 2013;

“Warranty Deposit” means that portion of the Bond equivalent to 5% of the cost of the Works retained by the City as security for the obligation of the Developer to maintain the Works for the Warranty Period pursuant to Section 2.2(i);

"Warranty Period" means a period of one year from the date of the Letter of Substantial Completion;

"Works" means the works and services required to be constructed and installed pursuant to Section 2.2 and includes all things required under this Agreement or the bylaws of the City to be done in relation to the construction and installation of the works and services referred to in Section 2.2.

1.2 Words and terms used in this Agreement and not defined in Section 1.1 of this Agreement have the meanings set out in the Subdivision Bylaw..

1.3 A reference to any statute, regulation, code or bylaw refers to that enactment as it may be amended or replaced from time to time.

## COVENANTS OF THE DEVELOPER

2.1 The Developer covenants and agrees with the City that except in strict compliance with the terms and conditions hereinafter contained:

(a) the Lands and any buildings or structures erected on the Lands shall not be used for any of the uses other than those set out in Schedule "C";

2.2 The Developer shall, at its cost and expense:

(a) design, construct and install all Works specified in Schedule "D" and shown on the Drawings;.

(b) construct the Works in accordance with the specifications and standards contained in the Drawings and those specifications and standards for the design and construction of works contained in the Subdivision Bylaw;.

(c) complete the design, construction and installation of the Works prior to **Date, 20__** and assign, transfer and convey to the City all of the Developer's right, title and interest in and to the Works;

(d) prior to the approval of the development of the Lands, provide to the City detailed plans and specifications acceptable to the Director of all services (off-site and on-site) to be provided by the Developer in connection with the development of the Lands;

(e) grant to the City all necessary road dedications, statutory rights-of-way and easements over the Lands to accommodate the Works, in the locations specified by the Director; and where the Works are located upon or under privately owned lands other than the Lands, to obtain at the Developer's expense, all necessary road dedications, statutory rights-of-way and easements over such lands, in favour of the City, to accommodate the Works;

(f) construct and install fully completed Works to the City's standards and to the satisfaction of the Director, which in the discretion of the Director may be varied because of conditions at the site, so that the Works function and operate to the satisfaction of the Director and should the Works as constructed prove to be in any way defective or should they not operate to the satisfaction of the Director, then the Developer shall, at the Developer's expense, modify or reconstruct the Works so that the Works shall be fully operative and function to the satisfaction of the Director, such satisfaction to be indicated by a Letter of Substantial Completion signed by the Director;

(g) submit to the City within **30 days** of the Completion of the Works, final as-built record drawings consisting of one set of A-1 format Mylar transparencies signed,

sealed and dated by a Professional Civil Engineer, 2 sets of Microfiche prints mounted on 3 1/4" x 7-1/2" cards and an AutoCAD latest release Drawing File on a CD disk of the as-constructed Works, as approved by the Director,;

(h) submit to the City within 30 days of the Completion of the Works as-constructed Service Record Cards for all Storm and Sanitary Sewer Connections and Water Connections consisting of one copy of the cards for each service connection and as approved by the Director;

(i) maintain the Works in complete repair for the Warranty Period;

(j) remedy any defects appearing within the Warranty Period and pay for any damage to other works or property resulting therefrom, save and except for defects caused by reasonable wear and tear, negligence of the City, its servants or agents, or acts of God;

(k) comply with all laws, statutes, regulations and orders of any authority having jurisdiction, including the City's bylaws, throughout the construction of the Works;

(l) pay within 30 days of receipt of an invoice from the City the costs of the removal by the City of material or debris left on a highway after the construction of the Works plus an amount equal to 10% of that cost of removal; provided however that except in case of emergency, the City shall first give the Developer a minimum 24 hours notice prior to removal of any material;

