CONSOLIDATED FOR CONVENIENCE

CITY OF PORT MOODY

BYLAW NO.2831

A bylaw to regulate the subdivision of lands and to establish the standard of services to be provided in subdivided land.

WHEREAS pursuant to the provisions of Section 938 to 941.1 of Part 26 Division 11 of the Local Government Act, the Council may by Bylaw regulate the subdivision of land.

NOW THEREFORE, the Municipal Council of the City of Port Moody in opening meeting Assembled, enacts as follows:

1.0 TITLE

This Bylaw maybe cited as the "City of Port Moody Subdivision and Development Servicing Bylaw, 2010" No. 2831.

2.0 REPEAL

Bylaw No.1804, cited as "City of Port Moody Subdivision Bylaw,1987, No. 1804", and all amendments thereto are hereby repealed and replaced by this Bylaw.

3.0 PURPOSE

The purpose of this Bylaw is to regulate the provision of works and services in connection with the subdivision and development of lands, taking into consideration the different zones regulated by the City of Port Moody Zoning Bylaw, in such a way as to benefit the community as a whole.

4.0 SEVERABILITY

If any section, subsection, clause, sub-clause or phrase of this Bylaw is for any reason held to be invalid by the decision of any Court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this Bylaw.

5.0 ORGANIZATION OF THE BYLAW

5.1 This Bylaw is divided into twenty sections and five schedules dealing with the following subjects:

I N D E X

Sections

6.0 DEFINITIONS

"Accepted For Construction Purposes" means that drawings so stamped are deemed acceptable by the Director to proceed to construction. Variation of this stamp having the same meaning are "Accepted for Development Permit / North Shore Development Authorization/ Development Authorization / Development Variance Permit Purposes";

"Approving Officer" means the person appointed by Council in accordance with the Land Title Act;

"Arterial" means a highway so designated in Schedule B;

"Boulevard" means all those portions of a highway not occupied by roadway and shall include the 'median' area between separated roadways;

"City" shall mean the City of Port Moody;

"Collector" means a highway so designated in Schedule B;

"Consulting Engineer" means the Professional Engineer currently registered under the provisions of Engineers and Geoscientists Act of the Province of British Columbia responsible for the design and/or construction supervision of all works and services on behalf of the Owner;

"Contractor" means a person or firm having a contract with an owner or the City to construct works and services or any other items required by this Bylaw;

"Council" means the elected officials of the City;

"Cul-De-Sac" means a highway which terminates with a vehicular turning area;

"Director" means the person appointed by the City as the Director of Engineering & Operations Department or the designated representative;

"Easement" means a right-of-way for works and services with a dominant and servient tenement;

"Excess Or Extended Services And Latecomer Payments" means the excess or extended services and procedures for recovering of the cost of the excess or extended services provided for in Section 939 of Division 11 of Part 26 of the Local Government Act;

"Final Approval" means that approval granted by the Approving Officer when all relevant requirements of this Bylaw, the Land Title Act and any other relevant Bylaws and legislation have been fulfilled;

"Highway" means a street, road, lane, bridge, walkway, pathway, trail, viaduct and any other way open to the use of public but does not include an "easement" on private property;

"Inlet Centre" means that area of the City north of and including St. Johns Street-Barnet Highway, west of Coquitlam border, south of and including Ungless Way-loco Road and east of CP Rail Spur Line;

"Interim Substantial Completion" means the date established by the City as the start of the one (1) year performance test for all works and services provided;

"Landscaping" means any combination of lawns, shrubs, trees, flowers, decorative bricks, boulders and gravels, bark mulch, fences, decorative paving and planters, arranged by design to enhance the appearance of a property or highway boulevard in a form acceptable to the City and excludes parking areas, sidewalks, uncleared undergrowth or weed growth;

"Lane" means a highway not less than six (6) meters wide but not more than ten (10) meters wide and intended to provide secondary access to parcels of land;

"Local Road" means a highway so designated in Schedule B;

"Moody Centre Downtown Core" means that area of the City bounded by St. John's Street, Barnet Highway, Clark Street and Moody Street plus St. John's Street from Moody Street to Ioco Road, including the lands having frontage on both sides of those highways;

"Official Community Plan" means a statement of Council policy for any use of land or pattern of subdivision of land expressed in maps, plans, reports or in any combination thereof, as approved by Bylaw and all amendments thereto;

"Owner" means an owner of land, as defined in the Local Government Act, who subdivides land or applies for a building permit including duly authorized representatives such as agents, developers, consultants, contractors, etc.;

"Parcel" means any lot, block or other area in which land is held or into which land is subdivided, but does not include a highway;

"Preliminary Layout Approval" means a conditional approval by the Approving Officer of a proposed subdivision layout, and outlines the requirements which must be fulfilled to obtain approval of a subdivision plan;

"Regional District" means the Metro Vancouver including the Greater Vancouver Water District and the Greater Vancouver Sewerage & Drainage District;

"Roadway" means the portion of a highway surfaced for the purpose of facilitating vehicular movement;

"Security" means an irrevocable Letter of Credit, in a form acceptable to the City Treasure or Cash or Certified Cheque;

"Sidewalk" means a portion of a highway surfaced for the purpose of facilitating pedestrian movement;

"Storm Drainage System" means a system of works and services designed and constructed to manage the collection, conveyance and discharge of surface runoff and other storm water;

"Subdivision" means division of land into two or more parcels as defined in the Land Title Act or Strata Property Act;

"Walkway" means a highway for pedestrian traffic only, not less than one (1) meter wide nor more than ten (10) meters wide;

"Works and Services" or any variation thereof means and includes all works and services required to be done for the completion of development of a subdivision, to the satisfaction of the Director.

7.0 GENERAL

7.1 Unless otherwise defined herein, any words or expression in this Bylaw shall have the same meaning as any similar word or expression contained in the "Land Title Act" and in the "Local Government Act" and amendments thereto.

7.2 The provisions of this Bylaw shall apply to the whole of the territorial area of the City.

8.0 APPLICATION

8.1 Before applying for approval of a subdivision plan, an Owner may apply for preliminary layout approval.

8.2 In addition to the requirements of the Land Titles Act, an application for preliminary layout approval shall be submitted to the City on the form provided as Appendix 1 to this Bylaw and be duly completed and signed by the Owner:

8.3 The application shall also be accompanied by the following:

8.3.1 the application fee pursuant to City Fees Bylaw;

8.3.2 a sketch in quadruplicate of the proposed subdivision drawn to a scale not less than 1:2000;

8.3.3 any additional items the Approving Officer may require or deems necessary.

8.4 Owners are required under the "City of Port Moody – Works and Services Bylaw" as a condition of subdivision plan approval or building permit issuance, to provide works and services in accordance with this Bylaw.

8.5 All works required pursuant to Section 8.4 shall be constructed and installed at the expense of the Owner prior to the granting of subdivision plan approval or prior to the issuance of a building permit, unless the Owner of the land complies with the requirements of Section 10 and other relevant parts of this Bylaw.

8.6 Prior to the issuance of any building permit the Owner shall provide a refundable security deposit for potential damages to public facilities.

9.0 ADDITIONAL INFORMATION

9.1 The Approving Officer may without limitation require the Owner to submit with the application any or all of the following:

9.1.1 a sketch of the ultimate subdivision of the relevant lands where further subdivision is possible and anticipated;

9.1.2 profiles of proposed highways and such topographical details as may indicate the engineering problems to be dealt with in opening up the highways;

9.1.3 a site plan to a scale not less than 1:1000 for the proposed subdivision to locate exactly buildings to be retained, watercourses, easements, ravines, flood plains one meter (1m) contours and the like, in order to ensure that the subdivision shall comply with all requirements of this Bylaw and Zoning Bylaw;

9.1.4 a report, prepared by an engineer experienced in geotechnical engineering, concerning hazardous conditions;

9.1.5 a traffic impact study as required by the Approving Officer;

9.1.6 an environmental impact study;

9.1.7 engineering report on infrastructure condition and/or capacity as required by the Approving Officer.

9.2 The Approving Officer may consider comments from:

9.2.1 Fisheries Branch of the Federal Department Fisheries and Oceans with respect to fish habitat; or

9.2.2 Fish and Wildlife Branch of the Provincial Ministry of Environment with respect to wildlife, species at risk and fish habitat; or

9.2.3 Water Management Branch of the Provincial Ministry with respect to flooding, flood plains and water right; or

9.2.4 Ministry of Health with respect to water supply and sewage disposal where City utility service is not available in Acreage Reserve Land; or

9.2.5 any interested persons regarding established amenities, adjacent properties or the public interest.

10.0 SUBDIVISION APPROVAL

10.1 When all the requirements of the preliminary layout approval have been met, the Owner may apply for subdivision plan approval. Where a preliminary layout approval has not been requested, formal approval will be withheld until all appropriate fees, charges and required agreements have been deposited.

10.2 Where a proposed subdivision includes the creation of a highway across a registered right-of-way or easement, the Owner shall provide at his or her own expense, from the holder of such right-of-way or easement, the necessary legal agreements regarding the creation of the highway containing all necessary services and utilities before final subdivision approval is granted.

10.3 The Approving Officer shall not approve the subdivision unless the Owner of the Lands:

i) deposits with the City a security in the form and amount prescribed in this Bylaw in the form and amount satisfactory to the Approving Officer having regard to the cost of installing and paying for all works and services required under this Bylaw and not provided prior to subdivision approval and,

ii) enters into an appropriate Servicing Agreement, in the form as attached as Schedule ”A” , with the City to construct and install the required works and service by a specified date or forfeit the security and,

iii) submits complete engineering design drawings prepared and sealed by a Consulting Engineer, certifying that all works and services are to the standard prescribed by this Bylaw and,

iv) submits a certificate issued by City’s Finance Division confirming that all taxes, rates and charges pursuant to Section 15.1.1 and 15.1.2 of this Bylaw have been paid.

OR:

v) constructs and installs all works and services required to be constructed, at the expense of the Owner of land being subdivided, to the standards prescribed by this Bylaw and,

vi) submits a certificate issued by City's Finance Division confirming that all taxes, rates and charges pursuant to Section 15.1.1 and 15.1.2 of this Bylaw have been paid.

11.0 PARCEL WIDTH AND AREA

The minimum parcel lot width and area shall be as required by the Port Moody Zoning Bylaw.

12.0 SERVICING REQUIREMENTS

12.1 The Owner shall provide within and immediately adjacent to a subdivision highways, boulevards, boulevard crossings, transit bays, sidewalks, walkways, street lighting, underground wiring, a water distribution system, a fire hydrant system, a sanitary sewage collection and disposal system and a storm drainage collection and disposal system to the standards prescribed in this Bylaw.

12.2 The works and services provided shall:

12.2.1 be connected to all parcels created by the subdivision;

12.2.2 be fully completed works and services on all highways both within and adjacent to the subdivision;

12.2.3 be connected by water, sewage or drainage mains to the City's systems in accordance with the standards prescribed in this Bylaw;

12.2.4 provide for extensions and connections of the system to lands and systems beyond the proposed subdivision and, where necessary, excess or extended services may be required, at the cost of Owner. The City shall determine the latecomer charge to be levied against lands benefitting from these extended or excess services;

12.2.5 be connected to the appropriate public utilities including gas, hydro power, telephone, and cablevision.

12.3 Without limiting the generality of Section 12.2 the Owner will not be required to provide water supply, sewage and drainage works, underground wiring, street lighting or highway improvements where a system already exists which meets the standards prescribed in this Bylaw.

12.4 To determine the completeness of the works and services, the works and services shall be subject to a performance test of one (1) year from interim substantial completion and Owner shall maintain the works and services in complete repair and remedy any defects within the one (1) year of interim substantial completion.

12.5 When works and services to be operated by public authorities are installed or proposed to be installed within a parcel in a subdivision, the Owner shall provide utility rights-of-way, to contain such works and services. Such right-of-way shall not be less than three (3) meters wide, shall be described by a plan or apt description as prepared by a land surveyor registered in the Province of B.C. and shall be registered with appropriate documentation against title of the affected parcel or parcels.

13.0 SECURITY

13.1 An Owner who elects to deposit a security to cover the cost of providing works and services shall enter into a Servicing Agreement with the City as described by Section 10.3(ii) whereby the owner agrees to construct and install the prescribed works and services by a specified date or should they not be completed by that date the City may complete the works and services at the cost of the Owner.

13.2 Portions of the security may be returned to the Owner or the irrevocable letter of credit may be reduced, as portions of the works and services are completed as certified by the Owner's Consulting Engineer to the satisfaction of the Director, except that ten (10) percent of the amount of the original security shall be retained by the City for one (1) year from the date of the interim substantial completion as approved by the Director and City shall deduct from this ten (10) percent the cost of correcting any defects detected during the one (1) year period if the defects are not corrected by the Owner.

The City shall retain, in addition to the ten (10) percent security referred to herein, an amount estimated by the Director to be the cost of completing all items shown to be deficient at the time of interim substantial completion of the works and services required to be installed and constructed until such deficiencies are corrected.

13.3 The City shall not pay any interest on security deposited with the City to cover the cost of installing and constructing all works and services required in a subdivision.

13.4 The amount of the security for inclusion in the Servicing Agreement to cover the cost of providing the works and services referred to in section 13.1 shall be determined, to the satisfaction of the Approving Officer, by the following method:

13.4.1 a) review of the detailed construction cost estimate including unit prices and schedule of quantities provided by the Owner's Consulting Engineer;

b) make any adjustments as necessary to the satisfaction of the Approving Officer which include the addition of deposits required to be paid by the Owner to provide underground wiring;

c) add a contingency allowance of five (5) percent for unforeseen problems which might be encountered during construction;

d) add an inflation factor to enable completion of the works and services by the City if not completed by the owner within the time frame established in the Servicing Agreement. The inflation factor is established as the annual rates of inflation, for the previous year, as established by the consumer price index or the construction price index, whichever is greater, for the Vancouver region rounded to the nearest one (1) percent.

e) add the current goods and services tax (GST) and any other applicable taxes to the total amount as determined from a), b), c) and d) above.

Added by BL3165

13.5 A Security shall be provided in the form of cash or automatically renewing irrevocable Letter of Credit.

14.0 COMPLETION OF WORKS

14.1 Where the Owner constructs and installs the works and services necessary to serve the proposed subdivision without entering into the Servicing Agreement with City referred to in Section 10.3 (ii) hereof, the Owner will not connect such works and services to any of the City's works, services or utilities and the City shall not accept the works and services constructed and installed by the Owner or any part thereof until:

14.1.1 The works and services have been certified by the Consulting Engineer, as complete and constructed in accordance with the standards prescribed in this Bylaw;

14.1.2 The Owner has deposited with the City one set of paper prints and one set of three (3) mil mylar transparencies of the drawings showing the works and services as actually constructed, certified as correct by the Consulting Engineer;

14.1.3 The owner has completed to the satisfaction of the Director the service connection record cards supplied by the City, to show the locations of the sanitary, storm and water service connections to each lot serviced;

14.1.4 The City has inspected the said works and services and notified the Owner in writing of not detecting any construction deficiencies and that the works appear to be in accordance with the plans, specifications and standards as herein contained;

14.1.5 The layout of the proposed subdivision has been approved by the Approving Officer;

14.1.6 The constructed works and services are subjected to the one (1) year performance test referred to in Section 12.4. This performance test will commence upon receipt of written notice of interim substantial completion. Any defects found during this one (1) year period shall be immediately rectified by the Owner at the expense of the Owner.

15.0 TAXES, RATES AND CHARGES

15.1 At the time of application for approval of a subdivision, the Owner shall pay to the City:

15.1.1 the total current year's school taxes, municipal taxes, rates and charges, including development levies/development cost charges assessed and levied against the land to be subdivided;

OR:

15.1.2 the amount estimated by the City to be the total current year's school taxes, municipal taxes, rates and charges including development levies/development cost charges assessed and levied against the lands to be subdivided.

15.2 Every payment of taxes and rates made pursuant to Section 15.1.2 of this Bylaw shall be deemed to be monies to be applied at a future date in payment of taxes and rates pursuant to the Local Government Act and every such payment and deposit accepted by the City shall be subject to the provisions of the Local Government Act.

16.0 PLANS

16.1 In addition to the survey plan prepared for every subdivision for which the Owner seeks subdivision approval; the Owner shall also provide:

16.1.1 A right-of-way plan for every utility right-of-way or easement required in a subdivision for which the Owner seeks subdivision approval;

16.1.2 Upon completion of construction of all works and services required by this Bylaw and prior to reduction of the security to ten (10) percent of its original amount as described by Section 13.2 the Owner shall provide, to the Director, completed service record cards, one (1) set of paper prints of the works and services as actually constructed, prepared by the Consulting Engineer certifying that the works and services are in conformance with the standards prescribed in this Bylaw.

16.0 RIGHT TO ENTER

The Director may enter at all reasonable times upon the lands for which a subdivision application has been made in order to ascertain whether the provisions of this Bylaw are being observed.

17.0 DEVELOPMENT VARIANCE PERMIT

The provisions of a Development Variance Permit prevail over any provision of this Bylaw in the event of conflict.

18.0 REFERENCES

Part 26 Division 11 of the Local Government Act

AND

Part 7 of the Land Titles Act;

19.0 OFFENCE AND PENALTY

It is an offence for any person to commit any offence or permit any act or thing to be done in contravention of this Bylaw.

It is an offence for any person who refuses, omits or neglects to fulfill, observe, carry out or perform any duty, obligation, matter or thing whatsoever prescribed or imposed or required to be done by this Bylaw.

A person convicted of an offence against this Bylaw shall be liable to a maximum fine of $5,000, or imprisonment for a period not exceeding 30 days, or both and each day during which any violation, contravention or breach shall continue shall be deemed a separate offence.

READ A FIRST TIME this 26th DAY OF January, 2010.

READ A SECOND TIME this 26th DAY OF January, 2010.

READ A THIRD TIME this 26th DAY OF January, 2010.

ADOPTED this 9th DAY OF February, 2010.

_____
MAYOR

_____
CITY CLERK

I hereby certify that the above is a true copy of Bylaw No. 2831 of the City of Port Moody.

_____
CITY CLERK

APPENDIX 1 -
APPLICATION FOR APPROVAL OF A SUBDIVISION OF LAND WITHIN THE CITY OF PORT MOODY

FILE No:_____

SECTION A (PLEASE PRINT)

LEGAL DESCRIPTION OF PARCEL(S):

_____

_____

STREET ADDRESS OF PARCEL(S):

_____

_____

ZONIING - EXISTING: _____

- PROPOSED: _____

SECTION B (PLEASE PRINT)

1. Where the Owner is a company, the signature required is from a representative with signing authority, with accompanying proof of signing authority.
2. Please attach a legal title search, not more than 30 days old from the time of application.

I/WE MAKE THIS APPLICATION FOR APPROVAL OF A SUBDIVISION OF LANDS WITHIN THE CITY OF PORT MOODY.

REGISTERED OWNER(S):_____

MAILING ADDRESS:_____

_____

TEL. NO:_____ FAX NO:_____ E-mail: _____

SIGNATURE:_____ DATE:_____

AUTHORIZED AGENT:_____

MAILING ADDRESS: _____

_____

TEL. NO:_____ FAX NO:_____ E-mail: _____

SIGNATURE: _____DATE: _____

APPENDIX 1 (CONTINUED)

SECTION C

Provide a sketch of the proposed subdivision, at a scale not less than 1:2000, to show the existing and proposed lot configuration, dimensions, highways both existing and proposed, and all existing features, which may affect this application such as buildings, utilities, right-of-way, floodplains, watercourses, environmentally sensitive areas, hazardous areas, etc. All relevant information such as soils reports and preliminary approvals of outside agencies should also accompany this application.