(m) protect all survey markers, pins, posts and similar things during the construction, installation, maintenance and repair of the Works and employ, at the Developer's expense, a British Columbia Land Surveyor to replace any markers, pins, posts or similar things which may be moved, damaged or destroyed during the construction, installation, maintenance or repair of the Works;

(n) pay all arrears of taxes outstanding against the Lands on or before the approval of the subdivision of the Lands and pay when due all current taxes levied or to be levied on the Lands on the basis of and in accordance with the assessment and tax roll entries to the extent the same are applicable to the Lands;

(o) pay when due any and all rates, levies and charges payable under any bylaw of the City applicable to the Lands and the Works;

(p) do or cause to be done, at the expense of the Developer, all acts reasonably necessary to grant priority to this Agreement over all charges and encumbrances which may have been registered against the title to the Lands in the New Westminster Land Title Office, save and except those specifically approved in writing by the City in favour of the City.

## SECURITY

3.1 As security for the due and proper performance of all of the covenants in this Agreement and the development contemplated, the Developer shall, forthwith upon execution of this Agreement, deposit with the City a Bond in the amount of **$0.00**, as detailed on Schedule "F" the "Bonding Summary".

3.2 The Bond shall be drawn on a Canadian Chartered bank or other financial institution approved by the City, located in British Columbia, and shall be valid for a minimum of one year from the date of this Agreement. If the Works are not completed within the terms of the Bond, the Developer shall renew the Bond for a further one-year period. If the Bond has not been renewed at least 10 days before its expiry, the City may draw down the full amount of the Bond and hold funds so drawn as a deposit in lieu of the Bond.

3.3 The parties agree that if the Developer fails to complete the Works in the manner and within the time provided for herein, the City shall be at liberty, at any time after the expiration of three weeks from the date of the City mailing a registered letter to the Developer advising the Developer that it is in default of its obligations under this Agreement, to make a demand on the Bond in its sole discretion to meet the costs of the default, provided that the amount of the Bond shall be reduced by the amount of the cost of the Works for which a Letter of Substantial Completion has been issued. If the Bond is insufficient to cover the actual cost of completing the Works, then the Developer shall pay such deficiency to the City within 30 days upon receipt of the City's bill for same. It is understood that the City may do such work either by itself or by contractors employed by the City. If the Works are completed by the Developer as herein provided, then the Bond shall be returned to the Developer on receipt of the Director's Letter of Substantial Completion

3.4 The parties agree that, notwithstanding Section 3.3, the City shall be entitled to retain a Warranty Deposit for the Warranty Period. Should the Developer fail to maintain any of the Works or remedy any defect or pay for any damages resulting therefrom, the City may draw upon the Warranty Deposit and may maintain the Works, remedy the defect or pay the damages at the cost of the Developer and may deduct the costs incurred thereby from the Warranty Deposit. The balance of the Warranty Deposit shall be returned to the Developer on issuance of the Letter of Final Acceptance from the Director. If the Warranty Deposit is insufficient to cover the actual costs incurred by the City for remedying any defects, then the Developer shall pay such deficiency to the City immediately upon receipt of the City's invoice for same. If the Works are maintained by the Developer as herein provided, then the Warranty Deposit shall be returned to the Developer on receipt of the Director's Letter of Final Acceptance.

## INSURANCE

4.1 The Developer shall, in respect of the Lands and the Works, take out and maintain, with such insurers and on terms that are acceptable to the City, at the Developer's expense:

(a) at all times while this Agreement is in force, comprehensive general liability insurance in the names of the Developer and the City which insurance shall cover, without limitation, premises and operations liability, non owned automobile liability and contractual liability, and

(b) at least until the Works have been Completed, insurance as specified in Section 4.1(a) also covering contractor's contingency liability with respect to the operations of sub-contractors, and

(c) during the Warranty Period, insurance as specified in subsection 4.1(a) also covering completed operations liability.

4.2 The limits of liability for personal injury and property damage combined shall be for not less than $5,000,000 for each occurrence.