SECTION D

For office use only. The Owner should ensure that all applicable information listed below has been supplied before requesting final approval.

a) Development Authorization Permit	Date of issue	_____
b) Dev. Variance Permit	Date of application	_____
c) Rezoning	Date of Zoning Bylaw Adoption	
d) Section 938 relaxation, if applicable	Date of Council Resolution	_____
e) Engineering plans	Date of approval	_____
f) Right-of-way plan	Date of registered plan receipt	_____
g) Right-of-way documents	Date of receipt	_____
h) Environmental report	Date of receipt	_____
i) Geotechnical report	Date of receipt	_____
j) Lot grading plans	Date of approval	_____
k) Tree survey	Date of receipt	_____
l) Landscaping	Date of approval	_____
m) GVS & DD permit	Date of receipt	_____
n) Dept. of Health permit	Date of receipt	_____
o) TransLink permits	Date of receipt	_____
p) Water Management	Date of receipt	_____

SECTION D (Continued)

q) Ministry of Environment Compliance and/or Approval	Date of receipt	_____
r) Fisheries & Oceans Canada Compliance and/or Approval	Date of receipt	_____
Security for provision of works & services	Amount	_____
	Type of Bond	_____
	Date Received	_____
	Receipt No:	_____
Subdivision Servicing Agreement	Received	_____
	Executed By City	_____
Development Variance Permit	Resolution of Council	_____
Development Cost Charges	Amount	_____
	Date Received	_____
	Receipt No:	_____
Pro Rata levies (215A or 286)	Amount	_____
	Date Received	_____
	Receipt No:	_____
Excess or Extended Service Levies	Amount	_____
	Date Received	_____
	Receipt No:	_____

Date of City Certificate that all taxes,
Rates and charges have been paid: _____

Date of receipt of Certificate of indefeasible title
for each parcel of land: _____

Date Subdivision plan signed by the Approving Officer _____

SECTION E

An application fee as prescribed in the City Fees Bylaw is required to accompany this application. This fee is non-refundable.

Amount of fee _____Receipt No:_____

SECTION F

This completed subdivision application form, along with the application fee, shall be presented to the Approving Officer for processing.

SCHEDULE A

CITY OF PORT MOODY

TYPICAL SERVICING AGREEMENT

THIS AGREEMENT dated the _____th day of _____, 20___

BETWEEN:

CITY OF PORT MOODY
100 Newport Drive
Port Moody, British Columbia
V3H 3E1

(the "City")

AND:

[DEVELOPER]
[ADDRESS LINE 1]
[ADDRESS LINE 2]
[ADDRESS LINE 3]

(the “Developer”)

WHEREAS the Developer desires to construct and install the prescribed works as required by “City of Port Moody Works and Services Bylaw No. 1789, 1986”, in relation to development authorized by Development Permit/Authorization No. _____

AND WHEREAS Section 940 of Division 11 of Part 26 of the *Local Government Act* R.S.B.C. 1996, c. 323 authorizes this Agreement for that purpose;

NOW THEREFORE in consideration of the premises and of the sum of Ten Dollars ($10.00), receipt of which from each party is acknowledged by the other and other good and valuable consideration;

THE PARTIES AGREE:

1. The Developer, being the registered owner of those certain parcels of land in Port Moody, British Columbia which are more particularly described as:

   [COMPLETE LEGAL DESCRIPTION]
   (PID [XXX-XXX-XXX])

   (the "Lands")

   shall construct and install all works and services prescribed by Section 4 of this Agreement (the "Works"), subject to any amendments pursuant to Section 11

hereto, to the standards prescribed in the City of Port Moody Subdivision and Development Servicing Bylaw No. 2831, by two years from the date of this Agreement.

2. The Developer covenants and agrees with the City to assign, transfer and convey to the City all of its right, title and interest in the off-site Works and any and all of the lands, save and except the on-site landscaping and those lands dedicated for roads and parks which shall become Crown lands, upon or in which the off-site Works are situated, upon the completion of the such works, and the Developer will from time to time and at all times so long as it exercises any rights of ownership in the Lands upon the request of the City, make, do and execute or cause or procure to be made, done and executed, all such further acts, deeds, rights-of-way, easements and assurances for the more effectual carrying out of this Agreement.

3. The Developer shall complete the construction of the Works as specified in Section 4 hereto in accordance with the Specifications and Standard Detail Drawings to the satisfaction of the City by the date specified in Section 1 above and to do all the work in accordance with plans and as accepted by the City, and/or to make all payments to the City provided for in this Agreement. If, in the opinion of the City, the work is not being carried out with due diligence, the City may, in writing, order the Developer to employ additional workmen, machinery, tools, plant, equipment, materials, articles and things deemed necessary by the City, for the diligent advancement of the work, and the workmen so provided shall be subject to discharge by the Developer only with the consent of the City.

4. It is understood and agreed that the intent of this agreement is that the Developer shall construct fully completed works and services, including provisions for gas, electrical, telephone and cable services and grant all necessary rights-of-way as shown on the plans prepared by the Developer's Consulting Engineer. These plans are described as follows:

   (a) Drawing Number [CONSULTING ENGINEER'S DRAWING No._____, Sheets 1 to ___, Off-Site entitled "[PROJECT TITLE]", prepared by [ENGINEERING FIRM] and marked "ACCEPTED FOR CONSTRUCTION PURPOSES", by the City Engineer, [DATE],

   (b) Drawing Number [CONSULTING ENGINEER'S DRAWING No.], Sheets 1 to ___, On-Site entitled "[PROJECT TITLE]", prepared by [ENGINEERING FIRM] and marked "ACCEPTED FOR DEVELOPMENT PERMIT PURPOSES", by the City Engineer, [DATE],

   with any amendments thereto subsequently approved in writing, and are attached to the Section 219 Covenant registering Development Permit/Authorization No. _____ dated _____ on title. Plans marked "ACCEPTED FOR DEVELOPMENT PERMIT PURPOSES" and forming part thereof, shall be revised as noted and submitted to the City for final review. Plans marked "ACCEPTED FOR CONSTRUCTION" by the City Engineer shall be returned to the Developer and the Developer's Consulting Engineer. Subsequent to receipt of said plans, the Developer's Consulting Engineer may arrange for a pre-construction meeting with the City Engineer, the Developer, and the Developer's contractor. Commencement of construction is subject to all

conditions thereby identified, including those prescribed for issuance of a Highway Use Permit for any works in City or road right-of-way and insurance requirements pursuant to Section 8 herein. In addition, the Developer's Prime Contractor and Developer shall both sign the City's Pre-Construction Guideline document in acknowledgement of the City's conditions, requirements and information, prior to commencement of the on- & off-site construction works.

5. The Developer covenants and agrees to adhere in all respects to the contours, elevations and drainage patterns indicated on the lot grading plan or plans prepared by the Developer's Consulting Engineers indicated in Section 4 hereof, which plans have been accepted for the purposes of this Agreement by the Engineering & Operations Department.

6. The Developer covenants and agrees with the City that the City shall provide and erect street marker signs, regulatory and warning signs and provide and apply traffic paint and reflective beads in the marking of traffic lanes and other traffic regulatory markings upon the Lands and Highways where deemed necessary by the City with the full cost to be paid by the Developer.

7. The Developer covenants and agrees that all Works required herein, to facilitate the use and development of the Lands, except landscaping, have been designed by a Professional Engineer, who is registered with the Association of Professional Engineers of British Columbia and retained by the Developer. Plans and specifications for the Works have been prepared and sealed by the said Professional Engineer and delivered to the City for review and acceptance as required herein.

8. The Developer covenants and agrees with the City that prior to the commencement of any Works on or adjacent to City property, the Developer and its servicing contractors shall obtain and maintain in force, during the term of the Servicing Agreement and the Maintenance Period, a policy of insurance acceptable to the Municipality with limits not less than those shown in the following items:

   (c) Comprehensive Public Liability Insurance and Property Damage Insurance providing coverage of at least $5,000,000 inclusive against liability for bodily injury or death and/or damage to property on an all risk occurrence basis.

   (d) Motor Vehicle Insurance for public liability and property damage providing coverage of at least $5,000,000 inclusive on owned, non-owned or hired vehicles.

   (e) Completed operations coverage on all-risk occurrence basis of at least $5,000,000 inclusive against liability for bodily injury, death and/or damage to property of others arising out of the existence of any condition in the Work when completed or any installation or repair operations during the Maintenance Period (as defined in Section 15 (a)).

   (f) In addition to the above, the insurance policy shall:

      (i) name the City as an additional insured;

(ii) be issued by an insurance company entitled under provincial law to carry on business in British Columbia; and

(iii) state that the policy:

(A) applies to each insured in the same manner and to the same extent as if a separate policy of insurance had been issued to each insured; and,

(B) cannot be cancelled, lapsed or materially changed without thirty (30) days written notice given to the City by registered mail;

(C) will be maintained for a period ending twelve months after this Agreement is terminated; and

(D) does not include any deductible amount greater than $5,000 per occurrence.

9. As security for the due and proper performance of all of the covenants and agreements in this contract contained, the Developer shall forthwith deposit with the City the security specified in Appendix "I", Item 1 (the "Security"). The Security shall be provided in the form of cash or automatically renewing irrevocable Letter of Credit.

10. The Developer agrees that if the Works are not completed pursuant to Section 3 herein, the City may complete the Works at the cost of the Developer and deduct from the Security held by the City the cost of such completion, and the balance of the deposit shall be returned to the Developer, less any additional administration fees or cost required. If there is insufficient money on deposit with the City then the Developer will pay such deficiency to the City immediately upon receipt of the City's bill for completion. 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 as herein provided, then the Security shall be returned to the Developer.

11. It is understood and agreed that the intent of this agreement is that the Developer shall construct fully completed Works and Services, as shown on the plans specified in Section 4 hereto, and which in the discretion of the City Engineer may be varied because of conditions at the site, or through changes in City standards, procedures or Bylaws, so that the Works function and operate in a manner satisfactory to the City. Should the Works provided to be constructed herein prove to be in any way defective or should they not operate to the satisfaction of the City prior to completion, then the Developer shall, at his own expense modify and reconstruct the Works so that the Works shall be fully operative and function to the satisfaction of the City, and that such satisfaction is to be indicated by a Certificate of Acceptance, signed by the City. The Developer shall provide the City with a letter confirming that the services of a Consulting Engineer have been retained to certify that all Works and services are constructed and installed to the standards and specifications as prescribed in Bylaw No. 2831 and all other City standards as required by the City Engineer. In the event that a change to the "Accepted for Construction Purposes" drawings is proposed by the Developer, the Developer's Consulting Engineer shall submit

to the City a written Change Order Request with any construction alteration that applies to Section 4 hereto for the City Engineer’s acceptance. Failing to submit a written Change Order Request and obtaining the City Engineer’s acceptance may result in the Developer removing and replacing the altered Works to the original agreement accepted in Section 4 herein.

12. The Developer covenants and agrees to comply with the provisions of the *Highways Act*, R.S.B.C., 1996, C.188, and amendments thereto and the "City of Port Moody Street and Traffic and Public Places By-law, 1981, No. 1528", and amendments thereto, throughout the construction of the herein referred to work and without limiting the generality of the foregoing, further covenants and agrees not to deposit any material or debris upon any roads throughout the construction of the work. In the event that any material or debris should be deposited upon any road during the construction of the work, the Developer covenants and agrees that the City may forthwith remove such material or debris at the expense of the Developer, the cost of such removal to be determined by the City. In the event that any invoice of the City, for the removal of such material or debris, shall remain unpaid after thirty (30) days of receipt of same by the Developer, the City is authorized to deduct the amount of such invoice from the deposit referred to in Section 9 hereof.

13. The Developer shall not employ any person who, in the opinion of the City, is unfit or not skilled in the work assigned to him. The Developer shall at all times in connection with the execution of the work, keep and employ a competent general superintendent capable of speaking, reading and writing the English language, and any explanations, orders, instructions, directions and requests given by the City to such superintendent shall be held to have been given to the Developer.

14. The Developer covenants and agrees to comply with any changes in requirements or standards enacted by Bylaw prior to the actual commencement upon the Lands of the Works contemplated by this Agreement.

15. The Developer covenants and agrees:

    (a) To maintain the Works to be built pursuant to this Agreement in complete repair for the performance test period of one (1) year from interim substantial performance thereof as certified by the City (the “Maintenance Period).

    (b) To remedy any defects appearing within the performance test period of one (1) year from the date of such interim substantial performance of the Works and pay for any damage to other work 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.

    (c) To deposit with the City for the performance test period of one (1) year from interim completion of the Works, as certified by the City, an amount specified in Appendix "I", Item 2, and should the Developer fail to maintain the Works, remedy any defect or pay for any damage resulting

therefrom, the City may deduct the cost of completing the Works, remedying the defect or paying the damage from the said deposit.

(d) In addition to paragraph 15(c), the City will require a security deposit for:

i) The placement of surface lift paving if not completed prior to the expiration of the one (1) year performance test period. The surface lift paving will require placement during favourable weather conditions, and after the one (1) calendar year completion period on the base lift asphalt pavement works, or as directed by the City Engineer. In addition, a new one (1) year performance test period shall apply in relation to the placement of the surface lift pavement. The amount of the security deposit, if necessary, will be established by the City Engineer and in place before the release of the amount specified in Appendix "I", Item 3(i).

ii) All outstanding deficiencies addressed in the Certificate of Interim Substantial Performance list. In addition, a new one (1) year performance test period shall apply to all the outstanding deficiencies, addressed in the Certificate of Interim Substantial Performance. Where the Developer fails to remedy all deficiencies contained in the Certificate of Interim Substantial Performance by the end of the additional one year performance test period, the City may, but is not obligated to, draw on the security deposited by the Developer as referred to in Appendix “I”, Item 1, and carry out such work as may be necessary to remedy all outstanding deficiencies. All deficiencies, as addressed in the Certificate of Interim Substantial Performance list, are to be completed and fulfillment of all performance test periods before the City may provide the Developer the Certificate of Acceptance towards the total performance for this project.

iii) The certified “As-Constructed” drawings and service connection cards, as described in paragraph 15(e). A deposit will be required in accordance with Appendix “I”, Item 3.

(e) The Developer’s Consulting Engineer shall submit to the City the final ”As-Constructed” drawings of all Works as constructed and as accepted by the City and certified correct by the Developer's Consulting Engineer, within two months after Interim Substantial Performance of the Works. The Developer’s Consulting Engineer shall provide the following Certified “As-Constructed” plans and documents:

i) One complete set of mylar 24” x 36” “As-Constructed” drawings, signed and sealed by the Consulting Engineer;

ii) One complete set of off-site and on-site digital AutoCAD drawings and digital field survey data;

iii) One complete set of paper form certified (signed, sealed and dated) and digital AutoCAD service connection records.

(f) To pay to the City those amounts set out in Sections 4 and 5 of Appendix “I”.

16. The Developer covenants to save harmless and effectually indemnify the City against:

(a) All actions and proceedings, costs, damages, expenses, claims and demands whatsoever and by whomsoever brought by reason of the construction of the Works.

(b) All expenses and costs which may be incurred by reason of the execution of the works resulting in damage to any property owned in whole or in part by the City or which the City by duty or custom is obliged, directly or indirectly, in any way or to any degree, to construct, repair or maintain.

(c) All expenses and costs which may be incurred by reason of liens for non-payment of labour or materials, workers' compensation assessments, unemployment insurance, Federal or Provincial Tax, check-off and for encroachments owing to mistakes in survey.

17. The City hereby covenants and agrees with the Developer to permit the Developer to perform all the work upon the terms and conditions herein contained.

18. The City covenants and agrees that upon satisfactory completion by the Developer of all of the covenants and conditions in this Agreement, and without limiting the generality of the foregoing, including the maintenance of the Works constructed pursuant to this agreement in complete repair for the performance test period of one (1) year, to provide the Developer with the letter of acceptance of the Works, signed by the City.

19. Notwithstanding any provisions of this contract hereinbefore contained and notwithstanding the provisions of "City of Port Moody Building and Plumbing Code Administration By-law, No. 2577" and amendments thereto and of Sections 694(1)(d) and 694(3) of the *Local Government Act*, R.S.B.C. 1996, c. 323, and amendments thereto, the Developer covenants and agrees that the City, with regard to the construction of new building(s) under building permits, may withhold the granting of an occupancy permit for the occupancy and/or use of any building or part thereof, constructed upon the Lands until the applicable works herein have been completed to the satisfaction of the City as evidenced by the Certificate of Completion provided to the Developer by the City.

20. It is understood and agreed that the City has made no representations, covenants, warranties, guarantees, promises or agreements (verbal or otherwise) with the Developer other than those in this Agreement.

21. Subject to this Agreement and Development Permit/Authorization No. _____ and accepted servicing plans attached thereto, the within Works and the development herein shall comply with all of the Bylaws of the City of Port Moody.

WHEREVER the singular or masculine is used throughout this Indenture, the same shall be construed as meaning the plural or the feminine or body corporate or politic where the context or the parties hereto so require.

THIS AGREEMENT shall enure to the benefit of and be binding upon the parties hereto, their respective heirs, executors, administrators and assigns.

IN WITNESS WHEREOF the parties hereto have hereunto set their hands and seals on the day and year first above written.

THE CITY OF PORT MOODY
By its authorized signatories:

_____
MAYOR

_____
(PRINT NAME UNDER SIGNATURE)

_____
CLERK

_____
(PRINT NAME UNDER SIGNATURE)

DEVELOPER
by its authorized signatory:

By

_____

_____
(PRINT NAME UNDER SIGNATURE)

APPENDIX "I"

1 The Security referred to in Section 9 of this Agreement shall consist of 100% of the costs of construction of the off-site works, in the amount of $_____, which is based on the detailed construction cost estimate provided by the Developer's Consulting Engineer, plus GST, contingency and inflation adjustments, to the satisfaction of the City Engineer.

2 The deposit of funds for the performance test period of one year for Interim Substantial Performance (maintenance) purposes, referred to by Section 15(c), shall be 10% of the total amount in item 1 above (less electrical, gas and communication utility costs).

3 The deposit of funds for item 1 above shall also be applied to:

i) The placement of the surface lift of paving referred to in Section 15(d) (i). If this Work is completed prior to receiving the Certificate of Interim Substantial Performance, the deposit of funds may not be required.

ii) The uncompleted deficiencies referred to in Section 15(d) (ii). The Developer shall submit cost estimates to the City for remedying all deficiencies listed in the Certificate of Interim Substantial Performance. If the Developer fails to submit cost estimates or submits cost estimates which are not acceptable to the City Engineer, the City Engineer shall have the right to determine the amount of the cost estimates and the value of the additional security to be deposited.

iii) The Certified "As-Constructed" drawings and service connection record cards, addressed in Section 15(d) (iii) and 15(e), shall be for a minimum of five thousand dollars ($5,000) or five percent (5%) of the total amount in item 1 above, whichever is the greater.

4 The payment of the off-site works plan review & monitoring fee as provided in the City's Fees Bylaw of the total amount identified in Item 1 above, which amounts to $_____, to be paid by cash or certified cheque.

5 The payment of on-site works plan review fee in accordance with the City's Fees Bylaw, which is based on the detailed construction cost estimate provided by the Developer's Consulting Engineer, plus GST, contingency and inflation adjustments, to the satisfaction of the City Engineer, which amounts to $_____, to be paid by cash or certified cheque.

END OF DOCUMENT

Schedule A Replaced by BL3165

Schedule A – Sample Letter of Credit

SAMPLE LETTER OF CREDIT

(TO BE ON BANK LETTERHEAD)

_____ DAY OF_____ , 20___

The City of Port Moody
100 Newport Drive.
Port Moody, B.C.
V3H 5C3

Dear Sirs/Madam:

Re: Subdivision at
Lot No. Block D.L. Plan

At the request of and for the account of (Name of Company or Person for whom the letter is for), we hereby establish in your favour our automatically renewing Irrevocable Letter of Credit for the sum not exceeding_____.

This credit shall be available to you by sight drafts drawn on the (Name of Bank) when supported by your written demand for payment made upon us.

We shall honour your demand without inquiring whether you have a right as between yourselves and our said customer, and that these funds shall be used to install and complete the servicing requirements for the subdivision known as_____ Port Moody, B.C.

Partial drawings are permitted and should be drawn under the (Name of Bank and Branch Address) automatically renewing Irrevocable Letter of Credit No._____ dated_____.

We hereby agree with the drawers, endorsers, and holders in due course of draft drawn under this credit that such drafts will be duly honoured provided that all the terms and conditions of the credit have been complied with.