4.3 All insurance policies shall provide that they shall not expire, be canceled or be materially changed without at least 30 days prior written notice to the City by registered mail.

4.4 The Developer shall, upon the request of the City, file with the City certified copies of each insurance policy required hereunder, or such other proof satisfactory to the City that all such policies are in force as may be applicable.

4.5 If the Developer does not obtain and maintain the required insurance or when required does not deliver the policy or policies to the City, the City shall have the right, but shall not be obligated, to obtain and maintain the required insurance, and the Developer hereby appoints the City its lawful attorney to do all things necessary for this purpose. All monies expended by the City for insurance premiums under the provisions of this section shall be charged to the Developer and are payable by the Developer to the City forthwith upon demand.

## PAYMENTS

5.1 The Developer shall, as a condition precedent to this Agreement, pay the City:

(a) **$0** for the cost of all engineering, inspection and administrative costs incurred by the City in respect of the development contemplated herein,

(b) **$0** for the cost of connecting each lot on the Lands with storm, sanitary sewer and water service connections, signage and other utility connection fees incurred by the City in respect of the development herein;

5.2 Section 5.1 of this Agreement is for the sole benefit of the City and may at any time be waived by the City without notice to the Developer.

5.3 The Developer agrees to pay the City, the total sum of **$0.00** relating to ---------- development being the amount of all applicable Development Cost Charges imposed upon the development of the Lands at the time of ----------approval for the development area; PROVIDED THAT if the aforesaid Development Cost Charges exceed $50,000.00, the Developer may pay them in installments in accordance with the Local Government Act and any regulations made pursuant thereto.

5.4 The Developer agrees to pay the City, the sum of **$0.00** as shown in Schedule F, being 5% cash in lieu of parkland dedication required by Section 941 of the Local Government Act;

5.5 The Developer agrees to pay the City, the sum of **$0.00** as shown in Section F, being the levy ($0.811 per square of floor area or per unit) as directed by the Greater Vancouver Regional District (GVRD) for sewer collection relating to non-residential use at the time of building permit approval for such buildings;

5.6 The Developer agrees to pay the City, the sum of **$0.00** as shown in Schedule F, as cash in lieu of the value of amenities provided to the City in relation to the development on the Lands;.

5.7 The Developer agrees to pay the City, the sum of **$0.00** as shown in Section F, being the levy ($0.00 per unit) as directed by School District #42 for the 'School Site Acquisition Charge' required by Section 937.3 of the Local Government Act relating to single family residential development at the time of ---------- approval for such buildings.

5.8 The City covenants and agrees with the Developer:

(a) to refund to the Developer, on a construction progress basis as the Works are completed, portions of the Bond referred to in Section 3.1, subject to the following:

(i) Progress Certificates prepared and certified by a Professional Engineer licensed to practice in British Columbia and in a form acceptable to the Director shall be submitted to the City not later than the last business day of each and every month during the term of this Agreement;

(ii) refunds not exceeding 90% of the value of that portion of the Works completed in any month as evidenced by a Progress Certificate approved by the Director shall be made by the City on or about the 15th day of the next ensuing month;

(b) that the City will credit Development Cost Charge credits to the Developer on eligible utility components of the Works once such components have been completed and certified by a Professional Engineer. Credits returned to the Developer will not exceed the amounts deposited to the City by the Developer. Credits in excess of the amounts deposited to the City by the Developer shall be applied against future DCC's payable by the Developer on future development phases adjacent to the Lands.

## CERTIFICATES OF COMPLETION

6.1 The City agrees that, upon satisfactory completion by the Developer of all the covenants and conditions in this Agreement, the City shall provide the Developer with Certificates of Completion for all the Works, and thereafter all Works provided by the Developer under this Agreement shall, subject to the provisions of the Local Government Act become the property of the City.

6.2 The Works shall remain at the full and sole risk of the Developer until the City, as evidenced by the Certificates of Completion, certifies them as Complete.