Yours truly,

Manager
On Behalf of
(NAME OF BANK)

SCHEDULE B

Required Level of Service

1.0 INTENT

The intent of the regulations set forth in this Schedule is to ensure that every parcel of land created by subdivision or developed under this Bylaw is provided with an adequate standard of works and services, including those provided by highways, boulevards, boulevard crossing, transit bays, street lighting, underground wiring, sidewalks, a water distribution system, a fire hydrant system, a sanitary sewage collection and disposal system, a storm drainage collection and disposal system.

1.1 For the propose of this Bylaw, the types of City services required under various zones shall be provided in accordance with the standards set out in Table 1 and Table 2 of this Schedule.

1.2 All City services required in Table 1 and Table 2 of this Schedule shall be designed and constructed in accordance with Schedules C, D and E of this Bylaw.

Schedule C: Design Criteria
Schedule D: General Construction Requirements
Schedule E: Specifications & Standard Detail Drawings

2.0 HIGHWAYS

Highways in or immediately adjacent to the development shall be provided in accordance with Table 2. Where a Highway abuts two different land uses, the highest requirement shall apply.

2.1 Sidewalks And Walkways

The Owner shall provide sidewalks on highways within or adjacent to the lands being subdivided in accordance with the standards as set out in this Schedule for the various classifications of highway in each zone. Without limiting the generality of the foregoing, the City will require:

2.1.1 sidewalks along any highway within or immediately adjacent to the subdivision on which pedestrian traffic is expected to be generated;

2.1.2 sidewalks along the side of the highway within or immediately adjacent to the subdivision which fronts on or abuts a school, park, recreation facility, public building, shopping or commercial development; and

2.1.3 sidewalks on each side of all arterial or collector roads within the subdivision; and

2.1.4 walkways within the subdivision connecting points between which pedestrian movement will be generated.

2.2 Cul-De-Sac

No-cul-de-sac shall exceed a length of 150 m as measured from beginning of its turnaround to the nearest right-of-way line of an intersecting highway having more than one access, unless an emergency alternate access is provided. However, the maximum length of any cul-de-sac shall not exceed 220 m.

The emergency alternate access shall directly connect from the turnaround of a cul-de-sac to an adjacent highway.

TABLE 1 SERVICING REQUIREMENTS

LAND USE	WATER SYSTEM	SANITARY SYS	STORM DRAINAGE SYSTEM	PRIVATE UTILITY SERVICES	HIGHWAY	STREET LIGHTING
Acreage Reserve	1	2 or 6	3 or 7	Overhead	4	At intersection
Residential	1	2	3	Underground	4	5
Commercial	1	2	3	Underground	4	5
Industrial	1	2	3	Underground o overhead at rear of lot	4	5
Institutional	1	2	3	Underground	4	5

NOTES OF REFERENCE FOR TABLE 1

1. All parcels shall be serviced by potable water and fire hydrant system supplied from city mains designed and installed in accordance to Schedules C, D and E.
2. All parcels shall be serviced by the City or Greater Vancouver Sewerage & Drainage District (GVS&DD) sanitary sewer system designed and installed in accordance to Schedules C, D and E.
3. All parcels shall be serviced by the City or Greater Vancouver Sewerage & Drainage District (GVS&DD) enclosed storm drainage sewer system designed and installed in accordance to Schedules C, D and E.
4. See Table 2 of this Schedule.
5. Street Lighting required in accordance to Schedules C, D and E.
6. When the City sanitary sewer system is not available, an alternative system satisfactory to the Medical Health Officer and the City is required.
7. If the existing storm drainage collection system consists of open ditches, the same may be accepted by the City. Ditches shall be sized to accommodate the major flow.
8. Underground means underground wiring for hydro, telephone and cablevision systems including distribution and services to each parcel.
9. Overhead means overhead wiring for hydro, telephone and cablevision systems permitted.

TABLE 2 HIGHWAYS MINIMUM STANDARDS

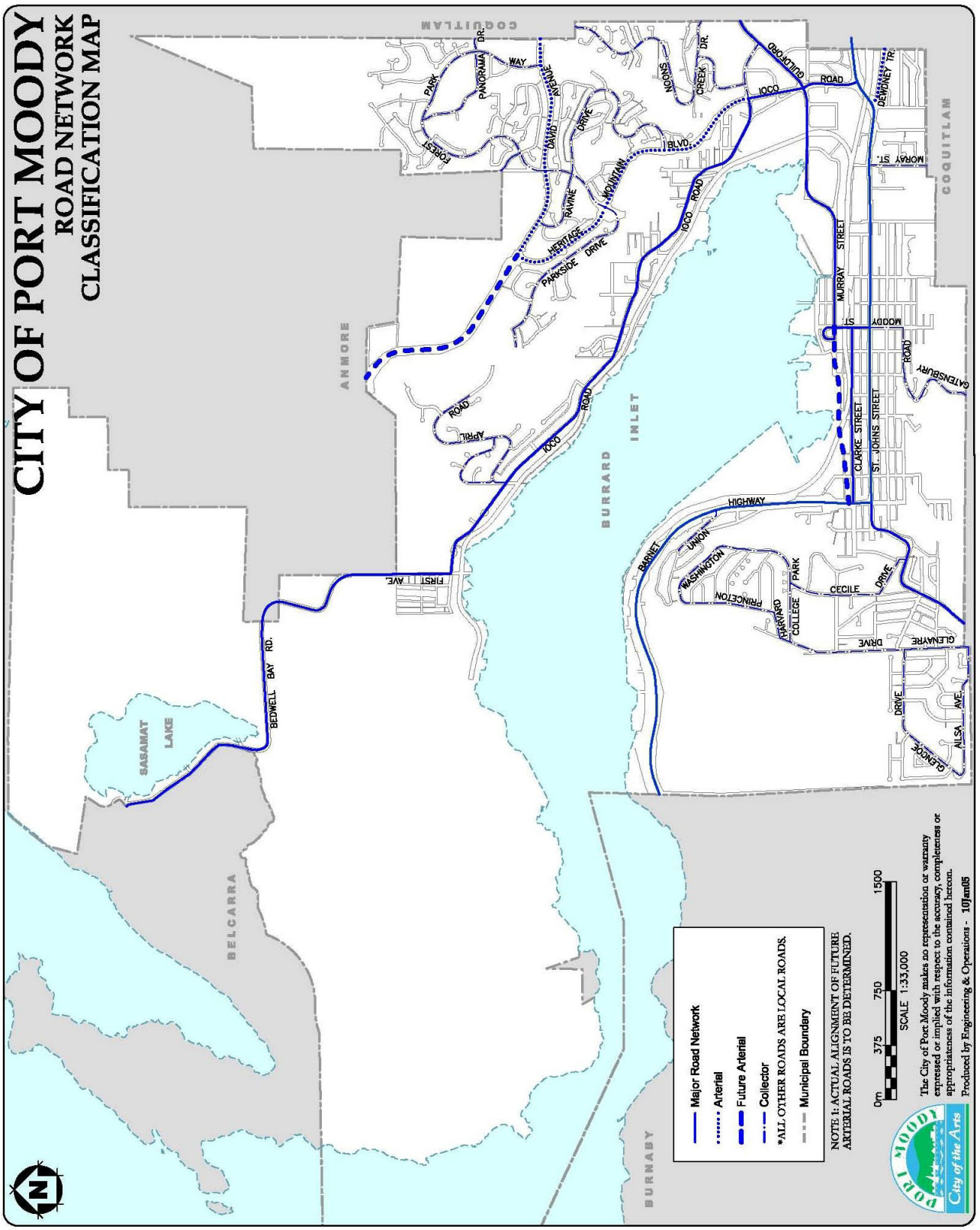
Replaced by BL3165

ROAD CLASSIFICATION	Right-of-Way Width (m)	Pavement Width (m)	Sidewalks	Boulevard Landscaping
Major Road Network – Arterial	See Note 1	See Note 1	Both Sides	Required
Arterial	See Note 1	See Note 1	Both Sides	Required
Collector with Bicycle Lanes	24	15	Both Sides	Required
Collector	20	11	Both Sides	Required
Local Residential (High Density)	20	11	Both Sides	Required
Local Residential (Single Family or Low Density)	17	8.5	One Side	Required
Local Industrial/Institutional	20	11	One Side	Required
Local Commercial	20	11	Both Sides	Required
Cul-de-Sac (Residential)	17m and 15m bulb radius	8.5m and 12m bulb radius	One Side	Required
Cul-de-Sac (Ind/Comm/Inst)	20m and 18m bulb radius	11m and 14m bulb radius	One Side or Both Sides	Required

Replaced by BL3165

NOTES OF REFERENCES FOR TABLE 2

1. To be determined by the Director for required right-of-way and pavement widths for various arterial highways.
2. Additional pavement width shall be provided at the intersection of highways to provide turning traffic movements.
3. Additional pavement widths and right-of-way shall be provided on transit routes for bus bays. The location shall generally be on the far side of the intersecting lateral road.
4. Provision must be made for mail box delivery and solid waste/recycling collection services in each proposed subdivision. This may require additional pavement and/or right-of-way.
5. Reduced right-of-way and/or pavement widths may be accepted by the Director for comprehensively planned infill development projects that can clearly demonstrate that all services required by this bylaw can be provided adequately by the development project.
6. Requirement for sidewalk may be reduced or waived at the discretion of the Director for short cul-de-sac's or in established neighbourhoods where sidewalk connection is not planned in the future.


CITY OF PORT MOODY
ROAD NETWORK
CLASSIFICATION MAP
COQUITLAM
ANMORE
BELCARRA
BURNABY
BURRARD INLET
SASAMAT LAKE
Major Road Network
Arterial
Future Arterial
Collector
*ALL OTHER ROADS ARE LOCAL ROADS.
Municipal Boundary
NOTE 1: ACTUAL ALIGNMENT OF FUTURE ARTERIAL ROADS IS TO BE DETERMINED.
0m 375 750 1500
SCALE 1:33,000
The City of Port Moody makes no representation or warranty expressed or implied with respect to the accuracy, completeness or appropriateness of the information contained hereon.
Produced by Engineering & Operations - 10Jan05
PORT MOODY
City of the Arts

SCHEDULE C

DESIGN CRITERIA

DESIGN CRITERIA

PART 1

GENERAL

1.1 GENERAL

1.1.1 Interpretation
1.1.2 Use of Design Criteria Mandatory
1.1.3 Minimum Standards and Consulting Engineer's Responsibilities
1.1.4 Existing Works and Services

1.2 UTILITY REQUIREMENTS

1.2.1 Utility Rights-of-Way
1.2.2 Water Supply Interconnections
1.2.3 Horizontal Separation
1.2.4 Vertical Separation
1.2.5 Special Conditions

1.3 DESIGN POPULATION BY LAND USE

1.4 EXCESS & EXTEND CAPACITY

GENERAL

1.0 GENERAL

1.1. Interpretation

In this Schedule, where the words "Professional Engineer" or "Consulting Engineer" are used, they shall mean a professional engineer registered in the Province of B.C. retained by the Owner for the purpose of designing and inspecting the works and services required under this Subdivision and Development Servicing Bylaw. Where the words "Specifications" and "Standard Detail Drawings" are used, they shall mean the Specifications and Detail Drawings in the Master Municipal Contract Documents and the City's Supplementary Specifications and Supplementary Standard Detail Drawings as defined in Schedule E forming part of this Bylaw.

1.2. Use of Design Criteria Mandatory

All works and services to be provided and constructed under this Bylaw shall be designed by a professional engineer in accordance with the Design Criteria and Specifications and Standard Detail Drawings set out in this Bylaw. Where conditions arise which are not covered by the Design Criteria, Specifications or Standard Detail Drawings, it shall be the responsibility of the Consulting Engineer to consult with the Director for direction prior to completing the design.

1.3. Minimum Standards and Consulting Engineer's Responsibilities

The Design Criteria specified in this Bylaw shall be considered minimum standards and shall not relieve the Consulting Engineer from his or her professional responsibilities to ensure the adequacy of the design.

The City requires quality submissions for design and record drawings. It is recommended that whenever engineering works are required or proposed, the Consulting Engineer arranges for a pre-design meeting to ensure compliance with the latest municipal standards, specifications and policies.

Where sub-consultants are employed by the Consulting Engineer in the design process, the City will expect the Consulting Engineer to represent the sub-consultant's work for administrative and procedural purposes.

1.4. Existing Works And Services

Existing (as-constructed) services information may be available from the City. This information is made available on the understanding that the City accepts no responsibility for their accuracy or completeness. Verification of this information must be made by the Consulting Engineer responsible

for the design. Variations must be referred to Director before completion of design drawings.

1.2 UTILITY REQUIREMENTS

1.2.1 Utility Rights-Of-Way

The minimum width of statutory rights-of-way shall be:

a) 3 m for a single lot utility
b) 5 m for two utilities
c) 6 m for three utilities

A cross section of the proposed trench(es) shall be shown indicating the minimum safe elevation of adjacent building footings based on a safe angle of repose from the bottom of trench excavation. This angle of repose shall be 45 degrees unless otherwise approved by the Director.

1.2.2 Water Supply Interconnection

There shall be no physical connection between a public or private potable water supply system and any appurtenance which would permit the passage of sewerage or polluted water into the City's potable water supply.

1.3 DESIGN POPULATION BY LAND USE

The following equivalent population should be utilized for design purpose:

Land Use	dupha	ppdu	ppha
Single Family Residential	23	3.2	74
Medium-Density Multiple Family Residential	60	2.5	150
High- Density Multiple Family Residential	170 or more	1.5	255
Commercial	-	-	90
Industrial	-	-	45
Institutional	-	-	50

NOTE dupha - dwellings units per hectare
ppdu - population per dwelling unit
ppha - population per hectare

1.4 EXCESS AND EXTENDED CAPACITY

When the Owner is required to install works and services which:

a) are in excess of the capacity required for the proposed development, or

b) may provide service to lands other than the proposed development with respect to road, water, sewage or drainage system, the City shall:

   i) determine the portion of the cost of providing those facilities that the City considers constitutes excess or extended service;

   ii) prepare an excess or extended services "Latecomer Agreement" to impose a charge related to that portion of the excess or extended service benefiting each parcel of land, that will be served by the excess or extended service. This charge shall be payable by the owner of the benefiting lands prior to connection of any of the benefitting lands to those services.

The Owner shall provide all supporting documentation necessary for the City to establish the cost of any excess or extended service provided and the extent of the benefitting lands. This information shall include detail cost estimates prepared by a professional engineer.

DESIGN CRITERIA

PART 2

DRAWINGS STANDARDS

2.1 GENERAL

2.1.1 Design Drawings

2.2 APPROVAL PROCEDURE

2.2.1 Works and Services Required
2.2.2 Preferred Location of Services, Mains and Service Connections
2.2.3 Design
2.2.4 Professional Engineer's Seal
2.2.5 Submission of Drawings
2.2.6 Review of Drawings
2.2.7 Unacceptable Drawings
2.2.8 Resubmission of Drawings
2.2.9 Approval of Other Agencies
2.2.10 Notice of Acceptability of Design Drawings
2.2.11 Other Utilities

2.3 UTILITY OFFSETS

2.4 TYPICAL DETAILS

2.5 CONSTRUCTION DRAWING STANDARDS

2.5.1 General
2.5.2 Description of Drawings
2.5.3 Preparation of Drawings
2.5.4 As-constructed Drawings
2.5.5 Operations and Maintenance Manuals

DRAWINGS STANDARDS

2.1 GENERAL

2.1.1 Design Drawings

All design drawings prepared by the Consulting Engineer for submission to the Director shall conform to the minimum drawing standards specified in this Schedule.

2.2 APPROVAL PROCEDURE

2.2.1 Works and Service Required

When notification is given to the Owner, by the City indicating that the proposed subdivision is currently being reviewed, the Owner shall have a concept plan prepared, showing the proposed works and service to be constructed under this Bylaw. This concept plan shall be submitted to the Director for preliminary review of the basic concepts of servicing proposed for this subdivision. This concept plan is intended only as a guideline and is not an approval of the proposed works and services. The concept plan will normally be prepared by the Owner's Consulting Engineer. Once this concept plan has been reviewed and accepted, the Consulting Engineer will be required to complete the detailed design drawings for the works and services to be provided and constructed in accordance with the Design Criteria, Specifications and Standard Detail Drawings of this Bylaw.

2.2.2 Preferred Location of Services, Mains and Service Connections

Preferred locations of services within highway rights of way are detailed in the Supplementary Detail Drawings. Variations from these locations must be referred to Director before completion of design drawings.

2.2.3 Design

Upon completion of the concept plan review by the Director, the Consulting Engineer shall arrange for any necessary survey, soil testing, feasibility study, traffic analysis, etc. in order to complete the required design drawings. "As constructed" information on existing city's underground utilities may be obtained from the City.

2.2.3 Design (continued)

The Consulting Engineer will be responsible for performing all the necessary calculations and field verifications to ensure that all the designs for the required works and services conform to the Design Criteria, Specifications and Standard Detail Drawings. Deviation from the concept plan may be accepted, providing they accomplish the same purpose and are agreed to by the Director. The Design Criteria as defined in this Bylaw shall be considered minimum standards and shall not relieve the Consulting Engineer of his or her professional responsibilities to ensure the adequacy of the design.

2.2.4 Professional Engineer's Seal

The professional engineer's seal on the drawing, submitted by the Consulting Engineer to the Director for review and acceptance, shall certify that the design has been completed in compliance with the Design Criteria, Specifications, Standard Detail Drawings and in accordance with accepted engineering practices of the day. Drawings shall not be submitted to the Director for review and acceptance without the professional engineer's seal on each drawing.

2.2.5 Submission of Drawings

The Consulting Engineer shall submit two complete sets of paper prints of the design drawings bearing the professional engineer's seal to the Director for review. The design submission shall also include a copy of supporting design calculations used to complete the drawings.

2.2.6 Review of Drawings

The City's review of the design drawings and calculations is procedural only to verify general conformance with the City requirements. By reviewing the design drawings and accepting them for construction purposes, the City does not confirm the adequacy or accuracy of the design nor certify that the design is correct. The City does not accept in whole or in part the responsibility for the proper design of the works and services which is the responsibility of the Owner's Consulting Engineer.

Any design errors, deficiencies and/or omissions found during construction of the works and services as well as resulting damages shall be rectified at the cost of the Owner.

The "Accepted for Construction Purposes" drawings shall not be revised or altered without the written approval of the Director.

2.2.6 Review of Drawings (continued)

The Director may approve changes to the “Accepted for Construction Purposes” drawings during construction. The changes requested by the Consulting Engineer will only be approved if, in the opinion of the Director, the requested change will operate in a like-manner to that which is already contained in the “Accepted for Construction Purposes” drawings.

2.2.7 Unacceptable Drawings

If the Director finds that the submitted design drawings and calculations are not acceptable, one marked up set of drawings will be returned to the Consulting Engineer for reconsideration and revision as necessary.

The Consulting Engineer will be fully responsible for the corrections made to the design. If, in the opinion of the Consulting Engineer, the revisions requested by the Director are not in accordance with accepted engineering practice, then an alternate resolution to the problem must be reached with the Director before resubmission of the design drawings.

2.2.8 Resubmission of Drawings

The resubmission of the design drawings shall be in accordance with Part 2 Section 2.2.5. When resubmitting revised design drawings, the Consulting Engineer shall return the marked up set of the prior submission drawing to the City.

2.2.9 Approvals of Other Agencies

It is the responsibility of the Consulting Engineer to obtain all the necessary approvals from other agencies who may be involved. These could include Fisheries and Oceans Canada, Ministry of Environment, the Regional District, hydro, gas and telephone utilities, the National Energy Board, Ministry of Health, etc. 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.

Normally, these applications would not be made until the City has notified the Consulting Engineer that the design drawings are acceptable. However, initial contact with these agencies shall be made by the Consulting Engineer during design to ensure agency requirements are addressed as part of the design.

2.2.10 Notice of Acceptability of Design Drawings

Upon notification that the design drawings are acceptable to the Director, the Consulting Engineer will be asked to submit five complete sets of paper prints duly signed and sealed. One set will be stamped "Accepted for construction purposes" by the City and returned to the Consulting Engineer. It is the responsibility of the Owner and the Consultant Engineer to ensure that the required works and services are provided and constructed in accordance with the "Accepted for Construction Purposes" design drawings.

2.2.11 Other Utilities

It shall be the responsibility of the Consulting Engineer to coordinate the design and location of hydro, telephone, cablevision, natural gas and other underground or overhead utilities with the appropriate authorities.

2.3 UTILITY OFFSETS

2.3.1 General

Wherever practical, utility layouts shall conform to the offsets indicated by the Standard Detail Drawings for the class of road in which they are being constructed.

Where the standard offsets are not practical, due to existing utilities or other constraints, the following principles shall apply to the choice of offsets:

- No utilities to be located directly under or within 0.5 m of the curb or sidewalk alignment.
- Manholes shall be kept out of wheel paths on roadways.
- Minimum clearance from face of curb to any fixed object to be 0.6 m.
- Preferred locations of service connections for single family lots are: water at 1.0m from either corner of the lot, storm drain at 3.0 m from the downhill corner and sanitary sewer 3.5 m from the downhill corner.

2.3.2 Horizontal Separation for Water and Sewer Works

(as specified by the Ministry of Health)

Whenever possible, sanitary or storm sewers shall be laid at least 3 meters horizontally from any existing or proposed watermain. Should local conditions prevent a lateral separation of 3 m, a sewer may be laid closer than 3 m to a watermain if:

a) It is laid in a separate trench, or

b) It is wrapped in lining approved by the Director.

c) In either case, the elevation of the crown of the sewer shall be at least 0.5 m below the invert of the watermain.

In all cases the proposed watermain improvements will require Ministry of Health approval.

2.3.3 Vertical Separation for Water and Sewer Works

Where sewer and water mains cross, the sewer shall be below the watermain with a minimum clearance, from invert of the watermain to the crown of the sewer main, of 0.5 m.

Where trench lines cross, the support for the upper pipes shall be adequately designed to span the defined trench width.

2.3.4 Special Conditions for Water and Sewer Works

When it is impossible to obtain proper horizontal and vertical separation as specified in this Schedule, the Director may consider the sewer to be either constructed of ductile iron pipe or encased in concrete over a length extending 3 meters either side of the watermain and sanitary sewer shall be pressure tested to ensure water-tightness.

2.4 TYPICAL DETAILS

Prior to commencing design, the Consulting Engineer shall be familiarized with this Bylaw including the Schedules as well as the Master Municipal Document (MMCD) and City's Supplementary Specifications and Supplementary Detail Drawings.

2.4 TYPICAL DETAILS (continued)

Where there is a discrepancy between the MMCD and the detail design drawings, the "Accepted for Construction Purposes" design drawings shall govern.

2.5 CONSTRUCTION DRAWING STANDARDS

2.5.1 General

All works and services drawings shall be prepared on 3 mil mylar reproducible film in metric units on A1 size sheets (594 mm x 841 mm outside dimensions). Where plan and profile views are required, the plan section shall be on the top with the profile at the bottom. Cross-sections shall be shown on grid lines to define the vertical and horizontal limits of the section.

2.5.2 Description of Drawings

A separate drawing shall be submitted for each of the following:

- Cover sheet – optional
- Site plan (1:500 to 1:5000)
- Key plan (1:250, 1:500, or 1:1000)
- Legal (subdivision) plan prepared by Registered B.C. Land Surveyor
- Storm drainage catchment area servicing plan
- Sanitary sewer catchment area servicing Plan
- Lot grading plan
- Storm water management plan including watercourses and channel features
- Sediment control plan (for construction phase)
- Roadworks plan and profile (including sidewalks and walkways)
- Road cross sections
- Waterworks plan and profile
- Sanitary sewer plan and profile
- Storm sewer plan and profile
- Street lighting and traffic signal plans
- Detail sheets as required
- Hydro service plan
- Telephone service plan
- Gas service plan

2.5.3 Preparation of Drawings

2.5.3.1 General

All drawings shall have the Consultant’s name, address and telephone number, Client’s name, project name, drawing title, drawing number, City of Port Moody project number where applicable, date, scale, professional engineer’s seal and drawing revision data.

All dimensions on plans and profiles shall be in metric (m or mm). The plan view shall show the legal layout of highways and properties, with all legal descriptions and dimensions (to the nearest 0.01m) taken from the registerable legal plans prepared by a registered land surveyor. The plans shall also show all statutory rights-of-way and easements. The names of highway shall be shown outside of the road right-of-way boundaries.

Except as otherwise shown, plans will be to a horizontal scale of 1:500 or 1:250 and a vertical scale of 1:50 or 1:25.

The key plan shall show all existing and proposed services including drainage, water, sanitary, road, street lighting, gas and hydro on a legal base plan. The City file number and the project title should be shown in the lower right-hand corner.

On profiles, all elevations used shall be to Geodetic Datum and rounded off to the nearest 0.01 m.

Bench marks shall be detailed and noted on each of the drawings with respect to location and elevation. Survey monument locations shall be shown on the plan view.

All proposed works and services shall be designed based upon field survey data showing existing ground elevations at maximum 20 m spacing. Design based on the grid “contour map” procedures will not be acceptable. Coordinated survey design procedures shall be used with a complete list of the location co-ordinates attached to the design submission.

Design drawings should extend beyond the limits of the development work to show any necessary transitions, connections and the effect of development work on existing City roads and utilities.

2.5.3.1 General (continued)

Design plans shall include all existing waterworks and connections, sanitary sewers and connections, storm sewers and connections, catch-basins, ditches, driveway culverts and their sizes, poles, manholes, hydrants, water valves, other surficial features such as watercourses, environmentally sensitive areas, trees, retaining walls and hedges which may be affected by proposed construction, base-line of survey, edges of existing road and driveways, gas and underground electrical and telephone ducts.

All works and services shall be referenced to property lines and dimensioned as to size. The proposed works shall be shown in bold lines.

2.5.3.2 Lot Grading

The Lot Grading Plan shall show the topography prior to development, with contours at maximum 1 meter spacing where the slope of the ground is 5% or greater or at 0.5 m spacing where the slope is less than 5%. The proposed roads, major flow flood paths and lots shall be shown with the post-development ground elevations at each corner of the lots and at any breakpoints. At the centerline of the roads and major flow flood paths, the elevations shall be shown at 20 m intervals. Each lot shall show the approximate location of the building, details of the grading around it to direct surface storm water flow away from the building and any other necessary grading or drainage features.

2.5.3.3 Sanitary and Storm Drainage Plans

Sanitary Sewer plans and the Storm Drainage plans shall show all data pertaining to the design including the size, full bore capacity in m^3/s, the design flow, grade, length, specifications (i.e. type and class of pipe), manhole and catch basin frame elevations and stationing and services crossed by proposed works and their elevations. Hydraulic grade line for both minor and major storm drainage flows shall be shown in profile. Drainage features such as culverts, headwalls, riprap, infiltration trenches, etc. shall include detailed specifications.

Sanitary Sewer plans and Storm Drainage plans must show existing lot elevations at 10m behind the front lot line, minimum

basement floor elevations for each new lot and basement floor elevations of all existing buildings.

The invert and depth for each proposed connection shall be "boxed in" for each property. A co-ordinate list of all locations of service connections, manholes, catch basins, etc., shall be submitted with the design drawings.

Where the storm and sanitary sewers are proposed in a common trench, the two drawings may be combined into one drawing for clarity.

The Drainage and Sanitary Sewer Catchment Area Plans shall show tributary catchment areas used in sizing the mains, as far as the point of discharge to an adequately sized trunk main or drainage outfall. The sanitary sewer plan shall show the tabular design calculations in accordance with the design criteria. The drainage plan shall show the tabular design runoff calculations in accordance with the design criteria for both the minor and major flows.

The Storm Water Control Plan shall show the routing, flow quantity and method of containment for storm water flows within and downstream of the development. Downstream effects shall be shown as far as the receiving adequately sized trunk main or watercourse.

2.5.3.4 Roadworks Plan

The Roadworks plan shall show centreline stationing and profiles complete with elevations of existing ground and proposed roadway elevations, curb return geometrics and profiles, cul-de-sac and intersection geometrics and profiles.

Road cross sections shall be provided at 10m intervals when widening existing roads and at 20m intervals for new road construction including property lines, final cut and fill slope, ditches, edges of existing roadways and finished surfaces. Typical and unusual cross-sections shall also be provided including corridors reserved for each utility.

The Roadworks plan and profile shall show all data pertaining to design of the proposed roadway such as horizontal and vertical curve design elevations, "k" factors, curb returns, typical cross-

section of roadway construction and reference to the co-ordinate listing of all design data relating to roadworks.

2.5.3.5 Water Works Plan

The Waterworks plan shall show all proposed waterworks and connections. All fittings and other details to be used shall be "boxed in" for each location. Details of valves, fittings and thrust blocks may require blow up details for clarification. All existing services crossed by the proposed works shall be shown along with elevations to verify clearance. A network system calculation report including computer analyzes shall be submitted along with the design drawings.

The maximum static pressure which the watermain will be subject to shall be shown as a separate note on the drawing.

Certification of proposed water works from the health unit shall be submitted along with the final design drawings.

2.5.3.6 Private Utilities Plans

The proposed underground utilities such as hydro, telephone, gas, cable and other communication shall be designed by the individual utility companies and the drawings submitted to the City for review and acceptance. The Consulting Engineer shall be responsible for coordinating and verifying the proposed corridor with the utility companies and the City will require verification that there are no conflicts in design by all outside agencies before final acceptance will be given by the City.

2.5.4 As-Constructed Drawings

As-Constructed Drawings shall consist of the original Design Drawings accurately revised to reflect actual construction changes in the field. Cross-section drawings do not require revisions to show final construction elevations. A record set of these design cross-sections shall be included with the As-constructed submission. One complete set of As-Constructed Drawings sealed by the Consulting Engineer, shall be provided.

The seal affixed by the Consulting Engineer shall be presented as the certificate that all works and services have been constructed and installed to the standards prescribed by the City. The Consulting Engineer is

responsible to ensure inspection and certification is provided through-out the construction period. The revisions portion of the title block shall be completed with the following:

"Certified As-Constructed Drawing"

Two complete sets of sealed paper prints shall be provided for review by the City. When acceptable, the original design drawings, certified to as-constructed conditions, along with the AUTOCAD files shall be provided.

The Consulting Engineer shall complete and submit a separate record connection card for each of the water, storm and sanitary connections made. The blank record cards shall be obtained from the City.

2.5.5 Operation and Maintenance Manuals

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

Four (4) copies of each Operation and Maintenance Manual must be provided and contain as appropriate:

- description of facility and major mechanical, ventilation, electrical and monitoring systems;
- status and location of facility within overall utility system or service;
- geographic location and photographs;
- design criteria including flows and pressures;
- record construction and shop drawings;
- test reports;
- equipment layout drawings;
- equipment manufacturers data and service manuals;
- electric power distribution single line diagram and service details;
- electrical, control and alarm wiring diagrams (laminated);
- PLC ladder diagram (laminated);
- control telemetry details with inputs and outputs identified;
- additional instrumentation;
- operating instructions for all equipment;
- routine and preventative maintenance schedule;
- routine and preventative maintenance diary;
- equipment data sheets;

- spare circuit cards for critical components;
- certified head/capacity curves for pumps;
- equipment part lists and list of suppliers;
- emergency operating procedures.

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

DESIGN CRITERIA

PART 3

SANITARY SEWER SYSTEM

3.1 GENERAL

3.2 DESIGN FLOWS

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3.2.2 Infiltration
3.2.3 Peaking Factor
3.2.4 Total Design Flow

3.3 SANITARY SEWER MAINS

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3.3.2 Velocity
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3.7 FORCEMAINS

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3.7.3 Air Release Valve
3.7.4 Termination
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3.8 CORROSION & ODOUR CONTROL

SANITARY SEWER SYSTEM

3.1 GENERAL

The sewerage collection and disposal system shall be designed in accordance with the requirements of Provincial Ministry of Environment, Ministry of Health and the Design Criteria specified herein.

Approval of the proposed works and services must be given by the Greater Vancouver Sewerage and Drainage District. Applications for approval of proposed works and services crossing railway tracks, high pressure gas distribution mains, rights-of-way, oil pipelines, B.C. Hydro or Provincial rights-of-way shall be made by the Owner, with the consent of the City, to the proper authorities. In the most cases, these authorities have specific requirements for clearance, carrier pipes, and methods of construction, types of drawings, and format of applicant. These requirements shall be obtained, by the Owner, directly from the authority involved.

3.2 DESIGN FLOWS

The sanitary sewers shall be designed for Peak Wet Weather Flow (PWWF) on the basis of ultimate land use of the upstream lands within the catchment area approved by the City. The PWWF is the sum of the Peak Dry Weather Flow (PDWF) and the infiltration flow. Refer to Part 1 Section 1.3 for design populations by land use.

3.2.1 Average Dry Weather Flow

Residential	350 l/day/capita
Commercial and Institutional	34,000 l/day/ha
Industrial (low water consumption)	34,000 l/day/ha

Industrial (high water consumption) based on projected flow and method approved by the Director

Flows from hospitals, nursing homes and rest homes shall be designed on the basis of the following average discharge:

Hospitals	800 litres per bed per day
Nursing & Rest Homes	400 litres per bed per day

3.2.2 Infiltration

An infiltration rate of 11,200 l/day/ha shall be used for all areas.

3.2.3 Peaking Factor

The peaking factor shall be computed by the Harmon Formula:

$$PF = 1 + \frac{14}{4 + (0.001 \times P)^{1/2}}$$

PF = peaking factor
P= population

For calculating the peaking factor:

Non-residential areas shall be converted from hectares to capita using an equivalent population of 90 persons per ha.

Special Institutional (hospitals, nursing & rest homes) areas shall be converted to capita by dividing the total flow by the average per capita discharge of 350 litres per capita per day.

Industrial areas shall use peaking factor of four (4) unless otherwise approved by the Director.

3.2.4 Total Design Flow (PDWF)

$$\text{Total Design Flow (l/s)} = \frac{q \times P \times PF}{86{,}400} + \text{Infiltration Flow}$$

q = Average Daily Dry Weather Flow (l/day/capita)
P = population
PF = Peaking Factor

Table 3.1 "Sanitary Sewer Design Calculation Forms" is included for the purpose of showing design calculations. A completed, sealed copy of this form shall be submitted with the design drawings.

Table 3.1 SANITARY SEWER DESIGN

PROJECT: _____

Location: _____

SEAL & SIGNATURE

Date: _____

Calculated By: _____

Sheet ____of _____

Location	From MH	To MH	Residential						Industrial/Commercial/ Institutional			Infiltration			Total Design Flow (l/s)	Comments						
			Land Use 1 (D.U.)	Equiv. Pop.	Land Use 2 (D.U.)	Equiv. Pop.	∑ Pop	Residential Flow (l/s)	Area (ha)	∑ Area (ha)	ICI Flow (l/s)	Total Area (ha	∑ Area (ha)	Infilt. Flow (l/s)		Q m^3/s	Qcap m^3/s	Dia. mm	n	S %	V m/s	L m

3.3 SANITARY SEWER MAINS

3.3.1 Pipe Size

Sanitary gravity sewers shall be designed by using the Manning Formula.

$$Q = \frac{A\ R^{0.667}\ S^{0.5}}{n}$$

Where Q = flow, (m^3/s)

A = cross-section area of the pipe (m^2)
R = hydraulic radius (m) [area/wetted perimeter]
S = slope of hydraulic grade line (m/m)

n = 0.013 for concrete pipe
0.011 for polyvinyl chloride (PVC) pipe

Gravity sewers shall be designed such that the Peak Wet Weather Flow depth will not exceed 75% of the full depth of the pipe.

The minimum sanitary sewer main pipe diameter for residential property shall be 200 mm except for the last upstream section which may be 150 mm diameter, provided the sewer cannot be extended in the future. In industrial areas the minimum pipe diameter shall be 250 mm. No reduction in pipe size shall be made downstream irrespective of grade.

3.3.2 Velocity

The minimum velocity shall be 0.75 m/s flowing full or half full. There is no maximum allowable velocity.

3.3.3 Grade

Terminal sections of sewers shall have a minimum grade of 1.0%. Where grades exceed 15%, special design consideration for scour protection and anchoring will be required. The Standard Detail Drawings may require modification for local conditions.

3.3.4 Location

- Sanitary and storm mains may be installed in a common trench subject to approval of the Director.

- Sewers must extend across the full width of each lot and extend to the boundaries of the subdivision plan to provide for further extension and connection beyond the subdivision where such extension is feasible.

- Sewers within public roads or lanes must be located in accordance with the Detail Drawings for each classification and section of road. Sewers on private property must be centered in a registered statutory right-of-way. The minimum right-of-way width is 3.0 m, with the sewer centered within the right-of-way, unless the sewer depth exceeds 3.0m, in which case a greater width must be provided. Sanitary and storm sewers within a common right-of-way require a minimum 5.0 m width.

- If a sewer is located within a statutory right-of-way, the owner must provide access for maintenance vehicles and equipment. 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 a structure shall be encased in concrete. A pipeline under a major arterial highway, railway or rapid transit corridor may be required to be installed inside a casing pipe as determined by the Director.

3.3.5 Depth

Sanitary sewer mains shall be installed at adequate depth to properly service adjacent properties on both sides of the road and all the tributary lands from the ultimate land use. When topographic conditions dictate that sewer mains would be in excess of 4 m in depth to provide such services, alternate main locations should be considered. A minimum pipe cover of 1.2 m shall be maintained.

3.3.6 Curvilinear Sewers

Pipes may be laid on horizontal curves provided that the maximum joint deflection does not exceed one-half of the maximum deflection recommended by the manufacturer. The minimum radius of curvature for any main shall be 60 m. Only one horizontal curve will be permitted between manholes. Vertical curves are not permitted.

3.4 MANHOLES

Generally, manholes shall be positioned outside the travel wheel paths on the roadway.

The crown elevations of mains entering a manhole shall not be lower than the crown elevation of the outlet main.

No drop is required for a through manhole where the mains are the same size, except that a 20 mm drop shall be provided through the manhole for deflections up to 45 degrees and a 30 mm drop for deflections from 45 degrees to 90 degrees. An outside drop shall be provided where the difference between the inlet and outlet inverts exceeds 600 mm.

Manholes are required at:

- a maximum spacing of 150 m
- every change of pipe size
- every change of grade and horizontal alignment on non-curvilinear sewers
- every junction of sewer mains
- all terminal sections
- downstream end of curvilinear sewers

The upper end or terminus of the sanitary sewer main shall be equipped with a manhole. However, if the terminal length is 75 m or less and extension is planned in the future, a cleanout may be used.

3.5 MATERIALS

Materials utilized in the sanitary sewer collection and disposal system shall be as specified in Schedule E of this Bylaw.

3.6 SANITARY SEWER SERVICE CONNECTIONS AND BUILDING ELEVATIONS

3.6.1 General

All services shall enter the sanitary sewer main at the top of the pipe. Connections to new sanitary sewer mains shall be made using wye fittings; connections to existing main shall be made using saddles. Wherever possible, sewer service connections shall be connected to manholes.

Each parcel lot shall have a single service connection to the sanitary sewer system unless otherwise approved by the Director. An as-constructed record card of all service locations shall be provided by the Consulting Engineer upon completion of construction.

3.6.2 Size and Grade

The minimum diameter of a service connection to a residential lot shall be 100 mm. The minimum design grade of a service connection, from the building setback to the sewer main shall be 2.0%.

3.6.3 Location

Service connections for development lots shall be located as shown on the Standard Detail Drawings. The connection shall be extended not less than 1.5 m into the property, with the inspection chamber located as shown on the Standard Detail Drawings. Alternate locations for service connections may be approved by the Director, but shall be approved prior to design submission.

3.6.4 Invert Elevation of Inspection Chambers

The design elevation of the inspection chamber shall take into account the following points:

a) Provide adequate depth for all existing outlets for developed lots.

b) Provisions for the house connection passing under the wall footing must be made. An allowance of at least 0.6 m below basement slab elevation to invert of connection at that point is required.

c) The depth of the inspection chamber at the property line shall be a minimum of 1 m and a maximum of 3 m unless otherwise approved by the Director

3.6.4 Invert Elevation of Inspection Chambers (continued)

d) Generally, when servicing a property where no dwelling exists, the invert of the inspection chamber shall be at least 1.5 m lower than the ground elevation at the 7.5 m setback from the front lot line.