## INDEMNITY

7.1 The Developer agrees to save harmless and indemnify the City against all losses, expenses, damages and costs:

(a) of any proceeding, claim or demand brought by reason of or in any way arising out of or related to the construction, installation, maintenance or repair of the Works;

(b) which may be incurred by reason of this Agreement, or resulting from damage to any property owned in whole or in part by the City which the City is obliged in any way to construct, repair or maintain; and

(c) which may be incurred by reason of liens or non-payment for labour or material, worker's compensation assessments, unemployment insurance, or Federal or Provincial Tax;

provided that this indemnity does not apply to a cause of action arising after the date of issuance of the Letter of Final Acceptance of the Works or to an action of the City.

## INSOLVENCY OF THE DEVELOPER

8.1 Notwithstanding any other provision of this Agreement, the City shall be entitled to draw on the Bond or the Warranty Deposit and complete the Works or remedy any defects in the Works in the event that:

(a) the Developer commits an act of bankruptcy or makes a proposal or general assignment for the benefit of its creditors;

(b) an order is made or a resolution passed or petition filed for the liquidation or winding up of the Developer; or

(c) if a receiver or receiver-manager of the Developer or the Lands is appointed or any encumbrance-holder takes possession of the Lands or any part thereof.

## COVENANTS OF THE CITY

9.1 The City covenants and agrees as follows:

(a) to permit the Developer to construct the Works upon the terms and conditions herein contained and to enter onto municipal and public lands in the vicinity of the Works for the purpose of such construction;

b) to fulfill its duties and obligations hereunder promptly and in a reasonable manner; and

(c) that the City and the Director shall act in a commercially reasonable manner in respect to their requirements where this Agreement confers discretion upon the City or the Director.

## GENERAL

10.1 It is understood and agreed that the City has made no representations, covenants, warrants, guarantees, promises or agreements, express or implied, with the Developer other than those in this Agreement.

10.2 Time shall be of the essence in this Agreement. If a delay in performance of the Works is caused by reason of labour disputes, fire, Act of God, unusual delay by common carriers or any other act which in the opinion of the Director is effectively beyond the Developer's control, the Director will extend the time for Completion of the Works by the Developer for whatever time the Director deems to be reasonable in the circumstances.

10.3 The covenants contained herein are made pursuant to Section 219 of the Land Title Act, it being the intention and agreement of the parties that the provisions hereof be annexed to run with and be a charge upon the Lands provided that this Agreement shall be discharged and released in whole or in part by the City after the granting of the Certificate or Certificates of Acceptance by the City to the Developer. The Lands shall not be subdivided except in accordance with this covenant.

10.4 Nothing contained or implied in this Agreement shall in any way prejudice or affect the rights and powers of the City in the exercise of its functions under any public and private statutes, bylaws, orders and regulations.

10.5 This Agreement shall enure to the benefit and be binding upon the parties hereto and their respective successors and assigns.

10.6 A reference in this Agreement to the City or the Developer includes their assigns, heirs, successors, officers, employees and agents.

10.7 Whenever it is required or desired that either party deliver or serve a notice on the other, delivery or service shall be deemed to be satisfactory and deemed to have occurred when:

(a) served personally, on the date of service; and

(b) mailed by prepaid registered mail to the address listed on the first page of this Agreement or other address of which that party has notified the other, on the earlier of the date received or on the fifth business day following date of mailing at any Canada Post Office, but in the event of interruption of mail service, notice shall be deemed to be delivered only when actually received by the party to whom it is addressed.

10.8 Should any clause or portion thereof of this Agreement be declared or held invalid for any reason, such invalidity shall not affect the validity of the remainder of that clause or of this Agreement and this Agreement shall continue to be in force and in effect and be construed as it had been executed without the invalid portion.

10.9 No amendment or waiver of any portion of this Agreement shall be valid unless in writing and executed by both of the parties to this Agreement.