3.7 FORCE MAINS

3.7.1 Hydraulic Analysis

Design computations for force mains must be made using a Hazen Williams "C" factor of 110 (for PVC pipe) and then re-calculating the system curve using a "C" factor of 145 to ensure adequate motor horsepower and pump characteristics.

3.7.2 Velocity

At the lowest pump delivery rate anticipated to occur at least once per day, a cleansing velocity of at least 1.0 m/s shall be maintained. Maximum velocity should not exceed 3.5 m/s.

3.7.3 Air Relief Valve

An automatic sewage air relief valve shall be placed at high points in the force main to prevent air locking.

3.7.4 Termination

Force mains should enter the gravity sewer system at a point not more than 600 mm above the flow line of the receiving manhole. An inside drop pipe must be incorporated. If the receiving manhole design does not allow this, a manhole drop structure to minimize turbulence and odour generation is required.

3.7.5 Size

The minimum size for mains discharging raw sewage shall be 100 mm diameter.

3.7.6 Flush Out Chambers

Flush out chambers shall be provided at the end of the force main and installed complete with a separate water connection, pressure reducer and backflow preventer.

3.7.7 Force Main Service Connections

Force main service connections shall be a minimum 75 mm diameter and have a check valve and gate valve at the property line.

3.7.8 Materials

Materials selected for force mains shall meet MMCD standards. 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 other than ductile iron pipe.

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

3.8 CORROSION AND ODOUR CONTROL

Corrosion and odour controls may be required by the Director.

DESIGN CRITERIA

PART 4

WATER SYSTEM

WATER WORKS

4.1 GENERAL

Waterworks shall be designed in accordance with the Design Criteria specified herein. Approval of the proposed works and services must be given by the Public Health Unit - Engineering Branch. Applications for approval of proposed works and services crossing of railways, high pressure gas distribution mains, rights-of-way, oil pipelines, hydro or Provincial rights-of-way must be must be made by the Owner, with the consent of the City, to the proper authorities. In most cases, these authorities have specific requirements for clearance, carrier pipes, and methods of construction, types of drawings, and format of application. These requirements shall be obtained by the Owner directly from the authority involved.

4.2 DESIGN

The design of the waterworks network shall be based upon the appropriate flows for peak domestic requirements and adequate flows for fire protection.

4.2.1 Population

The population projections to be utilized in the calculation flows shall be the full saturation population for the area in question. See Part 1 Section 1.3 for design population by land use.

4.2.2 Design Flow

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

i. Peak hour demand (H)
2,700 litres per capita per day for residential areas, and
67,500 litres per hectare per day for industrial areas.

OR:

ii. Peak day demand plus fire flow (D+F)
1,400 litres per capita per day for residential areas, and 45,000 litres per hectare per day for commercial and industrial areas plus the applicable fire demand at a location where pressure drop would be most critical.

4.2.3 Fire Demand

The determination of minimum fire flows shall be in accordance with the Fire Underwriters' Survey publication "Water Supply for Public Fire Protection 1999". In no case shall the fire flow utilized be less than:

TYPE OF DEVELOPMENT	REQUIRED FIRE FLOW
Single and Two Family Residential	60 litres/sec
Apartments 6-8 Suite	90 litres/sec
Townhouse & Multi-Family	150 litres/sec
Commercial, Institution or Industrial	150 litres/sec

4.2.4 Design Calculations

Use the Hazen-Williams formula:

$$Q = \frac{C\ D^{2.63}\ S^{0.54}}{278{,}780}$$

Q = Rate of flow in l/s
D = Nominal pipe diameter in mm
S = Slope of hydraulic grade line in m/m
C = Roughness coefficient (120 for cement mortar lined ductile iron pipe and 100 for all other piping materials)

All design must analyze the two criteria of "Peak Day Plus Fire" and "Peak Hour" to determine which set of calculations govern. The pipes shall be sized according to the worst case.

The pipes shall be sized to convey the design flow at a residual output head in excess of the minimum permissible as specified herein:

Maximum allowable pressure	1035 KPa
Minimum pressure at Peak Hour Demand	300 KPa
Minimum pressure anywhere in the system during design Fire Flow and Peak Day Demand	150 KPa

The input head into the network analysis shall be the head at the nearest pressure reducing valves station or reservoir.

In the design of a local distribution system for a single family residential area of less than 5 hectares, the volume for Peak hour demand "H" or for Peak day plus fire demand "D+F" may be assumed to be available at the

nearest 250 mm diameter or larger main, at a residual head there equal to 70% of the static head for the relevant pressure zone established by the City.

4.2.5 Minimum Pipe Size

Distribution mains –	150 mm in residential areas 200 mm in industrial, commercial or institutional areas.

In a cul-de-sac where emergency access is provided, the watermain shall be looped through that access. Wherever possible watermains shall be looped (e.g: back to back culs-de-sac).

4.2.6 Location, Depth and Grade

The watermain shall be located within the right-of-way as shown on the Standard Detail Drawings or as required by special design. On highways where cut and fill is required, the watermain shall, where possible, be installed on the 'cut" side of the highway.

The minimum grade on a water main shall be 0.1 %. The minimum cover for any water main, including service connections, shall be designed to prevent freezing and not less than 1.2 m. The maximum allowable joint deflection on any pipe joint shall be one half the manufacturer's recommended maximum deflection.

A watermain crossing a watercourse or a structure shall be encased in concrete. A pipeline under a major arterial highway, railway or rapid transit corridor shall be installed inside a casing pipe as determined by the Director. The size of the casing pipe shall be a minimum of 25% larger than the outside diameter of the watermain pipe bell.

When the invert grade of a main exceeds 15%, provision shall be made to anchor the pipe in accordance with the Standard Detail Drawings.

4.3 LINE VALVES

Line valves shall be:

a) not spaced greater than 200 m apart on mains 400 mm diameter or less.
b) not spaced greater than 800 m apart on mains over 400 mm diameter.

c) gate valves. Butterfly valves with mechanically assisted operating gear box shall only be used in special circumstances where watermain is greater than 400 mm diameter and approved by the Director.

d) clustered and flanged to the tee or cross at road intersections. Normally 3 valves will be required at a cross intersections and 2 valves at tee intersections.

e) the same diameter as the main. Line valves on trunk mains larger than 350 mm may be smaller than the line size and generally, the valve diameter may be decreased by two sizes subject to the approval of the Director. Valves over 350 mm diameter shall be provided with a bypass.

Not more than one hydrant shall be isolated between gate valves.

Connections between mains shall be valved.

4.4 HYDRANTS

Hydrants shall not be spaced more than 200 m apart and no dwelling shall be more than 100 m from a hydrant. A hydrant shall be provided at the end of all dead-end and terminus mains. Wherever possible, hydrants shall be located 3 m from the corner at an intersection. They shall be located 1.0 m from a property line with a pumper nozzle at right angles to the curb. Hydrant installations shall conform to the Standard Detail Drawings.

4.5 AIR VALVES

All watermains require double acting air valves at all summits in the main, including an "uphill" terminus. For typical air valve installations refer to the Standard Detail Drawings.

4.6 BLOW DOWNS

On all mains greater than 300 mm diameter, blow downs shall be installed at low points in the pipeline profile.

4.7 TEST POINTS AND CHLORINATION

For the purpose of hydrostatic pressure testing and chlorination of all new mains, at least one test point shall be installed beside a line valve on each section of the main, i.e., between two adjacent live valves. These test points will consist of a 19 mm corporation stop installed in the main. For the purpose of chlorination

these test points shall be installed at a location to ensure complete chlorination of the newly installed water mains.

4.8 THRUST BLOCKS

Concrete thrust blocking shall be provided at bends, tees, wyes, reducers, plugs and caps. In all cases, the Consulting Engineer shall be responsible to verify and specify the minimum sizes and bearing areas for the various types of soil conditions and the design pressure on the design drawings.

A note shall be included on the drawing indicating the design criteria assumed in sizing the thrust block areas (i.e. test pressure, type of soil and bearing pressure assumed in calculations).

Joint restraining devices may be used with the approval of the Director in cases where conventional thrust blocking is not feasible, or to augment conventional thrust blocking where the possibility of disturbance exists. Design plans shall identify the type of restraining device to be used and clearly show the minimum required restrained pipe length.

4.9 SERVICE CONNECTION

Minimum 19 mm diameter service connections shall be installed to new residential lots. Service connections shall be terminated at the property line and shall not be more than 30 m in length. Water connections shall be located as shown on the Standard Detail Drawings. An as constructed record card of all service locations shall be provided by the Consulting Engineer.

Service connections 75mm diameter and larger shall connect to the watermain with a tee and a gate valve complete with 50 mm square operating nut and valve box assembly, both the same diameter as the connection pipe. On metered 38 mm or larger connections, a valved meter by-pass line at the same diameter as meter is required as per the City Water Meter Specification.

Fire line connections require a shut-off valve, check valve and 19 mm diameter metered by-pass line around the valve installation.

Where the on-site water system is looped between two connections to City watermains, a gate valve will be required at each connection, on the property side of a check valve.

Metered services and fire lines shall utilize a common connection from the street main to the property line. From the property line to the building separate service

lines are required. All meters are to be placed at or adjacent to the property line as per City Water Meter Specifications.

Metered connections shall be provided to multi-familty residential lots, commercial, institutional and industrial buildings and to hotel buildings. The size will depend on the individual requirements of the development. Design and installation shall be in accordance with City Water Meter Specifications.

4.10 STRUCTURAL DESIGN

The structural design of watermains shall be the responsibility of the Consulting Engineer. Live loads on the watermain conduit shall include Highway H-20 loading conditions and an impact factor of 1.5. Ductile iron A.W.W.A. C-900 pipe shall be considered as rigid conduits when selecting the design methods. In cases where more stringent construction requirements are necessary to achieve the required field supporting strength of the watermain conduit, the Consulting Engineer shall specify both the class of bedding and the maximum trench width at the top of the pipe on the design drawings.

4.11 MATERIALS

All materials utilized in the waterworks system shall be supplied and installed as specified in Schedule E.

DESIGN CRITERIA

PART 5

STORM DRAINAGE SYSTEM

5.11 NATURAL WATERCOURSES

5.11.1 Environmental Protection
5.11.2 Grade Control Structures
5.11.3 Fisheries Periods
5.11.4 Senior Government Agencies
5.11.5 Deleterious Materials

5.12 CULVERTS

5.13 INLET AND OUTLET STRUCTURES

5.14 FRENCH DRAINS

5.15 LOT GRADING

5.15.1 General Criteria
5.15.3 Minimum Building Elevation (MBE)
5.15.3 Erosion Control
5.15.4 Sediment Basins
5.15.5 Ground Water Cut-off Ditches

5.16 MAJOR FLOW ROUTING

5.17 FLOOD PROOFING

STORM DRAINAGE SYSTEM

5.1 GENERAL

The purpose of the storm drainage design criteria is to standardize the procedures for designing common drainage facilities in the City. The design of storm drainage systems shall also incorporate best management practices that minimize impacts of development on the natural environment. All works shall be designed with considerations for public safety, regulatory requirements, economic benefits and the natural environment. The Consulting Engineer shall refer to the latest best management practices and reference materials available from the Federal Department of Fisheries and Oceans, BC Ministry of Environment, Metro Vancouver, or other relevant agencies as accepted by the Director. In addition, storm drainage works shall be designed in conformance with any adopted Integrated Storm Water Management Plans for the project area.

The storm drainage system shall be designed to include the minor and the major systems. The "minor system" consists of underground conduits, flow control facilities and open channels to convey a runoff from frequent storm events up to the return frequency specified in Section 5.2 and the "major system" consists of underground conduits, flow control facilities, culverts, surface flood paths, roadways and watercourses to convey runoff from rare and intense storms with return frequency specified in Section 5.2. Where surface flood paths cannot be established, pipes and culverts of the minor system shall be enlarged to accommodate the major flow.

Roadways, overland flow paths, channels and watercourses shall be designed to ensure that the maximum hydraulic grade line of the major flow is below the lowest existing or proposed minimum building elevation of adjacent buildings. If it is not feasible to lower the hydraulic grade line below an existing adjacent minimum building elevation, the Owner shall provide flood protection measures for the subject building.

The presence of an existing drainage facility does not imply that is has adequate capacity to receive the design flow, nor does it indicate that the drainage pattern of this facility is necessarily acceptable to the city. Existing undersized or inadequate drainage facilities shall be upgraded at the Owner's expense to accommodate the appropriate flow as specified herein.

It must be shown that all downstream drainage facilities for a distance of 1.0 km are capable of handling the projected changes in runoff characteristics created by the development. The computed upstream water profile or hydraulic grade line shall show that no flooding damage would occur.

To prevent the release of deleterious substances from the development construction into the downstream drainage system, an on-site sediment control plan, consistent with City of Port Moody Bylaw No. 2470, "Stream and Drainage System Protection Bylaw," for the construction phase shall be submitted to the City prior to commencement of construction.

Approvals of the proposed works and services must be given by regulatory authorities other than the City where appropriate. The Owner is responsible to submit applications to and to obtain approvals directly from the authority involved.

5.2 DESIGN FREQUENCIES

The following storm return frequencies shall be used for the design of the drainage system:

Minor Systems: 1 in 10 year
Major Systems 1 in 100 year

5.3 RUNOFF ANALYSIS

The Storm drainage system shall be designed to accommodate the post-development flows using the Rational Method or the Runoff Hydrograph Method. All calculations pertinent to the design of the system shall be signed and sealed by the Consulting Engineer and submitted to the City.

For developments where the total tributary area is 10 hectares or less, the Rational Method shall be used to compute the peak runoffs. For developments where the total tributary area is greater than 10 hectares, the Runoff Hydrograph Method shall be used to compute peak flows. The Runoff Hydrograph Method shall also be used for the design of storage facilities.

Design flows for existing and proposed drainage facilities shall be computed on the basis of catchment area established by the Consulting Engineer and approved by the City. Pre-Development flow shall be the accumulative effect of the flows from undeveloped areas and flow from existing developed areas. Post-Development flow shall mean the flow based on the ultimate development of the catchment area.

5.4 THE RATIONAL METHOD

The Rational Method calculates the peak flow using the formula:

$$Q = RAIN$$

WHERE Q = Flow in m^3/s
R = Runoff coefficient
A = Drainage area in hectares
I = Rainfall Intensity in mm/hour
N = 0.00278 (conversion factor)

5.4.1 Runoff Co-efficient

The following runoff coefficients shall be used to compute the design flow:

TABLE 5.1

LAND USE	Percent Impervious (%)	RUNOFF COEFFICIENT 10 Yr. return	RUNOFF COEFFICIENT 100 Yr. return
Low Density Residential (i.e. single family)	40	0.50	0.55
Medium-Density Residential (i.e. multi-family)	65	0.60	0.65
High-Density Residential (i.e. hi-rise, mixed use),	78	0.70	0.75
Industrial	90	0.80	0.85
Commercial/Institutional	90	0.80	0.85
Parks & Environmental Preserves	5 to 20	0.30	0.33

5.4.2 Drainage Areas

The extent of the tributary drainage areas of the storm drainage system under design shall be in accordance with the natural contours of the land, subject to overall drainage plans where established by the City.

It is the Consulting Engineer's responsibility to confirm the extent of the drainage areas with the City prior to final design, and to incorporate the designs for the minor and major flow into an overall coordinated system.

5.4.3 Time of Concentration

The time of concentration is the time required for rainfall runoff to flow from the most remote part of the catchment area under consideration to the design node. The time of concentration is the sum of the overland flow (inlet time) and flow in storm sewers, ditches, channels or watercourses (travel time) based on the following formula:

$$Tc = Ti + Tt$$

Where Tc = Time of concentration in minutes
Ti = Inlet or overland flow time in minutes.
Tt = Travel time in sewers, ditches, channels or watercourses (minutes)

Inlet or Overland Flow Time (Ti)

a) Inlet times for urban areas are as follows:

Single Family Lot	15 minutes
Multi-Family Lot	8 minutes
Commercial/Industrial/Institutional	5 minutes

b) Inlet time in rural areas shall be calculated using the Airport Method:

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

Where Ti = inlet time (minutes)
C = runoff coefficient (Table 5.1)
L = Travel distance (m), maximum length = 300 m
S = slope of travel path (%)

Travel Time (Tt)

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

$$Tt = \frac{C\ \ L\ \ N}{S^{0.33}}$$

Where Tt = inlet time (minutes)
C = runoff coefficient (Table 5.1)
L = Travel distance (m), maximum length = 300 m
S = slope of travel path (%)
n = roughness coefficient
0.050 for Natural channels
0.030 for Excavated ditches
0.016 for Overland flow on smooth paving
0.400 for Overland flow on natural areas
0.013 for Concrete or PVC pipe

The above formula provides an approximate travel time which shall be corrected with actual time of flow calculated from hydraulic properties of the selected pipe/channel. A composite value for Tt shall be calculated in cases where the type of flow along the longest path varies or the slope changes.

5.4.4 Rainfall Intensity

The rainfall intensity in mm/hr for the Rational Formula shall be determined from a rainfall Intensity-Duration-Frequency (IDF) curve based on the calculated time of concentration as shown on Figure 5.1.

5.4.5 Presentation of Rational Method Calculations

The Consulting Engineer will be required to tabulate and certify the rational calculations on Table 5.2 for submission along with the appropriate plans and other relevant information.

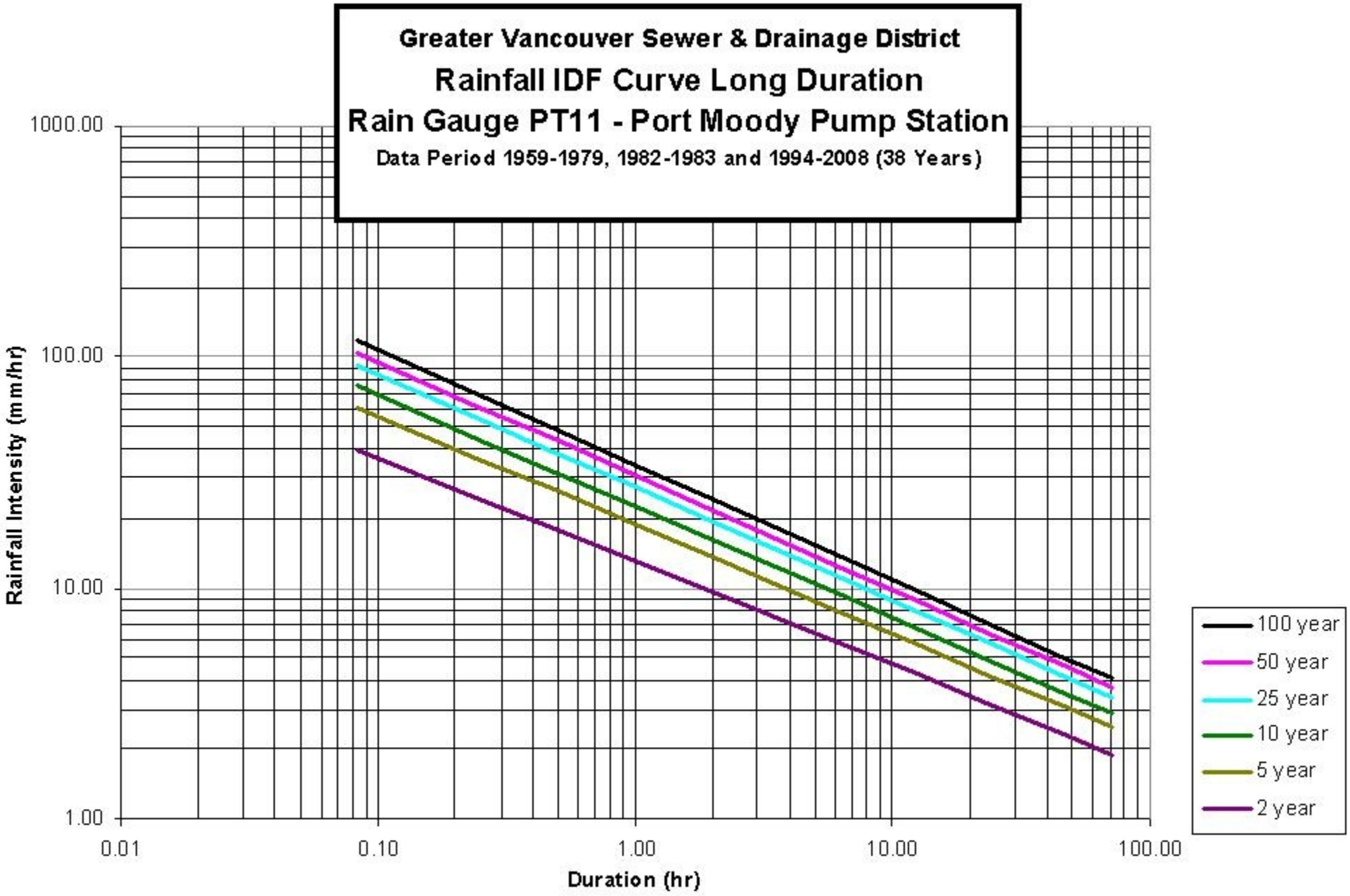
Greater Vancouver Sewer & Drainage District
Rainfall IDF Curve Long Duration
Rain Gauge PT11 - Port Moody Pump Station
Data Period 1959-1979, 1982-1983 and 1994-2008 (38 Years)
Rainfall Intensity (mm/hr)
1000.00
100.00
10.00
1.00
0.01
0.10
1.00
10.00
100.00
Duration (hr)
100 year
50 year
25 year
10 year
5 year
2 year

Table 5.1 STORM SEWER DESIGN – RATIONAL METHOD

PROJECT: _____ Date: _____

Location: _____ Calculated By: _____

Storm Frequency: _____ Year_____ Sheet ____of _____

SEAL & SIGNATURE

Location	From	To	Tributary Area			Time of Concentration			Storm		Sewer Design						Adj. Tt min	Comments
			R	A (ha)	∑ RA	Ti min	Tt min	Tc min	I mm/hr	Q m^3/s	Qcap m^3/s	Dia. mm	n	S %	V m/s	L m		

5.5 RUNOFF HYDROGRAPH METHODS

5.5.1 Selection of Modelling Program

For basins larger than 10 hectares, hydrologic programs based on runoff hydrograph methods shall be used. Common simulation programs include:

- OTTHYMO.89
- EPA- SWMM based programs
- U.S. Soil Conservation Service Method
- Other computer modeling as approved by the Director

5.5.2 Design Storms

Single event design storms with durations of 30 minutes to 12 hours shall be created using hyetographs developed using AES rainfall distribution curves. For 24 hours design storm, use the U.S. Soil Conservation Service (SCS) rainfall distribution curves. Simulation of large watersheds or complex drainage systems may require extended duration storms or continuous rainfall simulation. It is incumbent on the Consulting Engineer to obtain the appropriate rainfall data for analysis.

5.5.3 Watershed Data

Watershed data include catchment areas, percent of imperviousness, lengths of flow, surface slopes, soil type (CN value), etc. The imperviousness of common land uses are tabulated in Table 5.1.

For design purposes, the drainage model shall be based on the post-development conditions using the most current planning information such as the Official Community Plan. Conservative parameters shall be selected if calibration data is not available.

For assessment of existing systems, the drainage model may be based on existing conditions if no future land use changes are anticipated. Some parameters may be adjusted in order to calibrate the model.

5.5.4 Presentation of Modelling Results

The Consulting Engineer will be required to submit a report including the followings:

a) Name and version of modeling program
b) Design storms and default parameters

c) Schematic diagram of the model
d) Drainage map showing the catchment and sub-catchment boundaries, slopes, land uses, soil conditions, etc.
e) Input and output printouts and computer files

5.6 STORM SEWERS AND APPURTENANCES

5.6.1 Storm Sewers

Storm sewers shall be designed by using the Manning Formula.

$$Q = \frac{A\ R^{0.667}\ S^{0.5}}{n}$$

Where Q = flow, (m^3/s)
A = cross-section area of the pipe (m^2)
R = hydraulic radius (m) [area/wetted perimeter
S = slope of hydraulic grade line (m/m)
n = 0.013 for concrete pipe
=0.011 for polyvinyl chloride (PVC) pipe

5.6.2 Size

The minimum storm sewer pipe diameter shall be 250 mm diameter except where:

a) ditches discharge directly into a storm sewer where the minimum diameter shall be 300 mm, and

b) the terminal section of a storm sewer that will not require further extension at a future date and that is no longer than 75 m may be reduced to 200 mm diameter.

5.6.3 Velocity

The minimum velocity shall be 0.75 m/s second when flowing half full or full.

Where grades exceed 15%, scour protection may be needed and anchor blocks will be required as per Standard Detail Drawings. The Standard Detail Drawings may require modifications for local conditions.

5.6.4 Location

- Sanitary and storm mains may be installed in a common trench is permitted, subject to approval of the Director.

- Sewers must extend across the full width of each lot and extend to the boundaries of the subdivision plan to provide for further extension and connection beyond the subdivision where such extension is feasible.

- Sewers within public roads or lanes must be located in accordance with the Detail Drawings for each classification and section of road. Sewers on private property must be centered in a registered statutory right-of-way. The minimum right-of-way width is 3.0 m, with the sewer centered within the right-of-way, unless the sewer depth exceeds 3.0 m, in which case a greater width must be provided. Sanitary and storm sewers within a common right-of-way require a minimum 5.0 m width.

- If a sewer is located within a statutory right-of-way, the owner must provide access for maintenance vehicles and equipment. 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 a structure shall be encased in concrete. A pipeline under a major arterial highway, railway or rapid transit corridor may be required to be installed inside a casing pipe as determined by the Director.

5.6.5 Depth

Storm sewers shall be installed at adequate depth to properly service properties on both sides of the road and all the tributary lands from the ultimate land use.. When topographic conditions dictate that storm sewer mains would be in excess of 4 m in depth to provide such service, alternate main locations should be considered. On the other hand, the minimum depth of cover shall be 1.2 m.

5.6.6 Curvilinear Sewers

Pipes may be laid on horizontal curves, provided that the maximum joint deflection does not exceed one-half of the maximum deflection recommended by the pipe manufacturer. The minimum curvature radius shall be 60 meters. Vertical curves will not be permitted. Only one horizontal curve is permitted between manholes.

5.6.7 Surcharged Sewers

When necessary, storm sewers may be permitted to temporarily discharge into existing ditches with submerged outlets to allow the future

extension of the sewer at an adequate depth. In these cases, a hydraulic gradient must be calculated to ensure that no property damage will result.

5.6.8 Miscellaneous

The major and minor flow hydraulic grade lines shall be shown on the design drawings.

Storm sewer connections to other utility trenches shall be provided where there is any possibility of ground water concentration.

5.7 MANHOLES

Generally, manholes shall be located outside the travel wheel path on the roadway.

Manholes are required at:

- Every intersecting sewer
- Every change in pipe size
- Every change in direction that exceeds 1/2 of the maximum joint deflection recommended by the pipe manufacturer or grade
- Every 150 m or less for pipes 900 mm diameter and larger
- Every 200 m or less for pipes less than 900 mm diameter
- The downstream end of curvilinear sewers

The crowns of pipes entering the manhole shall be set at or above the crown of the outlet pipe. Hydraulic losses are to be calculated through manholes with significant change of grade or alignment and at confluence of several pipes. Drops are not required in manholes without change of grade or alignment except that a minimum drop of 30 mm shall be provided where the inlet is not at 180 degrees to the outlet. Outside drop structures shall be provided where the difference between the inlet and outlet inverts exceeds 600 mm.

Detailed engineering calculation is required for head losses in sewers greater then 600 mm diameter.

The upper end or terminus of the storm sewer main shall be equipped with a manhole. However, if the terminal length is 75 m or less a cleanout may be used.

A 2 m long 150mm diameter perforated drain complete with 1 m^3 of 25 mm drain rocks and end cap shall be installed at each storm manhole with the invert at the elevation of the storm main crown.

5.8 CATCH BASINS

Catch basins shall be provided at regular intervals along a roadway, at intersections and at low points. Catch basins shall be spaced to collect a maximum 500 m^2 of pavement drainage on road with grade up to 5% or a maximum of 350 m^2 on grade over 5%. No catch basin shall collect a flow greater than 30 l/s. The Consulting Engineer must ensure that sufficient inlet capacity is available to collect the entire minor flow into the underground pipe system.

The capacity of catch basins may be limited by the hydraulic characteristics of the inlet. The inlet capacity of a single catch basin can be calculated by the orifice equation:

$$Q = 0.67\ C\ A\ (2\ g\ h)^{0.5}$$

Where
Q = inlet capacity (m^3/s)
0.67 = clogging factor
C = orifice coefficient (0.8)
A = opening area (0.068 m^2 for Dobney B-23 grate)
g = gravitational acceleration (9.81 m/s^2)
h = depth of ponding (m)

Catch basins at low points shall include a side inlet on roads with barrier curbs. At the low point of a road where storm water could flood outside the road allowance or if catch basins may become blocked, a secondary inlet to the storm sewer shall be provided or an overland floodpath defined.

Leads for catch basins shall be 200 mm diameter for single catch basins and 250 millimeters diameter for double catch basins. Double catch basins shall not be connected directly together in series. Instead one basin lead will be "wyed" into the lead of the other. Catch basin leads will be taken into manholes wherever possible. The minimum grade for leads is 1% and the maximum length shall be 30 m.

5.9 SERVICE CONNECTIONS

5.9.1 General

A gravity connection shall be made where the habitable portion of a dwelling is above the 100 year flood level. Only a pumped connection will be allowed when the habitable area is below the major system hydraulic

grade line of the main to which it will be connected. Each parcel lot shall have a single service connection to the storm sewer system unless otherwise approved by the Director. An as-constructed record card of all services shall be provided by the Consulting Engineer upon completion of construction.

A manhole shall be required at the main connection and property line on all service connections where the size of the connection is 250 mm in diameter or greater. Service connections smaller than 250 mm in diameter shall include an inspection chamber at the property line as per the Standard Detail Drawings. A service connection exceeding 30 m in length shall be treated as a regular main.

5.9.2 Size and Grade

The minimum diameter of a gravity service connection to a residential lot shall be 150 mm. There shall be only one connection to each lot. The minimum design grade of a service connection, from the building setback to the storm sewer, shall be 2.0%.

5.9.3 Location

Service connections for new lots shall be located at the lower (downstream) portion of a larger lot or parcel. In urban areas, connections shall be as shown on Standard Detail Drawings.

All proposed storm sewer service connections shall be designed with adequate depth to properly service the properties. All existing lot drains shall be connected to the storm sewer connection provided that:

- All habitable areas are above major flow hydraulic grade line, or
- Sump pump pressure system are installed.

5.9.4 House Drains

Foundation connection drains shall not be surcharged. Roof drains shall discharge to a storm sewer except where splash pads are approved by the Director. The site shall be graded such that flows must be directed away from the dwelling but not as uncontrolled flow onto adjacent lots.

5.10 DITCHES

Ditches shall be trapezoidal in shape having maximum side slope of 1.5 horizontal to 1.0 vertical and a minimum bottom width of 0.5 m.

The minimum grade for 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.

The ditch right-of-way shall be sufficiently wide to provide a 2.5 m access road for maintenance vehicles in addition to the width required for the ditch.

5.11 NATURAL WATERCOURSES

5.11.1 Environmental Protection

Natural watercourses are integral components of the major drainage system and the ecological system. The Consulting Engineer shall refer to the latest best management practices and reference materials available from the Federal Department of Fisheries and Oceans, BC Ministry of Environment, Metro Vancouver, or other relevant agencies as accepted by the Director. The consulting engineer shall also refer to the City's Environmentally Sensitive Areas Management Strategy.

Design criteria to be applied to fish bearing streams shall be subject to the specific requirements of the environmental regulating agencies having jurisdiction.

5.11.2 Grade Control Structures

Grade control structures may be required in the watercourse. Design criteria for grade control structures shall be subject to the specific requirements of the environmental regulating agencies having jurisdiction.

5.11.3 Fisheries Periods

In-stream construction is only permitted in fish bearing watercourses during in-stream work window as stipulated by the regulatory agencies.

5.11.4 Senior Government Agencies

All design for works and services in natural watercourses shall be forwarded to the federal and provincial environmental regulatory agencies for approval.

5.11.5 Deleterious Materials

The sediment control plan shall be prepared to ensure that no deleterious materials such as machine fluid, curing concrete and fine soils will enter the watercourse. In no case will dry sand/cement bags be permitted as rip-rap or wall structures on watercourses with fish habitat.

5.12 CULVERTS

As per the City's "Official Community Plan," culverts are not permitted to be installed on Class A or Class B streams. If no reasonable alternatives are available, approvals from the Federal Department of Fisheries and Oceans, BC Ministry of Environment, and Port Moody City Council are required. The Consulting Engineer shall consult with the Director prior to consideration of culverting any portion of existing streams or any other in-stream work.

The minimum culvert diameter shall be 450 mm (300 mm for driveway culverts).

Culverts crossing highways shall be designed to accommodate the major flows using the greater of the sizes indicated by inlet or outlet control conditions. Surcharging is permitted, provided the back water profile does not intersect habitable property.

Special design considerations shall be given to enhance in-stream habitat quality such as flow baffles and open bottom or substrate-lined pipe culverts. The design capacity of the culvert shall be based on the net open area of the pipe for flow conveyance. The maximum allowable velocity for minor flow in a culvert located in a watercourse should not exceed 1 m/s for culverts over 25 m long and 1.2 m/s for culverts under 25 m in length.

Concrete culvert shall be used unless special authorization is given by the Director.

Driveway culverts shall be designed to accommodate the minor flows, unless otherwise indicated, with the headwater not to exceed the top of the culvert. All new driveway culverts shall be sized to ensure that there is no adverse impact on adjacent properties under the 1:100 year runoff conditions.

5.13 INLET AND OUTLET STRUCTURE

The Standard Detail Drawings shall be used as a guide for designing inlet and outlet structures for storm sewers and culverts.

Outlets for culverts and storm sewers having discharge velocities greater than 1.0 m/s will require rip rap and /or an approved energy dissipating structure to

control erosion and shall meet current best management practices and reference materials available from the Federal Department of Fisheries and Oceans, BC Ministry of Environment, Metro Vancouver, or other relevant agencies as accepted by the Director.

The structural requirements for inlet and outlet structures as given on Standard Detail Drawings are the minimum requirements only. Generally, structures exceeding 1.5 m in height or 2 m in width will require individual structural design.

A trash screen is required every 1 km of natural watercourse, preferably at a road culvert.

Grills are required at the inlet and outlet of every pipe or culvert over 450 mm in diameter or greater than 30 m in length (except large culverts over 1200 mm diameter in major watercourses). Grills may also be required on smaller diameter storm sewers and culverts at the discretion of the Director.

The trash screen and grillage shall be as shown on the Detail Drawings.

5.14 FRENCH DRAINS

French drains shall be provided where topography and soils condition dictate and at the toe of cut slopes where required to intercept groundwater.

French drains located adjacent to roads shall be extended well below the road base. The material for French drains shall be 25 mm minus clear round drain rock and a minimum 100 mm diameter PVC perforated pipe. Filter cloth may be required where soils conditions dictate.

5.15 LOT GRADING

5.15.1 General Criteria

When designing the proposed lot grades, the following points should be incorporated:

- Each lot should be graded away from the building foundation and drain into a drainage system or natural drainage path. Minimum lot grades are 2% and 1% for single-direction or double-direction drainage respectively. Lot grading shall be uniform and consistent, and can be reduced to 1% if an individual 450 mm lawn basin is placed at the low side of the lot.

- Where topography permits, by the natural lay of the land or by local re-grading, ensure that the lots are not lower than the adjacent road and that the lots slope toward the road.

- Provide flood proofing at road low points.

- Ensure the building envelopes are clear of the major flow path and above the hydraulic grade line. Where topography indicates that a lot will be below the road, the lot shall be protected from the major flow.

5.15.2 Minimum Building Elevation (MBE)

The MBE is defined as the elevation of the lowest floor slab in a building or the underside of the floor joists where the lowest floor is constructed over the crawl space.

Crawl space is the space between a floor and the underlying ground having a maximum height of 1.2 m to the underside of the joists and not used for the storage of goods or equipment damageable by floodwater.

The MBE shall be established at least 0.6 m above the service connection invert at the building setback from the roadway property line or 0.35 above the 1:100 year hydraulic grade line elevation whichever is greater. In areas that the 1:100 Year runoff is confined within the roadway isolated from the adjacent properties (i.e. no flow via driveway letdowns or storm connections into the adjacent properties), the freeboard between the 1:100 year hydraulic grade line may be reduced to 0.2 m. The MBE for buildings adjacent to major watercourses shall be 0.6 m above the 1:200 year hydraulic grade line. Accepted MBE's may not be revised without referral to the Director.

5.15.3 Erosion Control

Siltation basins and channels for erosion control at construction sites shall be designed so that the minimum detention time is 10 minutes. The depth of the basin shall not exceed 900 mm.

Erosion and sediment control plans shall be consistent with City of Port Moody Bylaw No. 2470, "Stream and Drainage System Protection Bylaw."

5.15.4 Sediment Basins

Sediment basins shall be provided within any natural watercourse, channel or storm sewer where the silt load is detrimental to the hydraulics of the facility or quality of water in fish bearing streams as determined by

the appropriate regulatory agencies. Construction of such facilities shall be immediately upstream of a road culvert, to provide ready access for cleaning and maintenance.

5.15.5 Ground water Cut-Off Ditches

Groundwater cut-off ditches shall be provided at the uphill perimeter of a development on sloping ground. Cut-off ditches shall similarly be provided at the top a highway cut slope where the cut slope height is greater than 3 m.

5.16 MAJOR FLOW ROUTING

All overland flows in excess of 0.05 m/s shall have specifically designed flow routes that are protected and preserved by restrictive covenants or statutory right-of-way. The major flow routing shall normally be provided along roads and in natural watercourses. In some cases the major flow may also be carried alongside the road in grass swales and across land in statutory rights-of-way. The pipes and culverts which form a part of minor system may be enlarged or supplemented to accommodate the major flow.

The proportion of flow to be carried along the major routing shall be the total major flow less the flow carried in minor system.

Where the road is used to accommodate major flow, it shall be formed, graded and sufficiently depressed below the adjacent property lines to provide adequate hydraulic capacity. Arterial roads shall not be used for overland major flow routing. On collector and local roads, the entire roadway may be used as a major flood path with the maximum flow depth not to exceed 150 mm above the gutter line. In all cases there shall be a minimum 100 mm freeboard at the street property lines. Special care shall be taken with the design of driveways so that this freeboard is not reduced.

Where roadways used for major flows intersect, care shall be taken to lower the intersection to allow flows to pass over the cross road. Where major flow routes turn at intersections similar care in the road grading design is required.

Rear yards of single family housing developments shall not normally be used for routing the major flow.

Major flow routing shall be shown on area development plans and sufficient design shall be carried out to provide assurance to the Director that no property damage or endangering of public safety will occur under major flow conditions. The discharge point from the development for the major flow route shall be

coordinated with the downstream routing to outfalls as determined by the City. Where the major flow outfalls to a receiving watercourse, the velocity shall not exceed 1.5 m/s or an energy dissipater shall be provided to prevent erosion.

5.17 FLOOD PROOFING

To ensure that flooding will not occur in dwellings adjacent to natural watercourses, the Consulting Engineer shall determine what effects downstream obstructions would have on the water level in watercourse, e.g. if a culvert is plugged what effect will this have on adjacent properties? It must be shown that the habitable area in the adjacent development will not be affected by flooding. All culverts other than driveway culverts shall be provided with an alternate overflow outlet on the assumption that the original inlet may become blocked.

DESIGN CRITERIA

PART 6

ROAD SYSTEM

6.14 SHOULDERS

ROAD SYSTEM

6.1 GENERAL

All roads in the City shall be designed in accordance with the recommended practices outlined in the latest edition of the "Geometric Design Guide for Canadian Roads" and the "Manual of Uniform Traffic Control Devices for Canada" as published and amended from time to time by the Canadian Transportation Association (TAC) or as stated elsewhere in this Document.