10.10 Waiver of any default by either party shall not be deemed to be a waiver of any subsequent default by that party.

10.11 This Agreement shall be construed according to the laws of the Province of British Columbia.

10.12 Whenever the singular or masculine is used in this Agreement, the same shall be deemed to include the plural, the feminine, or the body politic or corporate as the context so requires.

10.13 The following schedules are annexed to and form part of this Agreement:

Schedule "A": Legal Description of Lands
Schedule "B": Preliminary Development Plan
Schedule "C": Uses
Schedule "D": Works to be constructed
Schedule "E": Irrevocable Letter of Credit
Schedule "F": Bonding Summary

IN WITNESS WHEREOF the parties hereto have set their hands and seals the day and year first above written.

The Corporate Seal of **THE City OF PITT MEADOWS** was hereunto affixed in the presence of;

Mayor

C/S

Clerk

**SIGNED, SEALED AND DELIVERED** By: DEVELOPER by its authorized signatory: in the presence of;

Name:

Address:

Occupation:

DEVELOPER.

This is the instrument creating the condition or covenant entered into under Section 219 of the Land Title Act (British Columbia) by the registered owner referred to herein and shown on the print of the plan annexed hereto and initialed by me.

Approving Officer for the
City of Pitt Meadows

# SCHEDULE "A"

## Legal Description of Lands:

PID ----------
Full Legal Description

## SCHEDULE "B"

## Preliminary Development Plan

## Plan showing area

## SCHEDULE "C"

## Uses

1. The property identified in Schedule "A" will be limited to the uses, conditions of use, site requirements, dimensions of buildings and structures, and siting requirements permitted in the City of Pitt Meadows Land Use Bylaw No. 2505, 2011.

2. The intent of the **ZONING** Zone is to provide for all types of **description of intent of zone**.

## SCHEDULE "D"

## Works to be Constructed

1. Supply and install a WATER SERVICES into the lot, tie-in from existing water main on -------Road. This will include all tie-ins, boulevard restoration & service connections as noted on the Drawings.

2. Supply a SIZE OF Sanitary Service connection complete with an inspection chamber, from the existing sanitary main on -------- Road. This will include all tie-ins & boulevard restoration as noted on the Drawings.

3. Supply and install one SIZE OF storm service connection complete with inspection chamber from the Storm Sewer main on ----------Road. This will include all tie-ins, road restoration & service connections as noted on the Drawings.

4. Reconstruct ROADWAY from the south property line of the development to the concrete driveway letdown on ------- Road and replace with approx. 3 meters of 75mm thick asphalt in accordance with the Drawings.

5. Supply and install Hydro, Telephone and Natural Gas services to the development.

6. Supply, install and construct all temporary and miscellaneous measures as noted on the Drawings.

# SCHEDULE "E"

## Proforma of Irrevocable Standby Letter of Credit

**Bank:** _____
**Date of Issue:** _____
**Amount:** _____
**Expiry Date:** _____

**Irrevocable Standby Letter of Credit No**. _____

**Beneficiary:**
The City of Pitt Meadows,
12007 Harris Road,
Pitt Meadows, B.C.,
V3Y 2B5

**Applicant:**

**Reference:**

By order and on behalf of the applicant, we hereby issue in your favour this Irrevocable Standby Letter of Credit as security for the above mentioned reference. This credit shall be available to you on demand by sight drafts drawn on the _____(bank)_____, when supported by your written demand for payment made upon us.

Partial drawings are permitted.

The bank will not enquire as to whether or not the beneficiary has a right to make demand on this Standby Letter of Credit.

It is a condition of the Irrevocable Standby Letter of Credit that it shall be deemed to be automatically extended without amendment for a further one (1) year period from the present or any future expiration date hereof, unless at least 30 days prior to the present or any future expiration date, the issuer notifies the beneficiary in writing by registered mail, that it does not elect to consider this Irrevocable Standby Letter of Credit to be renewable for any additional period.