6.2 ROAD CLASSIFICATION

Prior to commencing with road design, the Consulting Engineer shall consult the Director with respect to classification, bicycle lane and pedestrian capacity requirements of all roads within or adjacent to any particular development. Refer to the Road Network Classification Map in Schedule B which shows the designated regional major road network and the arterial and collector road system within the City.

6.3 WIDTHS

The general arrangement of the road cross-section including right-of-way widths and pavement widths shall be in accordance to Table 2 of Schedule B of this Bylaw.

6.4 GEOMETRIC DESIGN

6.4.1 General

The design speed as shown in Table 6.1 governs horizontal and vertical geometrics.

Table 6.1

CLASSIFICATION	Design Speed (km/hr)	Max. Grade	
		Desired %	Absolute %
Arterial	60	6	9
Collector	50	8	12
Local	30	8	12
Lane	20	8	12

6.4.2 Grades

The absolute maximum grade listed in Table 6.1 shall not be exceeded and shall only be used where the desirable maximum grade cannot be attained because of topographic constraints.

Maximum longitudinal grades shall depend partially on the length of the grade. In exceptional circumstances, due to the topography and alignment of existing roads, short sections of local roads and lanes may have a maximum grade up to 15% where approved by the Director.

Cul-de-sac shall be designed so that the grade beyond the centre point is a maximum 5%, with a smooth transition by vertical curve from the centre point to the road grade leading to the cul-de-sac.

The preferred minimum longitudinal grade shall be 1.0%, with an absolute minimum of 0.5% for short distances when approved by the Director.

6.4.3 Cross-Slopes

Standard cross-slopes on roads shall be 2% with the crown in the center of the pavement. Where extreme topography applies, local roads may be approved with cross-slopes from 1% to 4%. When existing roads are being widened and existing driveways and private property levels dictate, cross-falls of the widening may be varied to 4% maximum and 1% minimum in order to minimize adverse effects. All roadways shall be crowned. Continuous cross-fall roads from curb to curb shall not be used, except where required for superelevation conditions or authorized by the Director.

All boulevards shall be sloped at 2% from the property line to the curb or sidewalk as shown on the Standard Detail Drawings.

6.4.4 Horizontal and Vertical Curves

Horizontal and vertical curves shall be governed by the design speed of the road in accordance with the "Geometric Design Guide for Canadian Roads" (TAC).

Horizontal curves are to be avoided where sharp vertical curves will be necessary. Spiral transition curves will not be required on local and collector roads.

The minimum K value for vertical curves shall be:

Design Speed	SAG	CREST
40 km/h	4	4

50 km/h	6	7
60 km/h	10	15

Design vertical curves may be omitted where the algebraic differences in grades does not exceed 2% for local roads and 1% for other roads. Vertical curves shall generally be symmetrical curves. Unsymmetrical vertical curves may be approved for local site conditions.

6.5 INTERSECTIONS

6.5.1 General

Intersections should be as near as possible to right angles. Roads shall not intersect at an angle of less than 70º nor more than 110º.

Intersections on curves near the crest of hills are to be avoided.

The minimum spacing between T-intersections shall be 60 m.

The ideal spacing for traffic signals for flow progression at the speed limit of 50 km/h is approximately 400 m. Major intersections should therefore be spaced approximately 400 m apart or multiples thereof where feasible.

Particular attention shall be given to the minimum "Crossing Site Distance" requirements and the maximum allowable approach grades and grade transitions on minor roads at intersections.

Where a local road servicing 100 homes or more intersects a collector or arterial road, the local road shall have a minimum width of 11 m for a distance of 20 m from the end of curb return, with a 30:1 taper to meet the required design width of the local road.

6.5.2 Curb Returns

Curb return radius shall be governed by the classification of the major street at the intersection:

Street	Intersecting Street	Minimum Radius*
Collector	Arterial	9.0 m
	Collector	7.5 m
Local	Arterial	9.0 m
	Collector	5.0 m
	Local	5.0 m

* Accessibility for service and transit vehicles may require larger curb return radii. The Consulting Engineer shall consult with the Director prior to design.

6.5.3 Cross-Slope at Intersections

Cross-slope on through roads may be reduced to a minimum of 0.5% within the intersection where topography would require considerable cut at the uphill side of an intersection. The resultant variation in cross-fall of the major road should be made by smooth transition over 15 m minimum each side of the intersection. The cross slope of the minor road shall be varied to suit the profile of the major road. The maximum rate of cross-fall variation shall be 1% per 10 m on a collector road and 2% per 10 m on a local road.

6.5.4 Vertical Curves at Intersections

There shall be a smooth transition from the grade of the major road cross-section to the design grade of the minor road by means of a vertical curve, starting at the projected gutter line of the major road. Where the minor road will have a stop sign, the K value, for either sag or crest curves, shall be a minimum of 4 on a local road and 6 on a collector road. However, where this minimum K value for a sag curve is not practical for reasons of topography, it may be reduced to 2 for local roads and 4 for collector roads, providing that they are stop sign controlled and have street lighting. This reduction would only be permitted in extreme cases.

The K value is calculated as followings:

$$K = \frac{Lc}{G1-G2}$$

Where G1 and G2 are the tangent grades (%) and Lc is the length of vertical curve.

6.6 CURBS & GUTTERS

The type of curbs to be used shall be determined from the following:

Classification	Curb Type
Arterial & Collector	Barrier curb & gutter
Local (Low Density)	Roll-over curb & gutter
Local (High Density)	Barrier curb & gutter

Reverse gutter shall be used when the road cross-slope falls away form the curb.

6.7 DRIVEWAYS

Driveway crossing shall conform to the Standard Detail Drawings.

Land Use	Minimum Width	Maximum Width
Residential	4.0 m	6.5 m
Commercial/Industrial (one –way)	4.0 m	9.0 m
Commercial/Industrial (two-way)	6.0 m	11.0 m

The maximum grade on the driveway shall be 25%, except on roads servicing industrial and commercial property where it shall be 10%. Driveway grade changes are to be designed so that vehicle will not "hang up" or "bottom out". The location and elevation of the driveway at property line shall be as shown on the subdivision plan and design drawings. At the vicinity of intersections, the near side of the driveway shall be located not closer than 6 m from the property corner closest to the intersecting roads.

The layout of new subdivisions shall avoid or minimize direct driveway connections of individual residential dwelling units to arterial and collector roads. Driveways shall be planned and designed to the satisfaction of the Director.

6.8 CUL-DE-SAC

Permanent residential cul-de-sac shall conform to the Standard Detail Drawings. Industrial cul-de-sac shall be 14 m radius to curb face with a 18 m right-of-way or of the hammerhead type. Cul-de-sac in residential areas shall be provided with a landscaped island including parking provisions where required as shown on the Standard Detail Drawings. A drain from the low side of the landscaped island shall be installed to the storm drainage system.

6.9 TEMPORARY DEAD ENDS

Temporary turnarounds shall be designed for roads longer than 150 m which will requires extension in the future. Temporary turnarounds shall be paved to an 11 m radius. Hammerhead turnarounds used for temporary dead ends shall be as shown on the Standard Detail Drawings.

6.10 EMERGENCY ACCESS

Emergency access-only lanes require a 6 m wide right-of-way for an emergency access road with a minimum travel width of 4 m having structural capability to support Highway H-20 loading conditions. Fencing shall be as shown on the Detail Drawings.

6.11 LANES

Where lanes are provided they shall run straight through from road to road without corners or Tee intersections; when these are unavoidable, a 3 m by 3 m triangular right-of-way for visibility shall be dedicated at corners.

6.12 BICYCLE FACILITIES (ON-ROAD)

Bicycle lanes shall be included in the road design on routes defined in the Official Community Plan and the City's Master Transportation Plan. The minimum widths of on-road bicycle lanes are:

Conventional On-Road Bike Lane:	1.5 m
Shared –Use Vehicle/Bike Lane:	4.3m (arterial & collector), 3.5m (local)

Bicycle facilities shall be provided for two-way travel on designated bicycle routes including traffic control features. Where road closure, diversion or single lane traffic is proposed, facilities to allow for two-way bicycle travel shall be provided in consultation with the Director. All bicycle routes shall include signage and marking conforming to the latest TAC guidelines.

Design criteria for off-road bicycle paths is outlined on Part 7.

6.13 PAVEMENT STRUCTURAL DESIGN

6.13.1 General

Pavement structural design shall be based on industry best practices in consideration of traffic volumes, truck volumes, subgrade conditions, frost susceptibility, moisture conditions, travelling noise and subgrade drainage provisions. References include:

"Pavement Design and Management Guide", (TAC)

For road improvements exceeding 300m in length where a new pavement structure is required, alternate pavement structures and appurtenances, such as permeable or low-noise pavement, may be required by the Director where deemed appropriate. Project scope, topography, soil conditions, adjacent land uses, etc. will be considerations.

6.13.2 Road Life

The structural design of the road pavement shall be adequate for a minimum 20 year life under the expected traffic conditions for each class of road.

6.13.3 Design Method

Road reconstruction and asphalt overlay design shall be based on the Benkelman Beam test analysis and test holes carried out by a qualified professional geotechnical engineer on the existing road which is to be upgraded.

The design for new roads shall be based on the analysis of the results of Benkelman Beam tests and test holes carried out on adjacent roads having similar sub-grade soil condition as the proposed road. The results shall be supplemented by analysis of materials taken from test holes dug on the proposed road site at intervals of approximately 80 m and reviewed by a professional geotechnical engineer.

Regardless of the method of design used, the maximum Benkelman Beam deflection (corrected for seasonal variation) on the finished pavement when tests for final acceptance shall not be greater than 1.5 mm for local roads, 1.3 mm for collector roads, nor 0.75 mm for arterial roads.

Pavement structure shall be designed based on geotechnical requirements and design traffic. The minimum total flexible pavement structure thickness shall be 75 mm of asphaltic concrete (50 mm base course and 25 mm surface course) and 100 mm granular base and 200 mm of selected granular sub-base for lanes, local roads roads and 115 mm of asphaltic concrete (75 mm base course and 40 mm surface course), 150 mm granular base and 300 mm of selected granular sub-base for arterial and collector roads if the structural design requirements determined by the Benkelman Beam test are less than that specified herein. All road pavements in industrial areas shall meet minimum arterial road structure requirements.

Whenever a pavement is being widened, a minimum overlay of 25 mm of asphalt for blending and levelling purposes shall be required over the full pavement width, or to the centerline of the pavement if the road widening is on one side only.

Deep strength asphalt designs are acceptable provided that the minimum equivalent thickness for the pavement structure as outlined in this section is met.

Except for minor pavement widening, new pavement shall be laid in two courses. The surface course shall not be placed before building construction on adjacent lots is 80% complete or for a 1 year period from the placement of the base course which ever is earlier. Asphalt deflectors shall be installed to direct surface runoff into catch basins until the final course is paved.

6.13.4 Special Designs

Whenever compressible soils are present or when maximum probable spring rebound values greater than 12 mm are identified, standard design procedures for flexible pavements cannot be applied.

A special design, usually involving pre-loading, supported by detailed soils testing and evaluation by a qualified professional geotechnical engineer shall be submitted to the Director for acceptance.

6.13.5 Asphalt Pavement for Driveways

Asphalt pavement driveways shall be 60 mm minimum asphalt pavement thickness on minimum 75 mm thickness of 25 mm minus crushed gravel based material.

6.13.6 Concrete Pavement for Driveways

Concrete pavement driveways shall be 150 mm minimum concrete pavement thickness on minimum 75 mm thickness of 25 mm minus crushed gravel base material.

6.13.7 Alternative Surface Treatments for Driveways

Alternative surface treatments for driveways such as permeable pavements or paver stones may be accepted by the Director.

6.14 SHOULDERS

When called for, paved or gravel shoulders shall be designed for the same load carrying capability as the adjacent road.

DESIGN CRITERIA

PART 7

SIDEWALKS, WALKWAYS, BIKEWAYS AND BOULEVARDS

SIDEWALKS, WALKWAYS, BIKEWAYS AND BOULEVARDS

7.1 SIDEWALKS

Concrete sidewalks shall be located within dedicated road allowances. For the requirement of sidewalks, refer to Table 2, Schedule B of this Subdivision Service Bylaw. Sidewalks shall be:

Locations	Minimum Width
Inlet Centre and Moody Centre Downtown Core arterial roads:	2.15m[1]
Inlet Centre and Moody Centre Downtown Core collector and local roads (except single family residential areas)	1.9m[1]
St. Johns Street	2.15m[1]
Commercial Areas	2.15m[1] or separated from curb
All other locations	1.5 m

1. includes 0.2 m wide soldier course banding on each side.

Sidewalks on arterial and collector routes should be separated from the curb with a utility strip wherever possible.

Sidewalks in designated areas with soldier course banding shall be installed with concrete "Holland" paver edging on each side, perpendicular to the sidewalk run. The paver colour shall be approved by the Director. The paver edge shall be on a concrete bedding poured with the sidewalk.

7. 2 WHEELCHAIR RAMPS

Wheelchair ramps shall be provided at all intersections wherever a walkway or sidewalk is separated from a roadway by barrier curbs. Low profile ramps shall be provided for median and delta islands to improve accessibility.

A catchbasin shall be located to intercept the water flowing in the gutter in advance of a wheelchair ramp.

7.3 WALKWAYS

Walkways separated from the road shall have a minimum right-of-way of 2.4 m and clear walking width not less than 1.5 m. The maximum desirable grade and cross-fall are 7% and 4% respectively. However, where the desirable grade cannot be obtained due to topographic restraints, the grade may be increased up to 12%. Where the maximum grade cannot be attained, a special design, including stairs, will be required.

Walkways may be surfaced with concrete, asphalt or pavers as approved by the Director.

7.4 BIKEWAYS (OFF-ROAD)

Bike routes should connect major destinations within the community and should utilize local and collector roads where possible. Where an off-road bike route is defined in the Official Community Plan and the City's Master Transportation Plan, the minimum widths are:

a) one-way	-	1.5 m
b) two-way, light use	-	2.5 m
c) two-way, heavy use	-	3.0 m

A two-way major bikeway will typically consist of two 1.5 m wide lanes separated by a landscaped median. Grades and cross-fall shall be similar to those specified for walkways. Surfacing shall be concrete, asphalt or crushed limestone, as approved by the Director.

7.5 WALKWAY AND BIKEWAY FENCING

Walkways and bikeways separated from the road in residential areas shall be provided with a chain link fence on both sides as shown in the Standard Detail Drawings. Each end of such walkway or bikeway, where it meets a road or other point of possible vehicular access, shall have baffles as shown in the Standard Detail Drawings. Where wooden fences are preferred by the City, they may be substituted for the chain link fence provided the fence meet the requirements of the City.

7.6 BOULEVARDS

Boulevards shall be provided within the road right-of-way with a 2% slope rising from the top of curb or back of sidewalk to the property line. This boulevard area shall be provided with topsoil and sod, except in the designated areas where a concrete utility strip is specified, to match the adjacent sidewalks and landscaped planting area. Landscaping including groundcover and street trees

shall be designed to the satisfaction of the Director. All drainage within the right-of-way collected on boulevards shall be directed to an adequately sized storm drainage collection system.

7.7 RETAINING WALLS

Retaining structures may be required within road or lane rights-of-way to support roads, utilities, buildings or structures, or to create a useable building envelope. The requirement for retaining structures shall be determined on the basis of a lot grading plan submitted for each development.

Design drawings for retaining structures must be prepared and certified by a qualified structural or geotechnical engineer. Building permit schedules are required for structures in excess of 1.2 m in height. Certification of inspection by the Consulting Engineer may be required by the Director, as a condition of approval.

Handrail or fencing shall be installed on retaining walls where adjoining hazards are deemed significant.

DESIGN CRITERIA

PART 8

STREET LIGHTING SYSTEM

INDEX

STREET LIGHTING

8.1 GENERAL

Street lights must be installed as required in Table 1 of Schedule B of this Bylaw and conform to neighbourhood plans where applicable. All street lights shall be designed by a qualified Professional Engineer. A copy of the lighting calculations shall be submitted to the City.

The design criteria and materials to be used are different for established areas including the Moody Centre Downtown Core, Inlet Centre and North Shore neighbourhoods of the City. The Director will advise the Consultant Engineer of the appropriate design criteria and materials.

8.1.1 Established Areas

Areas classified as "established areas", shall generally be those areas which are almost fully developed with the exception of areas described below.

8.1.2 Moody Centre Downtown Core and Inlet Centre

Moody Centre Downtown Core and Inlet Centre areas generally have special types of decorative lighting differing from the standard poles and luminaries used in other established areas. Layout and design drawings shall be submitted to the City, with complete architectural and structural data and computer design proof of photometrics, for review and acceptance

8.1.3 North Shore Neighbourhoods (NSN)

North Shore Neighbourhoods shall generally include Heritage Mountain and Heritage Woods.

8.2 ILLUMINATION LEVELS

Luminaries shall be high pressure sodium (HPS) unless otherwise approved by the Director. The minimum levels of illumination in average maintained lux when the light source is at its lowest output shall be as follows:

Road Classification	Adjacent Land Use	Luminaire Wattage	Min. Average Maintained Illumination (lux)	Max. Uniformity Ratio (Avg:Min)	Spacing Pattern
Arterial	Residential S.F.	150 or 250	10	3:1	Opposite or Staggered
	Residential M.F.	150 or 250	14	3:1	Opposite or Staggered
	Commercial	150 or 250	20	3:1	Opposite or Staggered
	Mixed Use	150 or 250	17	3:1	Opposite or Staggered
	Industrial	150 or 250	6	3:1	Opposite or Staggered
Collector	Residential S.F.	150	6	3:1	Staggered
	Residential M.F.	150	9	3:1	Staggered
	Residential (NSN)	150	0.7	15:1[2]	Staggered
	Commercial	150	12	3:1	Staggered
	Industrial	150 or 250	6	3:1	Staggered
Local	Residential S.F.	150	4	6:1	On one side[1]
	Residential M.F.	150	6	6:1	On one side[1]
	Residential (NSN)	150	0.5	15:1[2]	On one side[1]
	Commercial	150	9	3:1	Staggered
	Industrial	150 or 250	6	3:1	Staggered

1. on the side of sidewalk when sidewalk is required
2. Uniformity ratio of maximum:minimum

8.3 POLES

Ornamental street lighting poles shall be octagonal steel davit poles as per the Standard Detail Drawings. The pole structure shall be designed to withstand wind loads equivalent to 160 km/hr peak wind pressure at yield strength of the material with a safety factor of 1.4 using the recommended luminarie's projected area.

Poles shall be located as shown on the Standard Detail Drawings. The pole location shall not interfere with driveways, overhead wiring, street trees or underground services. The spacing of poles shall be such that intersections and walkways are illuminated. Separate ornamental lighting of walkways and bikeways shall be provided.

Colour of powder-coating for poles to be approved by the Director.

a) Pole heights in established areas shall be 9.14 m for arterial roads or major collector roads and 7.62 m for minor collector or residential roads.

b) Special ornamental poles are required along St. Johns Street commercial area and within Inlet Centre, except single family residential areas. They include flat glass type davit luminaries, pedestrian lighting, two sets of banner hangers and a receptacle for decorative lighting.

   The design standards for the Moody Centre Downtown Core west of Moody Street shall include 16 sides steel poles (8.5m high davit style with a rear mounted pedestrian scale light and/or 3.1m high post top style pedestrian scale light). Davit style poles shall be provided with two sets of banner hangers and a receptacle for decorative lighting.

   Pole-mounted Irrigated planter basket hangers may also be required. The Director will advise the Consulting Engineer on the appropriate pole type in the above referenced areas.

c) Special poles are required in North Shore Neighbourhoods. Luminaries for arterial roads shall be flat glass type 250 watt high pressure sodium type, with refractor of medium semi cut-off type III distribution. Luminaries for collector and local roads shall be post-top style, 150 watt high pressure sodium type, with sharp cut-off below 78 degrees and house side shield. The Director will advise the Consulting Engineer on the appropriate pole type in these areas.

Within a residential cul-de-sac, a pole shall be located in the center of the circular island and the luminaries shall have a symmetrical distribution.

8.4 UNDERGROUND DUCTING

Underground wiring for street lights shall be designed in accordance with B.C. Hydro Specifications and conform to the Canadian Electrical Code (Part 1), bulletins issued by the B.C. Electrical Safety Branch and Provincial Electrical Inspection amendments.

The minimum depth of bury of underground ducts is 0.6 m in boulevards and 1.0 m below the finished grade of the road. Ducts in shared trench with power and telephone ducts shall be at the same depth and separated by 0.3 m.

The Consulting Engineer is responsible for the design and to obtain connection permits from B.C. Hydro.

8.5 CIRCUIT SIZE

The maximum number of street lights service by a single service base is 25. Separate circuits shall be provided for lights on each side of the road. The maximum span from a service panel is 300 m.

DESIGN CRITERIA

PART 9

MISCELLANEOUS

9.1 GEOTECHNICAL ASPECTS

9.1.1 Certain areas of the City are geotechnically sensitive, particularly the north and south slopes of the City. Glacial till areas frequently contain stratified sand layers which are often water bearing. The presence of these and sources of ground water shall be taken into account during design for both construction and post-construction phases.

9.1.2 Restriction of development adjacent to pronounced slopes and ravines is critical to the stability of those slopes. There shall be no permanent structure constructed within the specified distances of the major slopes on the North Shore (east/west) escarpment and all watercourses within the City.

The Chines Area on the south slope of the City has geotechnical restrictions due to the sensitively of the underlying soils. An owner is advised that this area may only be developed under strict geotechnical control. The Director can provide additional information upon request of the Owner.

The minimum building setbacks adjacent to ravines shall be as prescribed in the Zoning Bylaw. Greater setback may be deemed necessary based on geotechnical and environmental requirements.

The minimum building setbacks adjacent to watercourses shall be shall be as prescribed in the Zoning Bylaw. Greater setback may be deemed necessary based on geotechnical and environmental requirements. The underside of the habitable floor shall be equal or higher than the higher of:

a. 0.6 m above the 200 Year Flood Level;
b. 3.0 m above the natural boundary
c. 0.6 m above the natural ground elevation within the Noons Creek fan only.

9.1.3 No gulleys or creeks shall be filled unless they are:

a. approved by environmental regulatory agencies, and
b. small enough to incorporate into the storm sewer system, and

c. less than 3 meters deep and 30 meters wide, and
d. beyond the specified setback of the major slopes, where at the crest of a major slope, and
e. supported by a geotechnical report certifying the feasibility of the proposed works.

9.1.4 Clean storm runoff from perimeter drains, roofs, lawn basins, ditches or interceptor trenches shall be directed to ground infiltration facilities where feasible.

9.1.5 Extreme care shall be taken during and following construction to prevent uncontrolled runoff and consequent erosion of slopes.

DESIGN CRITERIA

PART 10

ON-SITE WORKS & SERVICES

INDEX

ON-SITE WORKS & SERVICES

10.1 GENERAL

This design section supplements Parts 1 to 9 of this Schedule.

This section applies to on-site Works & Services, as permitted in section 938 (7) of the Local Government Act.

For this section "subdivision" includes "development" and "street" or "highway" means "road".

10.2 CONSTRUCTION DRAWING STANDARDS

Part 2 Sections 2.3.1 and 2.3.2 are deleted and replaced with the provisions of the B.C. Plumbing Code.

Part 2 Sections 2.5.1 and 2.5.2 are deleted.

Design Drawings shall be submitted on A1 size paper with sufficient information to clearly show all details of the proposed works and services. All drawings shall be clearly legible.

All drawings shall include the following information:

Consultant's name, address and telephone number, Client's name, drawing title, drawing number, date, scale, professional engineer's seal and drawing revision data.

Part 2 Section 2.5.3 Coordinated survey design procedures are not required.

10.3 PART 1 SECTION 1.4 EXCESS AND EXTENDED CAPACITY IS DELETED.

10.4 PART 3 - SANITARY SEWER IS DELETED.

Sanitary sewers shall be designed to the B.C. Plumbing Code. Construction specification shall be as per Schedules D & E.

10.5 PART 4 - WATERWORKS IS DELETED.

Waterworks shall be designed to the B.C. Plumbing Code. Construction specification shall be as per Schedules D & E.

10.6 PART 5 – STORM DRAINAGE SYSTEM IS DELETED.

Storm drainage system shall be designed to the B.C. Plumbing Code. Construction specification shall be as per Schedules D & E.

10.7 ROAD

In addition to the relevant sections of the B.C. Building Code, the following on-site road design parameters apply:

10.7.1 Part 6 Sections 6.1 to 6.3 are deleted.

10.7.2 Part 6 Section 6.4 is deleted and replaced by:

6.4 GEOMETRIC DESIGN

6.4.1 Grades

Maximum longitudinal grades shall be 15% and the minimum longitudinal grades shall be 1 %. In areas of extreme topography an absolute maximum longitudinal grade of 18% may be approved where an alternate access route is available with a slope of less than 15% and absolute minimum longitudinal grade of 0.5% may be approved.

Lateral slopes shall be 2% with a centre crown, except that lateral slopes from 1% to 4% may be approved in extreme topographical conditions.

Vertical curves shall be symmetrical and may be omitted where the algebraic difference in grades does not exceed 2%. Horizontal curves shall not coincide with sharp vertical Curves.

6.4.2 Intersections

Intersections shall be as near as possible to right angles; roads shall not intersect at an angle of less than 70 degrees. Particular attention shall be given to the minimum "Crossing Sight Distance"

requirements and intersections on sharp horizontal or vertical curves shall be avoided.

There shall be a smooth transition from the grade of the major road cross-section to the design grade of the minor road by means of a vertical curve. Where the minor road will have a stop sign, the K value, for either sag or crest curves, shall be a minimum of 4. However, where this minimum K value for a sag curve is not practical for reasons of topography, it may be reduced to 2, providing that there is a stop sign control and street lighting. This reduction would only be permitted in extreme cases.

The K value is calculated as follows:

$$K = \frac{Lc}{G1-G2}$$

Where G1 and G2 are the tangent grades (%) and Lc is the length of vertical curve.

10.7.3 Part 6 Section 6.7: Add

"Changes in a residential driveway elevation shall be attained with smooth vertical curves with a maximum tangent grade of 25%. The minimum length of driveway necessary to attain this maximum grade is 7m. The maximum driveway rise or fall from the curb or back of sidewalk (where a sidewalk exists) shall be 0.9m in a distance of 7m. A further rise or fall of up to 0.25m may be gained for every 1 m of separation greater than 7m.

10.7.4 Part 6 Section 6.12 is deleted.

10.7.5 Part 6 Section 6.13.2: Delete

"for each class of road."

10.7.6 Part 6 Section 6.13.3: Delete

"nor 1.3 mm for collector roads or 0.75 mm for arterial roads" from the fourth paragraph.

Add "The minimum travelled width for any road shall be 6.0 m".

10.8 DELETE PART 8 AND REPLACE WITH:

8.0 STREET LIGHTING

8.1 General

Street lighting shall be required.

Pole location shall not interfere with driveways, or underground services. The spacing of poles shall be such that intersections and walkways are illuminated.

8.2 Illumination Levels

Level of illumination to be minimum 0.4 lux with an uniformity ratio (max:min) of 20:1.

8.3 Poles

Poles shall be designed to withstand wind loads equivalent to 160 KPH peak wind pressure at yield strength of the material with a safety factor of 1.38 using the recommended luminaire's projected area.

8.4 Materials

All materials utilized for Street lighting shall be supplied and installed as specified in the Canadian Electrical Code current edition.

A permit shall be obtained from the Provincial Safety Engineering Services Division and the completed Electrical Safety Branch Authorization form provided to the City.

SCHEDULE D

GENERAL CONSTRUCTION REQUIREMENTS

GENERAL CONSTRUCTION REQUIREMENTS

1.0 Interpretation

No construction shall take place until such drawings have been "Accepted for Construction Purposes" by the Director.

Where there is a conflict between the design drawings and the Standard Specifications or Standard Detail Drawings, the "Accepted for Construction Purposes" drawings shall take precedence.

2.0 Existing Monuments, Benchmarks, Survey Pins and Stakes

Existing survey monuments, property stakes and pins, and benchmarks shall be fully protected and preserved. If they are damaged or disturbed by the Owner, he shall, unless the Director has declared the monument or benchmark to be redundant, bear all costs incurred in re-establishing them. The City will re-establish any damaged or disturbed monuments at the cost of the Owner.

3.0 Schedule

Before commencement of the works and services, the Owner shall make arrangements to hold a pre-construction meeting with the City Engineering staff. At this time, the Owner shall submit a construction schedule satisfactory to the Director showing the completion dates of the various parts of the works and services. While some variation of this construction schedule, necessitated by unforeseen conditions or circumstances is acceptable, the average rate of progress of each portion of works and services shall be maintained in close conformity with the schedule provided.

4.0 Testing of Materials and Completed Works and Services

Where doubts arise with respect to whether or not the completed works and services meet the Design Criteria, Specifications or Standard Detail Drawings of this Bylaw, the Director may order that quality assurance tests be carried out by an independent qualified professional engineer. The costs of such test(s) shall be paid by the Owner.

The Owner shall also supply representative samples of materials as and when requested by the City for the purpose of testing, at no cost to the City.

5.0 Personnel and Equipment for Measurement, Inspection and Testing

The Owner shall provide, at the Owner’s expense, a qualified person and whatever equipment is required by the Director in connection with the survey, measurements, checking, inspections and testing of the works and services. This person shall be made available during normal working hours, upon request.

6.0 Services for the Owner’s Plant Equipment and Work Force

The Owner shall be responsible for the supply, maintenance and removal of whatever electric, telephone, water, sanitation or disposal facilities required during construction.

7.0 Progress of Work

The Owner shall perform the work on each section of sanitary and storm sewer main, water main, roadway, sidewalk, walkway, bikeway and curb and gutter, street lighting and underground wiring continuously until completion.

For sanitary and storm sewer mains, the term “section” means that portion of work from manhole to manhole inclusive.

For water main, the term “section” means that portion of work between any adjacent line valves.

For roadway, sidewalk, curb and gutter, the term “section” means that portion of work between intersections.

8.0 Inspection

During construction and installation, the Owner shall call for periodic inspection of the work at the following minimum stages and more frequently if deemed necessary by the Director.

a) Prior to covering of each underground utility.
b) Prior to any utility tie-in to existing City facilities.
b) At the completion of sub-grade preparation and testing.
c) At the completion of sub-base course compaction and testing.
d) At the completion of base course compaction and testing.
e) Prior to curbing, sidewalk, walkway and bikeway construction.
f) Prior to paving.

Each stage shall be approved by the Director prior to proceeding with the next stage of construction. This inspection request shall be accompanied by supporting documentation from the Consulting Engineer, including test results.

9.0 Hours of Work

Unless otherwise approved by the Director, the Owner shall not execute any work requiring the City's field monitoring outside the normal working hours of city staff. Costs for city field monitoring outside the normal working hours, if approved, shall be paid by the Owner.

10.0 Testing

Unless otherwise authorized by the Director, testing of all newly constructed water, sewer mains and services shall be completed in the presence of designated city representative prior to connection to any existing City's main.

Testing of mains and service connections to the property line shall be done following road base construction completion.

11.0 Oral Agreements

No oral instruction, objection, claim or notice by any party to the others shall affect or modify any of the terms or obligations contained in the Bylaw or accepted drawings and none shall be held to be waived or modified by reason of any act whatsoever other than by a waiver or modification in writing.

12.0 Corrective Action by the City

Corrective action may be taken by the City when, in the opinion of the Director, a condition exists that could be potentially hazardous to the public or cause property damage. This corrective action may be taken without notice being sent to the Owner and all costs for this correction shall be paid by the Owner.

13.0 Clean-up

13.1 Ongoing Clean-up

The Owner shall at all times keep the construction site and adjacent haul roads in an orderly and tidy manner and shall remove any accumulation of rubbish or other materials as the work progresses.

13.2 Final Clean-up

Upon completion and before final inspection of the works and services, the Owner shall remove or otherwise dispose of all rubbish, surplus or discarded material, rock, falsework, temporary structures and all equipment and machinery, and shall leave the work site in a clean and tidy condition.

13.3 Final Surface Restoration

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 Owner to a condition equivalent to or better than that which existed before the work commenced. Proof of the existing condition of any works or services rests with the Owner. A request to the City for inspection to establish the preconstruction condition, prior to commencement of construction, shall be made by the Owner. Where no inspection was requested, the Director shall determine the acceptability of the restored works and services.

Existing traffic regulatory signs and posts, if removed, damaged or disturbed shall be reinstated immediately.

13.4 Release Letter for Works and Services on Private Properties

Where the Owner is required to provide works and services within easements and statutory rights-of-way, the Owner shall provide a written letter of release, signed by the owner of the property so affected, to signify the property has been restored to the owner's complete satisfaction.

14.0 Acceptance of Works and Services

No works and services will be accepted by the City until the installation of all required works and services have been satisfactorily constructed in accordance with the "Accepted for Construction Purposes" drawings, Standard Specifications, Standard Detail Drawings and completion of the one (1) year performance test. The Owner will continue to be fully responsible for the condition of works and services, except normal wear and tear, until such time that the works and services are accepted by the City. Such acceptance shall be signified by the Issuance of an "Acceptance Certificate" by the Director.

15.0 Public Safety and Avoidance of Damage to Property

The Owner shall comply with all the requirements of Work Safe B.C. and the Workers' Compensation Act of the Province. The Owner shall take all reasonable steps and precautions to eliminate injury to persons and to avoid or minimize damage to property, completed or partly completed works and services. This shall include the provision and erection of suitable barricades, safety fences, warning signs, lighting, watchmen, etc. The Owner shall ensure that all work shall be done in a manner that will avoid damage to adjacent property.

The Owner shall obtain a "Highway Use Permit" issued by the Director, as authorized In Bylaw No. 1528, Section 6.9 "City of Port Moody Street, Traffic and Public Places Bylaw 1981". The Owner shall pay to the City the amount of the fee and damage deposit, as determined by the Director, to ensure the highway is maintained to the satisfaction of the City.

The Owner shall provide and maintain adequate signage and traffic control devices, as required by the Director, to ensure the safe passage of vehicular and pedestrian traffic and the safety of the workers and equipment used in the provision of the works and services.

16.0 Damage to Existing Works and Services

Existing works and services which are damaged as a result of the Owner's operations, agents or contractors, shall be reinstated by the City at the cost of the Owner, unless other restoration methods are provided and approved by the Director. The work of reinstating shall include not only the reinstatement of that portion of the works and services that are damaged, but also the supply and installation of new materials, where the existing materials are deemed unsuitable for re-use by the Director, retesting of the service, flushing, chlorination and any other work that is required by the Director for the satisfactory reinstatement of the works and services so damaged.

Pre-construction CCTV inspection of adjacent city underground services may be required by the Director at the cost of the Owner.

17.0 Faulty Work

Any works or services not constructed in accordance with the "Accepted for Construction Purposes" drawings and the Specifications and Standard Detail Drawings of this Bylaw will not be accepted. If there is evidence of any fault, defect or damage from any cause whatsoever, which may adversely affect the strength, durability or appearance of any section of the works and services, the Owner shall satisfactorily correct such faults, defects or damage at the Owner's expense. The Director may require that all or a portion of said works and services be removed and reconstructed in accordance with the "Accepted for

Construction Purposes" drawings, the Specifications and Standard Detail Drawings of this Bylaw.

18.0 Latent Defects appearing During One-Year Performance Test Period

Any latent defects, excepting normal wear and tear, appearing from the time that all works and services are completed to the satisfaction of the City to one year thereafter, shall be corrected to conform to the "Accepted for Construction Purposes" drawings, the Specifications and Standard Detail Drawings of this Bylaw. The Director may require that all or a portion of these works and services showing signs of latent defects be removed and reconstructed to City's satisfaction.

19.0 Weather Conditions

The Director may determine that adverse weather conditions do not permit certain portions of the work and services to be completed within the meaning and intent of the Specifications, Standard Detail Drawings of this Bylaw and the "Accepted for Construction Purposes" drawings and he/she may order the Owner to discontinue work on these portions of the work until weather conditions improve. The Owner shall comply with such order and shall stop work on those portions of the work and service and shall not continue work on those portions until permission has been received from the Director to proceed. It shall be clearly understood that the Owner shall have no claim whatsoever against the City for any delays due to stoppage of work by the Director owing to adverse weather conditions.

20.0 Accuracy of Setting-out and Positioning

The survey for setting-out and positioning of the works and services shall be undertaken by the Owner. The layout shall be verified by the Consulting Engineer to ensure that it conforms to the "Accepted for Construction Purposes" drawings and Standard Detail Drawings.

The maximum permissible deviation from the dimensions and elevations shown on the "Accepted for Construction Purposes" drawing and Standard Detail Drawings shall be as given in Schedule E: Specifications and Standard Detail Drawings of this Bylaw. The Owner shall note that all portions of the works and services shall be set out and positioned to comply with these permissible limits. If the works and services are not constructed within the limits specified, the Owner shall, at the Owner's expense, reconstruct or otherwise bear the cost of such remedial or extra work required to bring the completed works and services to within the permissible limits.

21.0 Access to Properties

Unless alternate arrangements satisfactory to those adversely affected have been made by the Owner, pedestrian and vehicular access to properties shall be maintained at all times.

22.0 Supply of Water for Flushing and Testing

The normal supply of water is from the nearest fire hydrant to the construction site. Before operating any fire hydrant, the Owner shall:

a) Obtain a hydrant use permit from the City Engineering & Operations Department.
b) Keep such written authorization at the construction site as proof that such permission has been obtained.
c) Give the Director a minimum of 24 hours prior notice of the times when the use of such hydrants will take place.

Any fire hydrants so used shall not be opened and closed by the Owner without first having an operating procedure approved by the City’s Manager of Operations.

SCHEDULE E

SPECIFICATIONS AND STANDARD DETAIL DRAWINGS

1.0 INTRODUCTION

2.0 GLOBAL SUPPLEMENTS TO MASTER MUNICIPAL CONSTRUCTION DOCUMENT (MMCD) AND CONTRACT DOCUMENTS

1.0 INTRODUCTION

All engineering works and servicing provisions are provided in accordance with the Master Municipal Construction Document (MMCD), Volume 2, Specifications and Standard Detail Drawings as amended by the City’s Supplementary Specifications and Supplementary Standard Detail Drawings (SS&SSDD).

The Specifications and Standard Detail Drawings of the 2000 edition of the Master Municipal Construction Document and the City’s Supplementary Specifications and Supplementary Standard Detail Drawings are hereby incorporated into this Bylaw.

All references to the Specifications and Standard Detail Drawings in this Bylaw shall include both the MMCD and the SS&SSDD. Where a conflict between MMCD and SS&SSDD may arise, the SS&SSDD govern.

MMCD and SS&SSDD are designed to form part of a contract between an owner and a contractor, and the specifications in both documents, either directly or by reference to their respective General Conditions, include references to the responsibilities of an owner, contractor and contract administrator. The applicability of MMCD and SS&SSDD 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, for the purposes of the Bylaw, the City places full responsibility for design, construction, installation, inspection, testing and record keeping of Works and Services on the Owner who is required to hire the Consulting Engineer to undertake duties in accordance with the Bylaw, and MMCD and SS&SSDD must be interpreted in this way.

In order to give effect to the forgoing, the following global supplementary specifications form part of this Bylaw.

This Schedule may be further supplemented by supplementary specifications and drawings submitted in connection with a specific project and approved by the Director.

In case of inconsistency, the Bylaw including its schedules and any design drawings and specifications approved by the Director for a specific project take precedence over Supplementary Specifications and Supplementary Standard Detail Drawings which take precedence over MMCD.

2.0 GLOBAL SUPPLEMENTS TO MMCD AND SUPPLEMENTARY SPECIFICATIONS

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 “Owner’s Consulting Engineer”;

d) replace “Contractor” with “Owner”;

e) replace “Contract Documents” with “City of Port Moody Subdivision and Development Servicing Bylaw and design drawings ‘accepted for construction purposes’ by the Director”;

f) replace “Contract Drawings” with “design drawings ‘accepted for construction purposes’ by the Director”;

g) replace “Supplementary Specifications” with “City of Port Moody Supplementary Specifications and Supplementary Standard Detail Drawings”.