This Standby Letter of Credit is subject to the “Uniform Customs and Practice for Documentary Credits (1993 Revision) International Chamber of Commerce, Publication No. 500” and engages us in accordance with the terms thereof.

## SCHEDULE "F"

## Summary of Bonding and Cash Requirements

PID ----------
FULL LEGAL DESCRIPTION

**Items of Work:**

| | | | | |
|---|---|---|---|---|
| 1. | Road Works | $ | 0.00 | |
| 2. | Storm Sewer | $ | 0.00 | |
| 3. | Sanitary Sewer | $ | 0.00 | |
| 4. | Water Works | $ | 0.00 | |
| 5. | Boulevard Trees and Lot Grading | $ | 0.00 | |
| 6. | Street Lights | $ | 0.00 | |
| 7. | BC Hydro & Tel Civil Work | $ | 0.00 | |
| | Cost of Works | $ | 0.00 | |
| | 10% Contingency | $ | 0.00 | |
| | Total for Construction | $ | 0.00 | |
| | As-Constructed Drawings | $ | 0.00 | |
| 1. | Total Value of Bond | $ | 0.00 | Clause 3.1 |
| 2. | Warranty Deposit (5% of Bond) | $ | 0.00 | Clause 3.4 |
| 3. | Engineering/Insp./Admin. Fee | $ | 0.00 | Clause 5.1a |
| | Misc. Utilities Deposit (Tie-ins) | $ | 0.00 | Clause 5.1b |
| 4. | Development Cost Charges | $ | 0.00 | Clause 5.3 |
| 5. | 5% Cash in Lieu of Parkland dedication | $ | .00 | Clause 5.4 |
| 6. | GVRD Sewer Levy | $ | 0.00 | Clause 5.5 |
| 7. | Cash In Lieu for Amenities | $ | 0.00 | Clause 5.6 |
| 8. | School Site Acquisition Fee | $ | 0.00 | Clause 5.7 |
| 10. | Outstanding Taxes | $ | 0.00 | |

**END OF DOCUMENT**

# SCHEDULE F: COMMITMENT BY DEVELOPER AND ENGINEER

City of Pitt Meadows Date_____

Attn: Director of Operations and Development Services
City of Pitt Meadows
12007 Harris Road
Pitt Meadows BC V3Y 2B5

Re: Proposed Subdivision/Development of _____.

This confirms that an agreement has been executed between:

Developer
_____and

Consulting
Engineer_____

in connection with the above subdivision/development and provides for the Consulting Engineer to undertake, directly or through sub-consultants, until a Letter of Final Acceptance has been issued by the Director of Operations and Development Services (the Director), to:

1. review existing systems and design requirements, concepts and parameters with the Director;
2. arrange for topographic, pick-up and legal surveys and environmental, geotechnical, hydro geotechnical, or other studies that may be necessary for satisfactory design or as required by the Director;
3. submit conceptual designs if required by the Director;
4. submit detailed design plans and specifications (including a drainage, erosion and sediment control) in accordance with City bylaws and the requirements of utility companies and government agencies and to the satisfaction of the Director;
5. provide initial cost estimates and periodic cost estimates of uncompleted work to the Director for calculation of security retention;
6. discuss the submissions under 3, 4 and 5 with City staff as required by the Director;
7. undertake contract administration services using qualified personnel during construction and the maintenance period including:
    a) survey control to permit construction layout by contractors;
    b) interpretation of plans and specifications;
    c) periodic, or full time, resident inspection to determine if the work substantially complies in all material respects with the Drawings and with

City bylaws and with the requirements of utility companies and government agencies;

d) full time inspections and attendance during actual installation of all underground facilities including pipe surround materials and during all required testing;

e) inspection of the site and the drainage, erosion and sediment control *works* and receiving waters to ensure those *works* are constructed and functioning according to the approved plans, that they are being operated and maintained in accordance with Supplementary Specification 01 57 01 1.2.1, and that no unacceptable materials are discharged;

f) review and interpretation of test and inspection reports;

g) determination, and advising the Director, of corrective action required as a result of c),d), e) and f);

h) keeping a record of site visits and any corrective action taken as a result of g);

i) attending construction progress meetings; and

j) conducting final inspection to identify deficiencies;

8. submit summary reports during construction and the maintenance period as required by the Director including test and inspection reports and his review and interpretation thereof;
9. submit Inspection and Compliance Certificates and other certifications required by the Bylaw;
10. conduct inspections with the Director;
11. submit record drawings in both reproducible Mylar, PDF and AutoCAD format, service record cards, micro-fiche and operation and maintenance manuals.

Reference to the Director above includes any person authorized to act on the Director's behalf.

If sub-consultants, or others with specialist responsibility, are employed on components of the work, the Consulting Engineer will act as the prime consultant for co-coordinating and reviewing overall design, layout and inspection and test reports, and for communicating with the Director.

The following is a summary of project's the Consulting Engineer has completed that are similar in scope, nature and value to the Works:

_____

_____

_____

The names and addresses of all sub-consultants and others with specialist responsibility, that the Consulting Engineer proposes to retain and a summary of projects that they have completed that are similar in scope, nature and value to the Works:

_____

_____

_____

The names, curriculum vitae and employer of individual's assigned responsibility for various aspects of the work together with a summary of projects that they have completed that are similar in scope, nature and value to the Works:

_____

_____

_____

The Consulting Engineer and each sub-consultant carry professional liability insurance of $5,000,000 per claim with a maximum deductible of $5,000 and commit to continue the insurance throughout construction and the maintenance period.

We, the Developer and Consulting Engineer both acknowledge our separate responsibilities to each notify the Director as soon as possible prior to, or, if that is not possible, within one working day, if the Consulting Engineer ceases to be retained for all of the duties described or is unable to carry them out. Notification will be in writing delivered to the City office or transmitted by fax.

I, the Consulting Engineer, will notify the Director as soon as possible prior to, or, if that is not possible, within one working day, of a decision or circumstances that result in a sub-consultant or other specialist ceasing to be retained on this project.

Name of Consulting Engineer: Engineer's Seal

_____

Signature of Authorized Representative:

_____

Address: _____

_____

I/we the Developer will stop construction as soon as it is safe to do so in the event the Consulting Engineer ceases to be retained, or is unable to carry out the described duties, until a new Commitment by Developer and Engineer has been delivered to the Director and he has authorized work to recommence. I/we will continue essential maintenance of the site and of drainage, erosion and sediment control.

I/we, the Developer, understand that the City will rely on the expertise of the Consulting Engineer in performing services referred to in this Commitment letter. I/we acknowledge that review and inspections by staff or others on behalf of the City do not relieve the Owner from complying with the requirements of the bylaws.

_____
Signature of Authorized Representative

_____
Name of Developer

_____

_____
Address of Developer

# SCHEDULE G
**(Bylaw No. 2672, 2015)**

## COST ESTIMATE FOR PRIVATE WORK AGREEMENT

Date:_____

I (We) _____

of _____

Being the applicant for the private work described hereafter, herby agree that the cost estimate prepared by the City of Pitt Meadows for the works of

_____

_____

at _____

Pitt Meadows, BC in the amount of _____
_____($)

Which is tendered herewith, is a preliminary and approximate estimate of cost and that I (We) will pay the actual costs of the charges for the aforementioned work as determined by the City of Pitt Meadows in that, should the actual costs and charges exceed the amount of the said approximate estimate, I (We) agree to remit to the City of Pitt Meadows the full amount of any such over-expenditure within 30 days of completion of the works or prior to the issuance of an Occupancy Permit.

The City of Pitt Meadows herein agrees to refund to the applicant any under-expenditure resulting from the actual costs and charges being less than the said approximate estimate.

Signature of Applicant:_____

Signature of City Official:_____